THE SUN ABOVE, THE FUTURE AHEAD

CONFERENCE PROGRAM

JULY 26-29, 2021 | PACIFIC DAYLIGHT TIME
Through EngineeringCAS, institutions can **increase their reach and exposure, better communicate with applicants and analyze trends**. ASEE is happy to partner with Liaison on this useful tool for shaping the quality, variety and quantity of graduate engineering applicants.

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**Are you reaching, engaging and enrolling the students who will solve tomorrow’s engineering problems?**

Connect with Managing Director Ron Hyman at [drift.me/ronhyman](http://drift.me/ronhyman) to see how EngineeringCAS can help.

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[lnedu.com/EngCAS](http://lnedu.com/EngCAS)
It is my honor, as ASEE President, to welcome you to the 128th ASEE Annual Conference.

This will be our second and, almost certainly, final virtual conference. While we know there are limits to a virtual platform, by now we’ve learned to navigate online events to make the most of our experience. Last year’s ASEE Annual Conference was a success by almost any measure, and all of us—ASEE staff, leaders, volunteers, and you, our attendees—contributed to a great meeting. We are confident that this year’s event will be even better.

Whether attending in person or on a computer, one thing remains the same, and that’s the tremendous amount of great content that ASEE’s Annual Conference unfailingly delivers. From our fantastic plenary speakers, paper presentations, and technical sessions to our inspiring lineup of Distinguished Lectures and panel discussions, you will have many learning opportunities and take-aways.

I hope you enjoy this week’s events and please feel free to “find” me and reach out with any questions or comments!

Sincerely,

SHERYL SORBY
ASEE President 2020-2021
# Table of Contents

## 2021 ASEE Virtual Conference and Exposition Program

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASEE Board of Directors</td>
<td>4</td>
</tr>
<tr>
<td>Conference-at-a-Glance</td>
<td>6</td>
</tr>
<tr>
<td>Conference Highlights</td>
<td>8</td>
</tr>
<tr>
<td>Action on Diversity Sessions</td>
<td>20</td>
</tr>
<tr>
<td>ABET Sessions</td>
<td>24</td>
</tr>
<tr>
<td>Monday Workshops</td>
<td>27</td>
</tr>
<tr>
<td>Sponsor Technical Sessions</td>
<td>33</td>
</tr>
<tr>
<td>Sponsors</td>
<td>42</td>
</tr>
<tr>
<td>Registration Information and Fees</td>
<td>45</td>
</tr>
<tr>
<td>Technical Information</td>
<td>46</td>
</tr>
<tr>
<td>2021 ASEE Program Chairs</td>
<td>47</td>
</tr>
<tr>
<td>Future ASEE Annual Conference and Exposition Dates and Sites</td>
<td>49</td>
</tr>
</tbody>
</table>

## Conference Sessions

<table>
<thead>
<tr>
<th>Date</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday, July 26</td>
<td>50</td>
</tr>
<tr>
<td>Tuesday, July 27</td>
<td>103</td>
</tr>
<tr>
<td>Wednesday, July 28</td>
<td>175</td>
</tr>
<tr>
<td>Thursday, July 29</td>
<td>243</td>
</tr>
<tr>
<td>Sponsor Groups</td>
<td>299</td>
</tr>
<tr>
<td>Author Indices</td>
<td>320</td>
</tr>
</tbody>
</table>

ASEE online session locator can be found at [www.asee.org/osl](http://www.asee.org/osl).
President
Sheryl Sorby
Professor of Engineering Education
University of Cincinnati

Immediate Past President
Stephanie G. Adams
Dean and Lars Magnus Ericsson Chair, Erik Jonsson School of Engineering and Computer Science
University of Texas at Dallas

President-Elect
Adrienne R. Minerick
Dean, College of Computing, and Professor, Department of Chemical Engineering
Michigan Technological University

First Vice President, Vice President, External Relations
Agnieszka Miguel
Associate Professor and Chair, Electrical and Computer Engineering
Seattle University

Vice President, Finance
Doug Tougaw
Leitha and Willard Richardson Professor of Engineering, Department Chair of Electrical and Computer Engineering
Valparaiso University

Vice President, Member Affairs
Brian Self
Professor of Mechanical Engineering
California Polytechnic State University, San Luis Obispo

Vice President, Professional Interest Councils, Chair, Professional Interest Council IV
Beth Holloway
Assistant Dean for Diversity and Engagement, Leah H. Jamieson Director of Women in Engineering, Assistant Professor, Mechanical Engineering (by courtesy), College of Engineering
Purdue University

Vice President, Institutional Councils, and Chair, Corporate Member Council
Dan Sayre
President
New World Associates, LLC

Chair, Engineering Technology Council
Carol Lamb
Professor and Director, School of Engineering Technology
Youngstown State University

Chair, Engineering Research Council
Chuck Bunting
Associate Dean for Engineering Research and Professor
Oklahoma State University

Schedule subject to change. Please go to https://2021asee.pathable.co/ for up-to-date information.
Chair, Engineering Deans Council
Cammy Abernathy
Dean, Herbert Wertheim College of Engineering
University of Florida

Chair, Professional Interest Council I
Christi Patton Luks
Professor of Chemical and Biochemical Engineering
Missouri University of Science and Technology

Chair, Professional Interest Council II
Chell Roberts
Dean, Shiley-Marcos School of Engineering
University of San Diego

Chair, Professional Interest Council III
John K. Estell
Professor of Computer Engineering and Computer Science
Ohio Northern University

Chair, Professional Interest Council V
Maureen Barcic
Director of Cooperative Engineering, Swanson School of Engineering
University of Pittsburgh

Chair, Council of Sections, Zone I
Pritpal Singh
Professor of Electrical and Computer Engineering
Villanova University

Chair, Council of Sections, Zone II
John Brocato
Lecturer, Technical Communication, School of Chemical, Materials, and Biomedical Engineering, College of Engineering
University of Georgia

Chair, Council of Sections, Zone III
Kenneth Van Treuren
Associate Dean of Research and Faculty Development and Professor of Mechanical Engineering
Baylor University

Chair, Council of Sections, Zone IV
Lily Gossage
Director, Maximizing Engineering Potential, College of Engineering
California State Polytechnic University, Pomona

Executive Director
Norman L. Fortenberry
American Society for Engineering Education

ASEE online session locator can be found at www.asee.org/osl.
MONDAY, JULY 26

8:00 A.M.

2020/2021 ASEE Board of Directors Meeting 8:00 am – 3:00 pm

9:00 A.M.

Conference Workshops 9:00 am – Noon

10:00 A.M.

11:00 A.M.

12:00 P.M.

Technical Session 1:15 pm – 2:45 pm

1:00 P.M.

Technical Session 3:00 pm – 4:30 pm

2:00 P.M.

3:00 P.M.

ASEE General Body, Financial Town Hall and ASEE 101 Session 3:00 pm – 4:30 pm

4:00 P.M.

5:00 P.M.

Division Social Events (Optional)

6:00 P.M.

TUESDAY, JULY 27

8:00 A.M.

Plenary Featuring Keynote Address 8:00 am – 8:45 am

9:00 A.M.

Grand Challenges Demand Fearless Ideas – Presented by University of Maryland 8:55 am – 9:40 am

10:00 A.M.

11:00 A.M.

Technical Session & Business Meeting 9:45 am – 11:15 am

12:00 P.M.

Technical Session & Business Meeting 11:30 am – 1:00 pm

1:00 P.M.

NETWORKING SESSION 1:00 pm – 1:45 pm

2:00 P.M.

Technical Session & Business Meeting 1:45 pm – 3:15 pm

3:00 P.M.

Technical Session & Business Meeting 3:30 pm – 5:00 pm

4:00 P.M.

Interdivisional Town Hall 3:30 pm – 5:00 pm

5:00 P.M.

Division Social Events (Optional)

6:00 P.M.
# 2021 ASEE Virtual Conference

## Conference-at-a-Glance

### Wednesday, July 28

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:00 am – 8:00 am</td>
<td>Division Business Meetings Only (Optional)</td>
</tr>
<tr>
<td>8:00 am – 9:30 am</td>
<td>Technical Session &amp; Business Meeting</td>
</tr>
<tr>
<td>9:45 am – 11:15 am</td>
<td>Sponsor Tech Sessions &amp; ASEE Division Poster Sessions</td>
</tr>
<tr>
<td>11:30 am – 1:00 pm</td>
<td>Plenary Featuring Corporate Member Council Industry Day Keynote Speaker</td>
</tr>
<tr>
<td>1:00 pm – 1:45 pm</td>
<td>Networking Session</td>
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<tr>
<td>1:45 pm – 3:15 pm</td>
<td>Technical Session &amp; Business Meeting</td>
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<tr>
<td>3:30 pm – 5:00 pm</td>
<td>Technical Session &amp; Business Meeting</td>
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<td>Division Social Events (Optional)</td>
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### Thursday, July 29

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<tr>
<th>Time</th>
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<tr>
<td>7:00 am – 8:00 am</td>
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<tr>
<td>8:00 am – 9:30 am</td>
<td>Technical Session &amp; Business Meeting</td>
</tr>
<tr>
<td>9:45 am – 11:15 am</td>
<td>Sponsor Tech Sessions &amp; NSF Grantees Poster Sessions</td>
</tr>
<tr>
<td>11:30 am – 1:00 pm</td>
<td>ASEE Awards Ceremony</td>
</tr>
<tr>
<td>1:00 pm – 1:45 pm</td>
<td>Networking Session</td>
</tr>
<tr>
<td>1:15 pm – 3:15 pm</td>
<td>Nominating Committee</td>
</tr>
<tr>
<td>1:45 pm – 3:15 pm</td>
<td>Distinguished Lecture Series</td>
</tr>
<tr>
<td>3:30 pm – 5:00 pm</td>
<td>Technical Session &amp; Business Meeting</td>
</tr>
<tr>
<td>3:30 pm – 5:00 pm</td>
<td>New Board Orientation</td>
</tr>
<tr>
<td></td>
<td>ASEE President’s Farewell Reception</td>
</tr>
</tbody>
</table>

ASEE online session locator can be found at [www.asee.org/osl](http://www.asee.org/osl).
2021 ASEE VIRTUAL CONFERENCE
CONFERENCE HIGHLIGHTS

M360·GREET THE STARS!
New Members and First-time Attendees Orientation

MONDAY, JULY 26, 2021 NOON TO 1:00 P.M.
Moderator
Nathan Kahl, ASEE Managing Director of Communications and Society Advancement
Speaker
Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo, ASEE Vice President of Member Affairs

M543·ASEE Financial Town Hall & General Body Meeting

MONDAY, JULY 26, 2021 3:00 TO 4:30 P.M.
Open to all attendees.
Moderator
Nathan Kahl, ASEE Managing Director for Communications and Society Advancement
Speakers
Dr. Sheryl A. Sorby, University of Cincinnati, ASEE President
Dr. Adrienne Minerick, Michigan Technological University, ASEE President-Elect
Dr. Stephanie G. Adams, University of Texas at Dallas, ASEE Immediate Past President
Dr. Doug Tougaw P.E., Valparaiso University, ASEE Vice President of Finance
Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo, ASEE Vice President of Member Affairs
Joseph E. Dillon, ASEE Chief Financial Officer

T143·TUESDAY PLENARY
Sponsored by Autodesk

TUESDAY, JULY 27, 2021 8:00 TO 8:45 A.M.
Moderators
Dr. Sheryl A. Sorby, ASEE President
Mrs. Dora Smith, Chair-elect, ASEE Corporate Member Council

In June 2020, ASEE President Sheryl Sorby challenged members to review the current state of engineering and engineering technology education in preparing engineers and formed a steering committee to identify ways to fundamentally improve access, diversity, and student success. In this presentation, members of the steering committee will outline efforts to develop recommendations for systemic engineering curriculum changes along with a guide to share with ASEE members and others on creating the Engineering Mindset of the Future.

Speakers
Dr. Gary R. Bertoline, Purdue Polytechnic Institute

Gary R. Bertoline is the dean of the Polytechnic Institute and a distinguished professor of computer graphics technology and computer and information technology at Purdue University. He earned his Ph.D. at Ohio State University and was on the faculty in the College of Engineering for three years before joining the Purdue faculty in 1990. He served as founding department head of Computer Graphics Technology and then led the creation of the Rosen Center for Advanced Computing and the Envision Center for Data Perceptualization.

Bertoline cofounded the Indiana Next Generation Manufacturing Competitiveness Center (INMaC) as well as the Purdue Polytechnic Institute initiative—a major effort to transform the learning experience of students to better prepare graduates for life and work in the digital age. He also is the visionary leader of the Purdue Polytechnic charter high schools located in Indianapolis and South Bend, which aim to help close the educational gap for many underserved Indiana students.

The author of numerous papers in journals and trade publications on engineering and computer graphics, computer-aided design, and visualization research,
Bertoline has authored and co-authored seven textbooks in the areas of computer-aided design and engineering design graphics. One, *Fundamentals of Solid Modeling and Graphics Communication*, is currently in its 7th edition. His research interests are in scientific visualization, interactive immersive environments, intelligent manufacturing, distributed and grid computing, workforce education, and STEM education. Before entering higher education, Bertoline was a middle and high school technology teacher for seven years in Ohio.

Kelly J. Cross, *University of Nevada, Reno*

Kelly J. Cross, an assistant professor of chemical engineering at the University of Nevada, Reno, is a culturally responsive practitioner, researcher, and educational leader. She earned her bachelor’s of science in chemical engineering from Purdue University in 2007 and master’s of science in materials science and engineering from the University of Cincinnati in 2011. After completing the doctoral program in the Engineering Education Department at Virginia Tech in 2015, Cross was a postdoctoral researcher with the Illinois Foundry for Innovation in Engineering Education at the University of Illinois at Urbana-Champaign, where she worked to redesign the bioengineering curriculum through the NSF Revolutionizing Engineering Departments (RED) program. A member of the ASEE Leadership Virtual Community of Practice (LVCP) that organizes and facilitates Safe Zone Training workshops, Cross has conducted workshops on managing personal bias in STEM and promoting inclusion in higher education, online and in-person. Her research interests include diversity and inclusion in STEM, identity construction, intersectionality, teamwork and communication skills, and educational assessment. Her teaching philosophy focuses on student-centered approaches, such as problem-based learning and culturally relevant pedagogy. Her complementary professional activities promote inclusive excellence through collaboration.

Joel Alejandro Mejia, *University of San Diego*

Joel Alejandro (Alex) Mejia is an assistant professor of integrated engineering at the University of San Diego. His current research investigates the funds of knowledge of Latinx adolescents and how they use these funds of knowledge to solve engineering problems in their communities. He is particularly interested in how Latinx adolescents bring forth unique ways of knowing, doing, and being that provide them with particular ways of framing, approaching, and solving engineering problems. He is also interested in engineering and literacy education for equity, engineering literacies in K-16 settings, equity-oriented instructional strategies that support engineering activity, the use and application of critical theories in engineering education, and the development of critical consciousness in engineering through social justice. In spring 2019, Mejia was awarded a National Science Foundation CAREER grant to promote Latinx success in the field of engineering. This is NSF’s most prestigious award in support of faculty who have the potential to serve as academic role models in research and education and the first ever NSF CAREER grant awarded at USD’s Shiley-Marcos School of Engineering. A former Gates Millennium Scholar and CADRE Fellow, Mejia received his Ph.D. in engineering education from Utah State University, M.S. from the University of Utah, and B.S. from the University of Texas at El Paso.

Karan Watson, *Texas A&M University*

Karan L. Watson has served as provost and executive vice president at Texas A&M University since July 28, 2009 (interim for 18 months). She previously served as vice provost at Texas A&M University from December 2008 to July 2009 and as dean of faculties and associate provost from February 2002 to December 2008. She joined the faculty of Texas A&M University in 1983 and is currently a Regents Professor in the Department of Electrical and Computer Engineering and in the Department of Computer Science and Engineering. Before assuming the position of dean of faculties and associate provost, she served as the associate dean for graduate studies in the College of Engineering. She also served the Look College as associate dean for academic affairs and as a member of the faculty senate. She was interim
vice president and associate provost for diversity from November 2005 to September 2006, a role that she again held from December 2008 until July 2009. She is a fellow of the Institute of Electrical and Electronic Engineers (IEEE), the American Society for Engineering Education, and of ABET. Her awards and recognitions include the U.S. President’s Award for Mentoring Miniors and Women in Science and Technology, the American Association for the Advancement of Science mentoring award, the IEEE International Undergraduate Teaching Award, the College of Engineering Crawford Teaching Award, and two University-level distinguished achievement awards from the Texas A&M University Association of Former Students—one in Student Relations in 1992 and one in Administration in 2010. She has chaired the graduate committees of 34 doctoral students and more than 60 master’s degree students. In 2003–2004, she served as a Senior Fellow of the National Academy of Engineering Center for the Advancement of Scholarship in Engineering Education. Since 1991 she has served ABET as an accreditation evaluator and an engineering accreditation commissioner, on the Board of Directors, and as ABET president for 2012-2013. She has a B.S, M.S., and Ph.D. in electrical engineering from Texas Tech University.

T199B•KEYNOTE SESSION: Grand Challenges Demand Fearless Ideas – Presented by the University of Maryland

TUESDAY, JULY 27, 2021 8:55 TO 9:40 A.M.

Moderator
Nathan Kahl, ASEE Managing Director for Communications and Society Advancement

Speaker
Dr. Darryll J. Pines, President, University of Maryland College Park

Darryll J. Pines serves as president of the University of Maryland as well as the Glenn L. Martin Professor of Aerospace Engineering. Formerly the Nariman Farvardin Professor of Engineering and dean of UMD’s A. James Clark School of Engineering, where he has been on the faculty since 1995, Pines has amassed a record of academic leadership and research accomplishments that dramatically elevated the school’s rankings and stature nationally and internationally. In 2019, he was elected to the National Academy of Engineering for his “inspirational leadership and contributions to engineering education.”

As engineering dean for 11 years, Pines instituted sweeping changes to improve the student experience, including revamping teaching in fundamental undergraduate courses; encouraging participation in national and international student competitions; emphasizing sustainability engineering and service learning; and expanding innovation and entrepreneurship activities.

Students have consistently taken top honors in the U.S. Department of Energy’s Solar Decathlon, placed fifth in Elon Musk’s global Hyperloop pod design competition, and hold the world record for human-powered flight duration. Among other out-of-the-classroom opportunities, the Clark School’s Engineers Without Borders chapter is considered one of the nation’s best. The school also launched Startup Shell, the first student-run business incubator on a university campus in the United States, and its students helped create two major hackathons, Bitcamp and Technica, the first all-female and non-binary hackathon on a university campus.

As a result of investments in targeted recruitment, advising, STEM outreach, and its signature Keystone Engineering Education Program, the Clark School’s one-year undergraduate retention rate stands at 91 percent and its five-year graduation rate at 75 percent, putting it in the top 10 among public flagship universities in the United States.

Pines also made diversity a hallmark of his tenure as dean. As a co-principal investigator, the university became a National Science Foundation (NSF) ADVANCE grant recipient to further develop a culture of inclusive excellence, focused on improving work environments, retention, and advancement of tenured and tenure-track female faculty in ways that improve the culture for all faculty. The number of tenured or tenure-track women on the engineering faculty more than doubled, from 18 to 37, while the number of underrepresented racial minority faculty members increased from 11 to 19. At the undergraduate level, the proportion of women rose from 18 percent to 26.5 percent, and the number of enrolled underrepresented minority undergraduate students grew from 9.5 percent to 16 percent. According to Diverse Issues in Higher Education, the Clark School ranks among the top 10 in conferring the most B.S., M.S., and Ph.D. degrees to African-American students.
In 2004, the National Academy of Engineering published “The Engineer of 2020: Visions of Engineering in the New Century,” which urged the engineering profession to recognize what engineers can build for the future through not just technical jobs but also a wide range of leadership roles in industry, government, and academia.

It is now 2021. Where do we go from here?

Join us as we explore positioning engineering education in preparing the next generation of engineers—the “Engineers of the 2030s.” The Town Hall Planning Committee has been engaged in a visioning process for systematically developing the “Engineers of the 2030s” framework and has come up with the following eight discussion topics:

• Being stewards of the profession
• Engineering a more just world
• Engineering as meaningful and purposeful
• Engineers as an ethical authority in a technological society
• Engineers as mentors/instructors/coaches
• Rethinking sustainability
• The Engineers of the 2030s versus the Engineers of 2020
• The ever-evolving and multifaceted engineer

Additional details regarding these topics can be found in our abstract: https://tinyurl.com/2021ASEETownHall

This session will open with brief statements pertaining to the chosen topics and proceed directly to a set of hands-on, parallel breakout sessions for sharing suggestions and generating ideas designed to focus the discussions toward generating proposed lists of actionable items. Individuals identified during the Town Hall will be asked to apply their skills, knowledge, and expertise to these action items in crafting deliverables for guiding future efforts in support of the Engineers of the 2030s initiative. These deliverables will be shared with the ASEE membership and provided to the National Academy of Engineering.

The Interdivisional Town Hall has been an exciting way for us to un-silo our communities and work together across the entire ASEE membership in advancing engineering education. Please join us this year to share your thoughts and ideas!
global manufacturing and director of manufacturing systems research at General Motors. He is responsible for global manufacturing research focused on vehicle electrification, lightweight systems manufacturing, automation, and smart manufacturing. He led a research team that played a key role in bringing the Chevy Volt advanced battery to production and has held other leadership positions in product development and manufacturing at GM, Delphi, and DaimlerChrysler, including two international assignments. He has written numerous technical publications, been granted several patents, and has a strong track record of successful manufacturing technology implementation. He was twice presented with the Boss Kettering award, GM’s highest recognition for technical innovation.

Since 1998, Abell has served in various capacities with SME, such as International Awards Committee member and chair of the Education and Accreditation Committee. He has been elected to the NAMRI board and is an SME Fellow. He is vice-chair of the Industrial Advisory Council and member of the Engineering Accreditation Commission of ABET. A licensed professional engineer, he has a bachelor’s degree in mechanical engineering from General Motors Institute (now Kettering University), and graduate degrees in systems engineering from Oakland University.

PAPERS PRESENTED:

2020 BEST OVERALL PIC PAPER (PIC III)
Do Open Ended Design Projects Motivate First-Year Engineering Students?
   Dr. Chao Wang, Arizona State University

2020 BEST OVERALL ZONE PAPER (ZONE IV)
BOOSTing Preparedness through Engineering Project-based Service Learning
   Dr. Deborah Won, California State University, Los Angeles
   Dr. Gisele Ragusa, University of Southern California
   Dr. Gustavo B. Menezes, California State University, Los Angeles
   Prof. Adel Sharif, California State University, Los Angeles
   Masood Shahverdi, California State University, Los Angeles
   Ni Li, California State University, Los Angeles
   Dr. Arturo Pacheco-Vega, California State University, Los Angeles

BEST OVERALL DIVERSITY PAPER WINNER
An Exploratory Study of Intentionality towards Diversity in STEM Faculty Hiring
   Ms. Samara Rose Boyle, Rice University
   Dr. Canek Moises Luna Phillips, Rice University
   Dr. Yvette E. Pearson P.E., Rice University
   Dr. Reginald DesRoches, Rice University
   Prof. Stephen P. Mattingly, University of Texas at Arlington
   Dr. Anne Nordberg, Owl Evaluations
   Prof. Wei Wayne Li, Texas Southern University
   Prof. Hanadi S. Rifai P.E., University of Houston

R260A-NSF Grantees Poster Session
THURSDAY, JULY 29, 2021 9:45 TO 11:15 A.M.
Authors with currently funded NSF projects dealing with engineering education and related topics will be presenting their work in a poster-style interactive format.

Moderator
Dr. Amber Genau, University of Alabama at Birmingham

R360-ASEE Annual Awards Ceremony Sponsored by the NSF America’s Seed Fund
THURSDAY, JULY 29, 2021 11:30 A.M. TO 1:00 P.M.

Moderator
Sylvie Nguyen-Fawley, ASEE Assistant Board Secretary

R443B-DISTINGUISHED LECTURE: 2020 Best PIC and Zone Papers
THURSDAY, JULY 29, 2021 1:45 TO 3:15 P.M.

Please note that the OVERALL best PIC and Zone papers are presented at the Wednesday Plenary.

Moderator
Dr. Beth M. Holloway, ASEE Vice President of Professional Interest Councils and Chair, Professional Interest Council IV
PAPERS PRESENTED

2020 BEST PIC I PAPER WINNER
Hands-on Cybersecurity Curriculum Using a Modular Training Kit

Mr. Asmit De, Pennsylvania State University
Dr. Mohammad Nasim Imtiaz Khan, Pennsylvania State University
Mr. Abdullah Ash Saki, Pennsylvania State University
Mr. Md Mahabubul Alam, Pennsylvania State University
Mr. Taylor Steven Wood, Pennsylvania State University
Dr. Matthew Johnson, Pennsylvania State University
Mr. Manoj Varma Saripalli, Pennsylvania State University
Ms. Yu Xia, Pennsylvania State University
Dr. Stephanie Cutler, Pennsylvania State University
Swaroop Ghosh, Pennsylvania State University
Dr. Kathleen M. Hill, Pennsylvania State University
Dr. Annmarie Ward,

2020 BEST PIC II PAPER WINNER
Developing a Multi-Campus Model for REU Sites

Dr. Pamela McLeod, Stanford University
Dr. Junko Munakata Marr, Colorado School of Mines
Prof. Richard G. Luthy, Stanford University

2020 BEST PIC IV PAPER WINNER
Student Perceptions of an Ethics Intervention - Exploration Across Three Course Types

Dr. Madeline Polmear, University of Florida
Dr. Angela R. Bielefeldt P.E., University of Colorado Boulder
Dr. Nathan E. Canney P.E., CYS Structural Engineers
Dr. Chris Swan, Tufts University
Dr. Daniel Knight, University of Colorado Boulder

2020 BEST PIC V PAPER WINNER
Reimagining Engineering Education: Does Industry 4.0 Need Education 4.0?

Dr. Shuvra Das, University of Detroit Mercy
Dr. Darrell K. Kleinke P.E., University of Detroit Mercy
Dr. David Pistrui, University of Detroit Mercy

2020 BEST ZONE I PAPER WINNER
The Engineers’ Orchestra: a Conductorless Orchestra for Developing 21st Century Professional Skills

Dr. Diana S. Dabby, Franklin W. Olin College of Engineering

2020 BEST ZONE II PAPER WINNER
A New Assessment Model in Mechanics of Materials

Dr. Ron Averill, Michigan State University
Sara Roccabianca, Michigan State University
Dr. Geoffrey Recktenwald, Michigan State University

2020 BEST ZONE III PAPER WINNER
Supplemental Instruction and Just-in-Time Tutoring: The Who, When, and Why Students Attend in a First-Year Engineering Course

Dr. David Joseph Ewing, University of Texas at Arlington
Mrs. Catherine Mary Unite, University of Texas at Arlington
Christina Natasha Miller, University of Texas at Arlington
Mr. Cedric Shelby, University of Texas at Arlington

2020 BEST ZONE IV PAPER WINNER
A New Assessment Model in Mechanics of Materials

Dr. Ron Averill, Michigan State University
Sara Roccabianca, Michigan State University
Dr. Geoffrey Recktenwald, Michigan State University

2020 BEST ZONE V PAPER WINNER
Reimagining Engineering Education: Does Industry 4.0 Need Education 4.0?

Dr. Shuvra Das, University of Detroit Mercy
Dr. Darrell K. Kleinke P.E., University of Detroit Mercy
Dr. David Pistrui, University of Detroit Mercy

R433-DISTINGUISHED LECTURE: Creating Inclusive and Diverse P-12 Learning Environments
THURSDAY, JULY 29, 2021 1:45 TO 3:15 P.M.

As part of the distinguished lecturer series, the Pre-College Engineering Education Division has partnered with the Minorities in Engineering and Women in Engineering Divisions to promote inclusion and diversity within the P-12 engineering education space by inviting a speaker who has many accomplishments in this area.

Dr. Renetta Garrison Tull, Vice Chancellor of Diversity, Equity, and Inclusion at the University of California, Davis, brings a wealth of knowledge and experience about inclusion and diversity in STEM education. In her distinguished lecture, she explains what we can do as an engineering education community to foster positive inclusion and diversity in different P-12 learning environments.

Moderator
Jaimie R. Gurganus, University of Maryland, Baltimore County

Speaker
Renetta Garrison Tull, University of California, Davis

Before joining UC Davis in 2019, Tull was Associate Vice Provost for Strategic Initiatives at the University of Maryland, Baltimore County

2021 ASEE VIRTUAL CONFERENCE
CONFERENCE HIGHLIGHTS

All sessions are Pacific Daylight Time
(UMBC) and Professor of the Practice in UMBC’s College of Engineering and Information Technology (COEIT). Within COEIT, she served as part of the engagement team and pursued research in humanitarian engineering. Tull was founding director and co-PI for the 12-institution National Science Foundation University System of Maryland’s PROMISE AGEP and co-director/co-PI for the NSF USM’s Louis Stokes Alliance for Minority Participation (LSAMP). She also served the University System of Maryland as special assistant to the senior vice chancellor for academic affairs and student affairs and was the system’s director of graduate and professional pipeline development. In 2017, Tull was appointed to serve as chair for the University System of Maryland’s Health Care Workforce Diversity subgroup. She has engineering and science degrees from Howard University and Northwestern University.

An international speaker on global diversity in STEM, Tull has led discussions around the world on topics such as “Inclusive Engagement – Engineering for All,” “Cultivating Inclusive Excellence within Science, Engineering, and Technology,” work/life balance, family, and prevention of domestic and workplace abuse. She co-led Puerto Rico’s ADVANCE Hispanic Women in STEM project and continues to lead the “Women in STEM Forum” for the Latin and Caribbean Consortium of Engineering Institutions (LACCEI) and the Engineering for the Americas/Organization of American States as LACCEI’s current Vice President for Initiatives.

Recognitions include the 2015 O’Reilly Media “Women in Data” cover, the 2015 Global Engineering Deans Council/Airbus Diversity Award Finalist, and the 2016 ABET Claire L. Felbinger Award for Diversity. She has been an invited plenary panelist for diversity in engineering initiatives for the 2016 International Conference on Transformations in Engineering Education in India, and an invited speaker for the International Federation of Engineering Education Societies (IFiEES) “Global Engagement in Diversity” webinar. She was also part of an invited United Nations Educational, Scientific, and Cultural Organization (UNESCO) team for the “Engineering Report II” meeting in Beijing in September 2017 hosted by the Chinese Academy of Engineering. In 2017, she was appointed to a two-year term for the National Academies for Science, Engineering, and Medicine’s committee on the Science of Effective Mentoring in Science, Technology, Engineering, Medicine, and Mathematics (STEMM). In 2018, she was invited back to the United Nations headquarters to talk about women in engineering as part of a UNESCO-sponsored event during the 62nd Session on the UN’s Commission on the Status of Women.

Tull, a Tau Beta Pi “Eminent Engineer,” has more than 50 publications and has given more than 200 presentations on various STEM topics. She also engages the public on topics related to STEM and society, and was a speaker for “Diversity, STEAM, and Comics,” where “A” adds the “arts” to STEM, at Awesome Con in March 2018. She is a passionate advocate, global mentor, education policy strategist, and champion for equity in STEM.

R460A·DISTINGUISHED LECTURE: Setting the Stage for P-12 Engineering Standards - How Our Community Can Revolutionize STEM Education for All Students

THURSDAY, JULY 29, 2021 1:45 TO 3:15 P.M.

STEM education in today’s schools comes in a variety of shapes and sizes. In many schools around the country, STEM has become just another buzzword to cover up a “business as usual” educational approach and has drifted from its original intent to transform learning for all students. No longer does STEM education require creative integration, innovation, or authentic, real-world student experiences that once defined its importance and urgency.

Engineering touches every aspect of human life, from providing access to clean drinking water to 5G telecommunications and drug/vaccine development. This presents a need to provide learning opportunities that support the next generation in becoming engineering-literate global citizens. Now, more than ever, we need to prepare and inspire our students to grow into the informed designers and innovative creators necessary to solve the toughest challenges facing the world, both today and tomorrow. Accordingly, engineering learning is essential for every child, in every school, from every town, city, and municipality in the United States.

Engineering education is well positioned to deliver on many of the forgotten promises of STEM education. Many of us within the P-12 education community recognize that there is something special about engineering learning. When given the opportunity to engineer, students of a variety of ages and backgrounds are motivated to learn and eager to engage in solving difficult problems. They work together. They communicate. They are critical and creative and resourceful. We’ve seen it with our own eyes,
experienced it as teachers and professional development coordinators, and advocated for it at parent/teacher nights, school board meetings, and legislative briefings. We know that engineering should be taught in parallel with science and math to ensure an equitable, authentic, relevant, and exciting STEM education experience. Yet there have been minimal efforts from the education community toward adopting engineering as a distinct component of every child’s schooling. The Framework for P-12 Engineering Learning is a step toward changing this reality and democratizing engineering learning across grades P-12.

In this talk, Tanner J. Huffman, executive director of the Advancing Excellence in P-12 Engineering Education (AE3) research collaborative and an assistant professor in the College of New Jersey’s integrative STEM education department, will argue that the Framework for P-12 Engineering Learning sets the stage for an educational revolution in which engineering becomes a more integral part of a child’s learning through more authentic and comprehensive educational standards. He will highlight the leverage points and work needed to realize this revolution.

**Moderator**

Geraldine Gooding, ASEE Manager for P-12 Initiatives

**Speaker**

Dr. Tanner J. Huffman, College of New Jersey

Tanner J. Huffman, the executive director of the Advancing Excellence in P-12 Engineering Education (AE3) research collaborative, is an assistant professor in the department of integrative STEM education and director of the Center for Excellence in STEM Education in the College of New Jersey’s School of Engineering. He was the editor and a primary author of the Framework for P-12 Engineering Learning (AE3 & ASEE, 2020). His research focuses on P-12 engineering learning and preservice STEM teacher education. His projects include investigating the culturally responsive and relevant teaching of engineering and age-appropriate P-12 learning sequences for engineering. As a middle and high school teacher, Huffman served as a board member of ASEE’s Pre-college Engineering Education Division. He is also an adviser for Carnegie Mellon University’s CREATE Lab Satellite Network and the NSF-funded INCLUDES project STEM PUSH Network. Huffman is the national event coordinator for the Test for Engineering Aptitude, Math, and Science (TEAMS) student competition. From 2017 to 2019, he served as a committee member on the National Academies of Sciences, Engineering, and Medicine consensus study, “Building Capacity for Teaching Engineering in K-12 Education.”

**R477·DISTINGUISHED LECTURE:**

**Black in Engineering: A Social Justice Movement for the Academy**

**THURSDAY, JULY 29, 2021 1:45 TO 3:15 P.M.**

The George Floyd murder in May 2020 heralded a battle cry heard around the world. Academia saw the emergence of grassroots Black in STEM (science, technology, engineering, and mathematics) organizations whose members convened and communicated their expertise via social media. In June, this grassroots effort was catalyzed by the “BlackInTheIvory” hashtag trending on Twitter, where historically marginalized and minoritized populations in academia shared their experiences with implicit bias, marginalization, the double bind, hypervisibility, and invisibility.

Black engineering faculty responded by creating an arm of the 400-member Academic and Research Learning (ARL) Network called Black in Engineering (BIE), which focuses explicitly on racial equity and social justice in the STEM academy. By integrating media, policy, and activism, BIE offers a common gathering place for Black engineering faculty across disciplines to communicate and highlight their work, share experiences, and present antiracist suggestions for engineering leadership, professional societies, and organizations. By amplifying these unique voices, BIE also meets a goal of diversifying the STEM academy by normalizing engineers’ experiences and work. Finally, it provides an avenue to connect with allies, sponsors, and financial support for the movement.

The combination of engineering, computing, and social justice provides an interdisciplinary perspective that is a unique and relevant skill for the engineer of the 21st century. Presenters in this distinguished lecture will engage in a candid discussion about practical strategies to transform engineering for Black faculty and students. Informed by BIE’s Call to Action, which provides system-wide antiracist recommendations for graduate students, undergraduates, faculty, and staff, the panel will present practical, timely strategies to implement and sustain change for diversity, equity, and inclusion in engineering.


2021 ASEE VIRTUAL CONFERENCE

CONFERENCE HIGHLIGHTS

Moderators

Dr. Elizabeth Litzler, Chair, ASEE Diversity, Equity, and Inclusion Commission
Ms. Rachelle Reisberg, Assistant Dean and Director of Women in Engineering, Northeastern University

Speakers

Dr. Carlotta A. Berry, Professor, Electrical and Computer Engineering, Rose-Hulman Institute of Technology

Carlotta A. Berry is a professor in the Department of Electrical and Computer Engineering at Rose-Hulman Institute of Technology and one of a team of faculty in ECE, mechanical engineering, and computer science and software engineering to create and direct the college’s first multidisciplinary minor in robotics. She is co-director of the NSF S-STEM Rose Building Undergraduate Diversity (ROSEBUD) program and an adviser for the National Society of Black Engineers. Recognitions include being selected as one of 30 Women in Robotics You Need to Know About 2020 by robohub.org, Reinvented magazine’s Interview of the Year award for “On Purpose and Passion,” Women & Hi Tech’s Leading Light award in the “You Inspire Me” category, and INSIGHT Into Diversity’s Inspiring Women in STEM. She has a special passion for diversifying the engineering profession by encouraging more women and underrepresented minorities to pursue undergraduate and graduate degrees. She feels that the profession should reflect the world that we live in to solve the unique problems that we face.

Dr. Monica Farmer Cox, Professor of Engineering Education, Ohio State University

Monica F. Cox is a professor of engineering education at Ohio State University and a 2020 American Society for Engineering Education (ASEE) Fellow. She holds degrees in Mathematics (B.S., Spelman College), Industrial Engineering (M.S., University of Alabama), and Leadership and Policy Studies (Ph.D., Peabody College at Vanderbilt University, 2005). She began her academic career in the School of Engineering Education at Purdue University, where she earned a Presidential Early Career Award for Scientists and Engineers (PECASE), becoming the first African American woman to earn tenure in Purdue’s College of Engineering. In 2016, she became professor and inaugural chair in the Department of Engineering Education at Ohio State. She is the Founder and CEO of STEMinent LLC, which houses educational assessment, professional development, and media offerings. Her research focuses on the use of mixed methodologies to explore questions across the education continuum, particularly why women persist on engineering faculties. She has led and collaborated on multidisciplinary projects totaling approximately $16 million and has authored over 130 publications.

Prof. Tahira N. Reid Smith, Purdue University at West Lafayette

Tahira Reid Smith is an associate professor in the School of Mechanical Engineering at Purdue University and a NASA Visiting Scholar for fall 2020. Her research involves the quantification and integration of human-centered considerations in engineering systems and/or the design process. Her research has been funded by the National Science Foundation, the Air Force Office of Scientific Research, Procter & Gamble, Ford, General Motors, and other sponsors. Her projects that involved the intersection of diversity and mechanical engineering have been featured in such media outlets as the National Geographic, NBC’s Today Show, Essence magazine, Reuters, National Public Radio, and many others. A highly sought out role model for the younger generation, Reid Smith’s story is featured in two children’s books and was on the 2017 New York State English and Language Arts Common Core Exam for over 100,000 fourth graders. She is passionate about rebranding mechanical engineering to be more inviting to young women, especially those of African descent. Reid Smith obtained B.S. and M.S. degrees in mechanical engineering from Rensselaer Polytechnic Institute and a Ph.D. in design science, with a focus on mechanical engineering and psychology, from the University of Michigan, Ann Arbor.

Dr. Christopher Alexander Carr, Chief Diversity Officer, Volgenau School of Engineering, George Mason University

Christopher Carr is a leadership and policy wonk in the areas of diversity, higher education, and STEM (science, technology, engineering, and mathematics). In his professional life, Carr has convened numerous social
justice leadership forums in STEM education, bringing together over 100 deans and diversity administrators to talk about marginalized students’ persistence, diverse faculty recruitment, and creating inclusive campus climates. He currently serves as the Chief Diversity Officer for the Volgenau School of Engineering at George Mason University. Previously, he worked with the National Society of Black Engineers, the American Society for Engineering Education (ASEE), and the National Science Foundation’s Graduate Research Fellowship Program. Currently the chair-elect for ASEE’s Minorities in Engineering Division, Carr previously served as the MIND program chair and as the Diversity Societies representative for ASEE’s Commission on Diversity, Equity, and Inclusion. Carr has a bachelor’s degree from William Jewell College, a Master of Public Policy degree from Pepperdine University, and a doctorate in education from Creighton University.

R414·DISTINGUISHED LECTURE: Continuing the Conversation: Working toward Antiracist Engineering Education

THURSDAY, JULY 29, 2021 1:45 TO 3:15 P.M.

Volume 109, Issue 4 of the Journal of Engineering Education highlights the work of engineering education scholars in guest editorials that address racism in engineering education history, curriculum, and research. Through the creation of that work, a recorded podcast conversation was conducted between scholars Kelly Cross, James Holly, Leroy Long, and Ebony McGee. This session, sponsored by the Educational Research and Methods Division, continues that conversation. The hope is that engaging the broader ASEE community will have the greatest impact in their engineering courses and the culture of their home institutions.

Moderator
Dr. Lisa Benson, Editor, Journal of Engineering Education

Speakers
Dr. Kelly J. Cross, University of Nevada, Reno

Dr. Kelly J. Cross, an assistant professor of chemical engineering at the University of Nevada Reno, is a culturally responsive practitioner, researcher, and educational leader. She earned her B.S. in chemical engineering from Purdue University in 2007 and an M.S. in materials science and engineering from the University of Cincinnati in 2011. Cross completed the doctoral program in the engineering education department at Virginia Tech in 2015 and worked as a postdoctoral researcher with the Illinois Foundry for Innovation in Engineering Education at the University of Illinois at Urbana-Champaign (UIUC). Cross worked to redesign the curriculum in the bioengineering department through the NSF program Revolutionizing Engineering Departments (RED) at UIUC. She is a member of the ASEE Leadership Virtual Community of Practice (LVCP) that organizes and facilitates Safe Zone Training workshops. Cross has conducted workshops on managing personal bias in STEM and promoting inclusion in higher education—online and in person. Her research interests include diversity and inclusion in STEM, identity construction, intersectionality, teamwork and communication skills, and educational assessment. Her teaching philosophy focuses on student-centered approaches such as problem-based learning and culturally relevant pedagogy. Her complementary professional activities promote inclusive excellence through collaboration.

Dr. Leroy L. Long III, Embry-Riddle Aeronautical University - Daytona Beach

Leroy Long III is an assistant professor of engineering fundamentals at Embry-Riddle Aeronautical University in Daytona Beach, Fla., where he directs a research team called Engineering, Arts & Sports Engagement (EASE). His research interests include educational equity and racial justice; student retention and career readiness; and students’ ethical reasoning and technology use, with a particular focus on STEM students. He has helped to lead research funded by an NCAA Innovations in Research and Practice Grant to improve the well-being of student athletes through support of their career readiness. He has also helped to secure funding from the National Science Foundation (award # 2024973) to examine the potential benefit of using critical narratives as a pedagogical tool in the professional formation of engineers.
Detroit native James Holly, Jr., is an educator and researcher focused on mitigating anti-Blackness in P-20 STEM education. He has a bachelor’s degree from Tuskegee University and a master’s degree from Michigan State University, both in mechanical engineering. These experiences motivated his pursuit of a doctoral degree in engineering education from Purdue University as he sought to revolutionize the conceptualization of engineering presented to urban Black youth. Holly is currently an assistant professor of urban STEM education at Wayne State University, where he trains aspiring math and science teachers to be critically conscious STEM educators who affirm the assets of urban non-White students. His research explores the complexities of teaching the STEM disciplines in an urban context, the process of developing engineering literacy among preservice teachers, and how the narratives of Black people with STEM degrees can inform equitable STEM education.

Ebony McGee, associate professor of diversity and STEM education at Vanderbilt University’s Peabody College, investigates what it means to be racially marginalized in the context of learning and achieving in STEM higher education and industry. In particular, she studies the racialized experiences and racial stereotypes affecting the education and career trajectories of underrepresented groups of color by exploring the costs of academic achievement and problematizing traditional forms of success in higher education, with an unapologetic focus on Black individuals in these places and spaces. McGee’s NSF CAREER grant investigates how marginalization undercuts success in STEM through psychological stress, interrupted STEM career trajectories, the imposter phenomenon, and other debilitating race-related trauma for Black, Indigenous, and Latinx doctoral students.

Barbara Oakley, a professor of industrial and systems engineering at Oakland University, is a best-selling author and teacher of the world’s most popular massive open online course (MOOC), “Learning How to Learn.” Oakley started studying engineering much later than many engineering students, because her original intention had been to become a linguist. Enlisting in the U.S. Army right after high school, she spent a year studying Russian at the Defense Language Institute in Monterey, California. The Army eventually sent Oakley to the University of Washington, where she received her first degree—a B.A. in Slavic languages and literature. Eventually, she served four years in Germany as a signal officer and rose to become a captain. After her commitment ended,
she decided to leave the Army and study engineering to better understand the communications equipment she had been working with.

Five years later, Oakley received a second degree: a B.S. in electrical engineering. In the meantime, she worked several fishing seasons as a Russian translator on Soviet trawlers up in the Bering Sea and wrote a book about that experience: *Hair of the Dog: Tales from a Russian Trawler.* As one of her captains used to enjoy reminding her: “You know too much, it’s time to kill you.” (It rhymes in Russian.)

Oakley also spent a season as the radio operator at the South Pole Station in Antarctica, where she met her husband of 37 years, Philip Oakley. (They were married as soon as they got “off the ice,” in New Zealand, and have two daughters as well as two adopted sons who are originally from Kosovo.) With the electrical engineering degree in hand, Oakley settled down and spent three years working as a instrumentation and controls engineer at a laser research and development firm near Seattle. The couple moved to the Detroit area in 1989, and Oakley worked for Ford briefly and then began doing consulting and attending Oakland University part time while her children were small. She received an M.S. degree in electrical and computer engineering in 1995, and a Ph.D. in systems engineering in 1998, joining the faculty upon graduation.

Oakley’s work focuses on the complex relationship between neuroscience and social behavior. She has published in outlets as varied as the *Proceedings of the National Academy of Sciences,* the *New York Times,* and the *Wall Street Journal,* which described her work as “revolutionary.” Oakley, a fellow of both the American Institute of Medical and Biological Engineers and IEEE, is the recipient of numerous honors, including Michigan Distinguished Professor of the Year (2018), ASEE’s Chester F. Carlson Award for outstanding technical innovation in engineering education (2015), and National Science Foundation New Century Scholar (1999).

**R643 · President’s Farewell Reception**

**THURSDAY, JULY 29, 2021 5:15 TO 6:15 P.M.**

Join ASEE President Sheryl Sorby as she “passes the gavel” virtually to incoming President Adrienne Minerick.
2021 ASEE VIRTUAL CONFERENCE
ACTION ON DIVERSITY SESSIONS

Safe Zone Ally Training

Safe Zone Ally Training workshops are interactive, research-informed sessions that seek to foster a more inclusive environment for LGBTQ+ individuals in STEM through building participant knowledge and skills and creating a visible network of allies. Faculty, students, administrators, staff, and other professionals are encouraged to participate.

ASEE Safe Zone Ally Training workshops are supported by the National Science Foundation through grants EEC-1539140 and EEC-1748499. To learn more and to access free ally resources, please visit https://lgbtq.asee.org.

M477·Safe Zone Ally Training - Level 1
MONDAY JULY 26, 2021 1:15 TO 2:45 P.M.

Safe Zone Level 1 focuses on understanding LGBTQIA+ concepts and the coming-out process, responding to bias, and adopting simple strategies for building an inclusive environment. For more advanced content, look for Safe Zone 2 or 3 sessions.

Moderators
Dr. Leonard J. Bohmann P.E., Michigan Technological University
Ms. Rachelle Reisberg, Northeastern University

Speakers
Dr. Adrienne Minerick, Michigan Technological University
Prof. Anthony Butterfield, University of Utah

W577·Safe Zone Ally Training - Level 3
WEDNESDAY, JULY 28, 2021 3:30 TO 5:00 P.M.

The Level 3 Safe Zone Trans Allyship workshop explores transgender-specific terms and concepts, the climate for trans individuals in society and in STEM and its broader implications, and action strategies for trans allies.

Moderators
Dr. Lynn A. Albers, Hofstra University
Ms. Rachelle Reisberg, Northeastern University

Speakers
Mr. Tiago R. Forin, Rowan University
Prof. Anthony Butterfield, University of Utah

M477B·Diversity, Equity, and Inclusion: 100
MONDAY, JULY 26, 2021 1:15 TO 2:45 P.M.

Diversity, equity, and inclusion starts with us. This session aims to answer the questions: What is DEI? Why should I care about it? What work do I need to do to become a more equitable educator? In this workshop, participants will identify ways in which we can expand our awareness through self-analysis. Participants will engage in learning activities that provide an introductory overview of DEI, including reflection on their identities, privileges, biases, spheres of influences, and beliefs related to diversity, equity, and inclusion.

Moderators
Prof. C. Lilley, University of Illinois at Chicago
Ms. Rachelle Reisberg, Northeastern University

T577·Safe Zone Ally Training - Level 2
TUESDAY, JULY 27, 2021 3:30 TO 5:00 P.M.

The Level 2 Safe Zone workshop explores the concepts and implications of privilege and bias, the climate for LGBTQ+ individuals in STEM and ways that allies can support LGBTQ+ students and colleagues, and techniques for creating inclusive classroom environments.
T477·Diversity, Equity, and Inclusion: 200

**TUESDAY, JULY 27, 2021 1:45 TO 3:15 P.M.**

In this session, we will introduce a systems-thinking framework through case study analysis to assist in identifying organizational successes and opportunities for improvement as we become catalysts for institutional change. We aim to raise the collective awareness of institutional biases to promote shared accountability to create equitable engineering education communities at every organizational level.

**Moderators**
Dr. Teresa L. Larkin, American University  
Dr. Lynn A. Albers, Hofstra University

**Speakers**
Kayla R. Maxey, Purdue University  
Ms. Brianna Shani Benedict, Purdue University  
Dr. Meagan C. Pollock, Engineer Inclusion  
Dr. Linda Vanasupa, Franklin W. Olin College of Engineering

T377·Understanding and Interrogating Racialized Power and Privilege in the STEM Classroom: An Anti-Racist Pedagogical Approach

**TUESDAY, JULY 27, 2021 11:30 A.M. TO 1:00 P.M.**

This workshop will explore U.S. cultural norms that create an inequitable status quo, privileging whites and the concept of whiteness while disenfranchising people of color and offering undue privilege to other dominant identities. The workshop presenters will facilitate discussions and individual self-reflection and provide tools to interrupt and dismantle white privilege and other forms of systemic dominance that STEM faculty and staff may not otherwise have access or exposure to explore.

**Moderators**
Dr. Elizabeth Cady, National Academy of Engineering  
Ms. Rachelle Reisberg, Northeastern University

**Speakers**
Dr. Kelly J. Cross, University of Nevada, Reno  
Dr. Elizabeth Litzler, University of Washington  
Emily Affolter, University of Washington  
Dr. Christian Matheis

T277A·Best DEI Paper Award Finalists

**TUESDAY, JULY 27, 2021 9:45 TO 11:15 A.M.**

Now in its sixth year, the ASEE Best Diversity, Equity, and Inclusion Paper Award seeks to identify highly impactful research or programs published at an ASEE conference that help address inequities in engineering and influence the inclusive, diverse future of engineering. Diversity dimensions addressed can include (but are not limited to) age, belief system, disability status, ethnicity, gender, gender identity, gender expression, national origin, race, sexual orientation, socioeconomic status, and any other visible or non-visible differences.

Nominated DEI papers and presentations are assessed for a) the extent of inclusivity and focus on diversity, equity, and/or inclusion; b) novelty of approaches/ideas/interventions; c) depth and extent of connection with existing literature and/or theory; d) demonstrated or potential impact; and e) communication effectiveness. The ASEE Best Diversity, Equity, and Inclusion Paper Selection Committee to assess these scholarly attributes of the nominated manuscripts and to identify up to five finalists.

**Moderator**
Dr. Susan E. Walden, University of Oklahoma

**Speaker**
Dr. Elizabeth Litzler, University of Washington
W177•Student Panel: Understanding Queer Experiences in Engineering

WEDNESDAY, JULY 28, 2021 8:00 TO 9:30 A.M.

In this panel, students from different backgrounds will get a chance to share their own experiences navigating the intersections of engineering and their queer identity. Participants will develop a better understanding of queer students in STEM and will learn actionable ways to apply this at their institution.

Moderators
Jeanne Sanders, University of Nevada, Reno
Dr. Meagan C. Pollock, Engineer Inclusion

Speakers
Brandon Bakka, University of Texas at Austin
Madeleine Jennings, Arizona State University, Polytechnic campus
Mr. Hector Enrique Rodriguez-Simmonds, Purdue University
Shannon Clancy, University of Michigan
Anna Pasek, University of Michigan
Jerry Austin Yang, Stanford University

R177•Expanding the Accessibility of Mathematics Using PDMs: A Process-Driven Math Demo All Teachers Can Apply

THURSDAY, JULY 29, 2021 8:00 TO 9:30 A.M.

Process-Driven Math (PDM) is a method of math instruction and assessment designed to reduce barriers for students with visual and print disabilities. We demonstrate how to use PDM to chunk mathematical content into component substructures using color and shape. (Downloadable PowerPoint slides with shape templates will be made available to participants.) Participants also will learn how the “speak screen” feature in PowerPoint can be used to give students with dyslexia or dyscalculia confidence that they are accurately interpreting the mathematical content they are seeing.

Moderators
Jeanne Sanders, University of Nevada, Reno
Ms. Rachelle Reisberg, Northeastern University

Speakers
Dr. Canek Moises Luna Phillips, Rice University
Dr. Yvette E. Pearson P.E., Rice University
Ms. Ann Patrice Gulley
Logan C. Prickett

W477•Community Organizing for the Year of Impact on Racial Equity

WEDNESDAY, JULY 28, 2021 1:45 TO 3:15 P.M.

The ASEE Commission on Diversity, Equity, and Inclusion is leading an ASEE Year of Impact on Racial Equity (YIRE) for the 2021-2022 Society year. Join CDEI leaders and members to develop action plans for the coming year around three impact areas: increasing participation among Black and brown children in engineering activities; empowering postsecondary student organizations to work toward greater inclusion in higher education; and implementing organizational policies and practices in colleges of engineering to disrupt the status quo and increase racial equity for students and faculty.

Moderators
Jeanne Sanders, University of Nevada, Reno
Ms. Rachelle Reisberg, Northeastern University

Speakers
Dr. Elizabeth Litzler, University of Washington
Dr. Jeremi S. London, Virginia Polytechnic Institute and State University
Dr. Homero Murzi, Virginia Polytechnic Institute and State University
As the COVID-19 pandemic progresses, this moment has brought attention to the structural issues of academic capitalism, academic racism, and inequities that have long been reproduced by higher education in the United States. In response, this workshop asks what would it mean to center collective care and dismantle hierarchies of power? We intend to examine these questions and establish modes of visioning for how the world could be otherwise via writing and ideation exercises.

Moderators
Prof. C. Lilley, University of Illinois at Chicago
Ms. Rachelle Reisberg, Northeastern University

Speakers
Dr. Ellen Foster, Purdue University
Dr. Donna M. Riley, Purdue University
Ms. Stephanie Quiles-Ramos, Virginia Polytechnic Institute and State University

The Commission on Diversity, Equity, and Inclusion aims to empower those who wish to take a more active role in advocating DEI within their sphere of influence by facilitating opportunities to talk about issues and learn together. This session is a celebration and visioning gathering for those who wish to spend an uplifting hour networking and brainstorming with others who share their passion for equity and access in engineering!

Moderators
Dr. Jafar F. Al-Sharab
Ms. Rachelle Reisberg, Northeastern University

Speakers
Dr. Meagan C. Pollock, Engineer Inclusion
Ms. Brianna Shani Benedict, Purdue University
Dr. Jeffrey W. Fergus P.E., Auburn University
Dr. Seyed Mohammad Seyed Ardakani, Ohio Northern University
Ms. Hoda Ehsan, Georgia Institute of Technology

The ASEE Commission on Diversity, Equity, and Inclusion hosts any ASEE member wishing to discuss DEI topics in a community format. This year working groups will begin planning for Year of Impact on Racial Equity initiatives. One group may focus on continuing conversations from Distinguished Lectures. Other topics are determined by those in the room.

Moderator
Dr. Susan E. Walden, University of Oklahoma
Ms. Rachelle Reisberg, Northeastern University

Speakers
Dr. Elizabeth Litzler, University of Washington
Dr. Jeremi S. London, Virginia Polytechnic Institute and State University
Dr. Homero Murzi, Virginia Polytechnic Institute and State University
**M679•Preparing for My Virtual ABET Accreditation Review in 2021 – 2022 ... Am I Ready?**

**MONDAY, JULY 26, 2021  4:15 TO 6:15 P.M.**

Going through ABET accreditation for the first time, and it’s virtual? You will gain a firm understanding of the foundational processes and procedures of the ABET accreditation process, what is needed to prepare for the initial accreditation of a program, and where to turn for further information. We will go over the entire process of ABET accreditation—from how to apply to the purpose of the Self-Study Report and what to expect during the on-site visit. You also will understand what a due process response entails and when to expect the final decision.

**Moderator**
Christine Kalambary, Manager, Academic Services, ASEE

**Speakers**
Dr. Winston F. Erevelles, Adjunct Accreditation Director of Engineering, ABET

Winston Erevelles is a professor of engineering and the dean of the School of Science, Engineering and Technology at St. Mary’s University. As the chief academic and administrative officer, he is responsible for the school’s academic programs, furthering education innovations and building the school’s national and international reputation. To date, Erevelles has helped raise $36 million in partnership with faculty and staff across the school to fund these initiatives. He is also responsible for fostering faculty development in teaching, scholarship, and service, as well as promoting undergraduate research, technology-based teaching and learning, and the integration of liberal arts and professional education. He is an adjunct director of engineering accreditation for ABET and former chair of the Engineering Accreditation Commission.

Dr. Patricia Brackin P.E., Professor of Mechanical Engineering, Rose-Hulman Institute of Technology

Patsy Brackin is a professor in mechanical engineering at Rose-Hulman Institute of Technology, where she also serves as director of engineering design. Her B.S. and M.S. are from the University of Tennessee, and her Ph.D. is from the Georgia Institute of Technology. She has significant industry experience and is a licensed professional engineer and a Fellow of ASME and ABET. Brackin has been involved in several areas of ABET accreditation — she has served as her departmental ABET coordinator, member of ASME’s Committee on Engineering Accreditation, program evaluator, team chair and as a member of the Executive Committee of the EAC, where she also served as chair of the Criteria Committee.

**T279•ABET Academic Advisory Council Listening Session: Ask Us Anything!**

**TUESDAY, JULY 27, 2021  9:45 TO 11:15 A.M.**

Attendees are invited to ask any and all accreditation-related questions, and our experts—ABET Academic Advisory Council Chair Jeff Ray and ABET Chief Accreditation Officer Joe Sussman—will be there to answer your questions.

**Moderator**
Christine Kalambary, Manager, Academic Services, ASEE

**Speakers**
Dr. Jeffrey L. Ray, Dean, College of Engineering and Technology, Western Carolina University

Jeffrey L. Ray, chair of the ABET Academic Advisory Council, is dean of the College of Engineering and Technology at Western Carolina University. His degrees include both B.S. and M.S. degrees in mechanical engineering from Tennessee Technological University and a Ph.D. from Vanderbilt University. Before beginning engineering school, he completed an apprenticeship and was awarded the title of Journeyman Industrial Electrician. An ASEE Fellow and an active member since joining ASEE in 1994, Ray has held multiple leadership positions at the national and sectional level, including serving on the Board of Directors as chair of the Engineering Technology Council and Vice-President, Institutional Councils.
Dr. Joseph L. Sussman, Chief Accreditation Officer and Chief Information Officer, ABET

As chief accreditation officer and chief information officer since 2011, Joe Sussman leads ABET’s global accreditation operations, collaborating with the organization’s volunteer leadership in both tactical execution and strategic development of ABET’s accreditation practice. Previously, he spent 26 years as an engineering leader and senior business executive at Bayer AG, leading many of the company’s quality, manufacturing, and IT efforts. After retiring from Bayer he became an industry specialist at Deloitte Consulting, where he worked with many global clients. Before joining the ABET staff, he served for 24 years in nearly every volunteer capacity, including as program evaluator for mechanical engineering programs, chair of the Engineering Accreditation Commission, representative director from ASME on the ABET Board of Directors, and president (2008–2009). He was inducted as an ABET fellow in 2002 after having played a pivotal role in implementing the ground-breaking Engineering Criteria 2000. In 2011 he was elected an ASME fellow for his contributions to quality in engineering education, and in 2015 he received the Linton E. Grinter Distinguished Service Award for his contributions to the technical disciplines through his work in accreditation. He earned his baccalaureate, master’s and doctoral degrees in mechanical engineering from Columbia University.

Moderator
Christine Kalambary, Manager, Academic Services, ASEE

Speaker
Dr. Jennifer McFerran Brock, Associate Dean for Academics and Professor of Mechanical Engineering, University of Alaska Anchorage

Jennifer McFerran Brock, Ph.D., is the Associate Dean for Academics and a Professor of Mechanical Engineering at the University of Alaska Anchorage. She is a PEV through ASME. In addition to leading her home department’s assessment efforts since 2012, she was chair of the UAA College of Engineering Assessment Committee from 2014-2018 and has been involved in numerous campus-wide assessment- and accreditation-related initiatives, most recently serving as a tri-chair of the UAA Institutional Self-Study Committee from 2016-2018 in connection with the institution’s regional accreditation and an NWCCU Mission Fulfillment Fellow in AY2019-20.

T679·Make an Impact on STEM Education and Support My Academic Program at the Same Time – Become an ABET Program Evaluator

TUESDAY, JULY 27, 2021 4:45 TO 6:45 P.M.

This talk is designed for a prospective program evaluator (PEV) who is interested in having as much information as possible on what the job really entails. The speaker has also received useful feedback for representatives of institutions who have never gone through an ABET visit before, as it describes the visit process in detail. The presentation showcases an ABET visit from the perspective of a PEV, from the initial assignment to the campus visit and return home. Topics include communication with the rest of the team, tips for reviewing the materials prepared by the program before the visit, required documentation, making travel arrangements, and what happens after arrival on campus. The importance of the team as the decision-making body and the support that the more experienced team members will provide are a focus of this talk.

W479·New Curricular Areas Seeking ABET Accreditation: Data Science, Cybersecurity, Facility Management, Applied Science, and More

WEDNESDAY, JULY 28, 2021 1:45 TO 3:15 P.M.

ABET accreditation has long been the global standard for programs in applied science, computing, engineering, and engineering technology. Recently, programs in disciplines outside of these four main areas have shown interest in becoming accredited. This presentation will explore accrediting natural science and mathematics programs under ANSAC General Criteria as well as programs under CAC General Criteria and the value accreditation brings to these programs.
2021 ASEE VIRTUAL CONFERENCE
ABET SESSIONS

Moderator
Christine Kalambary, Manager, Academic Affairs, ASEE

Speakers
Scott Murray, Data Engineer, ProCore Technologies, ABET CAC Executive Committee and Chair, CAC Criteria Committee

Scott Murray has twenty-five (25) years of data analytics, date engineering, and data management experience and currently works as a data engineer at Procore Technologies. Additionally, he is a member of the Computing Accreditation Commission’s (CAC) Executive Committee and currently co-leads the CAC’s Criteria Committee which is currently working on data science criteria development among other items. Scott Murray is additionally a board member at large for CSAB.

Lisa Sachs, Managing Principal, Cumming Construction Management, Inc., ABET ANSAC Executive Committee Director at Large

Lisa Sachs, an architect and Certified Construction Manager (CCM), is a graduate of the Rhode Island School of Design, a Fellow of the American Institute of Architects (AIA) and a Fellow of the Construction Management Association of America (CMAA). She is a past president of the CMAA Southern California Chapter and Chapter Foundation, and in 2014 was appointed by CMAA as its first ABET (Accreditation Board for Engineering and Technology) commissioner representing construction management in the applied and natural sciences. She currently serves on the CMAA National Foundation and Southern California Chapter Foundation Boards. For over twenty-five years Lisa was a key contributor to the success of two of the largest multi-billion-dollar educational construction management bond programs in California, initially as a principal of her own firm and then as a managing principal of Cumming after merging firms. Her commanding role on these programs influenced the quality of the built environment and improved the level of contract performance by both design and construction professionals based on shared lessons learned and industry best practices. Currently, Lisa serves on the Construction Management Advisory Councils for two institutions in Southern California, the NewSchool of Architecture & Design in San Diego and Cal State University Northridge. She has also guest lectured at these institutions as well as at the University of Southern California and Woodbury University Schools of Architecture, expanding awareness of the CM profession. As an educator, mentor and lecturer she strives to bridge the gap between the architectural, engineering and construction professions by improving communications and clarifying each other’s goals and objectives to further the construction management profession.

Rebecca “Becki” Popeck, Survey Project Manager, SPACECO, Inc., ABET ANSAC Executive Committee and Vice Chair of Operations

Rebecca Popeck is a licensed Land Surveyor at Rosemont based SPACECO, Inc., a civil engineering, land surveying and consulting firm. Popeck studied Land Survey Engineering and Civil Engineering at Purdue University’s West Lafayette Campus earning bachelor’s degrees in both disciplines. She has been a licensed Illinois Land Surveyor since 2005. Popeck has spent almost 20 years performing surveys and providing surveying services in the greater Chicagoland area. Specialties include development work in residential, commercial and industrial sectors with an increased focus on projects within the limits of the City of Chicago. She joined ABET in 2006 as a Program Evaluator supporting her member society of National Society of Professional Surveyors (NSPS). NSPS is a member of three accreditation commissions including: ANSAC, EAC and ETAC. She has had the pleasure of serving as a PEV for both ETAC and ANSAC visits early in her ABET career. In 2014 Popeck became a commissioner/team chair for the Applied and Natural Science Commission. In 2017 she further progressed through the ranks to join ANSAC’s executive committee. During the 2019-2020 accreditation cycle Popeck was a team chair for her first international visit to Krishnan Kovil, Tamil Nadu, India.
M201·ASEE Satellite Workshop

Speakers
Dr. Sharan Asundi, Old Dominion University
Dr. Michael C. Hatfield, University of Alaska Fairbanks

M213·Putting Students to Work: Using Findings From a Multi-University Study of Engineers’ First Year of Work to Enhance Design Education

Moderator
Dr. Beshoy Morkos and Mr. Bob Rhoads P.E.

Speakers
Dr. Daria A. Kotys-Schwartz, University of Colorado Boulder
Dr. Marie C. Paretti, Virginia Polytechnic Institute and State University
Prof. Robin Ott, Virginia Polytechnic Institute and State University
Prof. Susannah Howe, Smith College
Prof. Julie Dyke Ford, New Mexico Institute of Mining and Technology
Dr. Beshoy Morkos, University of Georgia
Mr. Bob Rhoads P.E., Ohio State University

M214·Maximizing Interactivity in Online Classes

Speakers
Marcelo Guerra Hahn, SoundCommerce

M214B·Fostering Well-Being Amid Cycles of Professional Shame in Faculty-Student Interactions

Speakers
Dr. James L. Huff, Harding University
Dr. Jeannine E. Turner, Florida State University

M218·Teaching More Skills in the Same Amount of Time – Sketchtivity, an AI-Based Tutoring Platform for Free-Hand Sketching While Also Learning Spatial Visualization

Speakers
Dr. Tracy Anne Hammond, Texas A&M University
Dr. Julie S. Linsey, Georgia Institute of Technology
Dr. Kerrie A. Douglas, Purdue University at West Lafayette (COE)
Dr. Vimal Kumar Viswanathan, San Jose State University
Mr. Blake Williford, Texas A&M

M213B·Learn to Apply Methods From Neuroscience for Engineering Design Education

Speakers
Dr. Tripp Shealy, Virginia Polytechnic Institute and State University
Dr. John S. Gero, University of North Carolina at Charlotte
Dr. Beshoy Morkos, University of Georgia
Mr. Bob Rhoads P.E., Ohio State University
M220•Launching the OEC’s Engineering Ethics Educators Community of Practice: A Workshop to Share Strategies and Discuss Goals

**Speakers**
- Dr. Rosalyn W. Berne, *University of Virginia*
- Dr. Laura R. Grossenbacher, *University of Wisconsin - Madison*
- Dr. Rider W. Foley, *University of Virginia*
- Dr. Karin Ellison, *Arizona State University*
- Ms. Kelly Laas, *Illinois Institute of Technology*

Dr. Tamecia R. Jones, *North Carolina State University at Raleigh*
Dr. Katey Shirey, *EduKatey*

M233B•Engineering For Us All (e4usa): “Us All” Includes You!

**Speakers**
- Dr. Stacy S. Klein-Gardner, *Vanderbilt University*
- Dr. Kenneth Reid, *University of Indianapolis*
- Mr. Kevin Calabro, *University of Maryland College Park*

M227•Helping First-Year Students Catalyze Success: How to Productively Bring Serendipity, Risk, and Failure Into the Classroom

**Speakers**
- Dr. Jessica A. Kuczenski, *Santa Clara University*
- Dr. Robert Schaffer, *Mission College*
- Mr. Timothy J. Hinds, *Michigan State University*
- Dr. Kaitlin Mallouk, *Rowan University*

M233•What Makes a Project an “Engineering” Project

**Moderator**
Dr. Katey Shirey, *EduKatey*

**Speakers**
- Dr. Laura Bottomley, *North Carolina State University at Raleigh*
- Dr. Tameshia Ballard Baldwin, *North Carolina State University at Raleigh*
- Dr. Evelyn C. Brown, *North Carolina State University at Raleigh*

M242•Educational Evaluation Skills for Improving Your Teaching and Outreach

**Speakers**
- Dr. Joni Lakin, *University of Alabama*
- Dr. Karen E. Rambo-Hernandez, *Texas A&M University*
- Dr. Derek Breid, *Saint Vincent College*
- Dr. Kerry R. Widder, *Milwaukee School of Engineering*

M242B•Developing Facilitators of Learning for a Holistic-Style STEM Professional

**Moderators**
- Dr. Derek Breid, *Saint Vincent College*
- Dr. Kerry R. Widder, *Milwaukee School of Engineering*

**Speakers**
- Dr. Pedro E. Arce, *Tennessee Technological University*
- Andrea Arce-Trigatti, *Tennessee Technological University*
- Dr. Stephanie Jorgensen, *Tennessee Technological University*
- Dr. Robby Sanders, *Tennessee Technological University*
M245·Projects-Based Arduino/Raspberry Pi Activities

Moderator
Dr. Robert A. Ross, University of Detroit Mercy

Speakers
Dr. Carl K. Frederickson, University of Central Arkansas
Dr. Bala Maheswaran, Northeastern University

M246·Expressing Computing Competency Statements

Speakers
Dr. Stephen T. Frezza, Gannon University
Dr. Robert W. Hasker, Milwaukee School of Engineering

M257·Transform Your Institution’s Faculty Development with the ASPIRE Inclusive Professional Framework for Faculty (IPF: Faculty)

Speakers
Dr. April Dukes, University of Pittsburgh
Dr. Jacqueline A. El-Sayed, American Society for Engineering Education
Dr. Karen A. High, Clemson University

M299B·Visual, Creative Problems for Any Engineering Course: Student-created Problems that Reverse Engineer YouTube Videos

Speaker
Prof. Matthew W. Liberatore, University of Toledo

M299C·America Learns Mathematics

Speaker
Dr. Andrew Grossfield P.E., Vaughn College of Aeronautics and Technology

M299D·Tips and Tools to Integrate Sociotechnical Thinking in the Classroom for the Next Generation of Engineering Professionals

Moderator
Dr. Kathryn Johnson, Colorado School of Mines

Speakers
Dr. Jon A. Leydens, Colorado School of Mines
Dr. Stephanie Claussen, San Francisco State University
Dr. Janet Y. Tsai, University of Colorado Boulder
Prof. Jenifer Blacklock, University of Colorado Boulder
Dr. Barbara M. Moskal, Colorado School of Mines

M299E·Growing Our Research Community, One Reviewer at a Time

Moderator
Dr. Lisa Benson, Editor in Chief, Journal of Engineering Education, Clemson University

Speakers
Dr. Nadia N. Kellam, Arizona State University
Dr. Sarah E. Zappe, Pennsylvania State University
M299F·Hands-on, Interactive Learning in Fluid Mechanics and Heat Transfer with Virtual Options

**Moderator**
Prof. Bernard J. Van Wie, Washington State University

**Speakers**
David B. Thiessen, Washington State University
Dr. Olusola Adesope, Washington State University
Dr. Prashanta Dutta, Washington State University
Dr. Kristin Bryant
Jacqueline Gartner Ph.D., Campbell University
Mr. Olufunso Oje, Washington State University
Kitana Kaiphanliam, Washington State University
Mrs. Olivia Reynolds, Washington State University
Aminul Islam Khan, Washington State University

M299I·Task-based Educational Interventions on Design for Additive Manufacturing

**Moderator**
Mr. Rohan Prabhu, Pennsylvania State University

**Speakers**
Dr. Nicholas Meisel, Pennsylvania State University
Dr. Stephanie Cutler, Pennsylvania State University
Prof. Timothy W. Simpson, Pennsylvania State University
Dr. Scarlett Rae Miller P.E., Pennsylvania State University

M299G·Tools for Equitable and Impactful Pre-College Outreach

**Speaker**
Dr. Meredith D. Portsmore, Tufts University

M299K·Contemplative Pedagogies: A Way of Democratizing Engineering Education

**Speakers**
Dr. Yevgeniya V. Zastavker, Frank W. Olin College of Engineering
Dr. Madhvi Jayalakshmi Venkatesh, Franklin W. Olin College of Engineering

M299H·Broadening Participation in Engineering through Community Colleges: Lessons Learned from the Black Engineering Student Transfer (BEST) Project

**Moderator**
Dr. Bruk T. Berhanem, Florida International University

**Speakers**
Dr. Shannon Hayes Buenaflor, University of Maryland, College Park
Dr. Sharon Fries-Britt, University of Maryland, College Park

M299L·Collaborative Learning in Online Professional Development Engineering Courses

**Moderator**
Ms. Tiantian Li, Purdue University

**Speakers**
Dr. Kerrie A. Douglas, Purdue University
Dr. Andrew Hurt, Purdue University
Dr. Wanju Huang, Purdue University
M299M·Designing a High School Biomedical Engineering Curriculum for Differentiated In-person, Virtual, and Hybrid Classroom Environments

Moderator
Dr. Marjorie Letitia Hubbard, North Carolina School of Math and Science and South Carolina Governor’s School for Math and Science

Speakers
Dr. Marjorie Letitia Hubbard, North Carolina School of Math and Science and South Carolina Governor’s School for Math and Science
Dr. Ershela L. Sims, Women in Engineering ProActive Network, South Carolina Governor’s School for Math and Science

M299N·New Digital Frontiers: Understanding Our Place in the Changing Landscape of Higher Education

Moderator
Sarah Appelhans, University at Albany—SUNY

Speakers
Dr. Alan Cheville, Bucknell University
Dr. Atsushi Akera, Rensselaer Polytechnic Institute
Thomas De Pree, Rensselaer Polytechnic Institute
Melissa Shuey, Rensselaer Polytechnic Institute

M299O·Using Learning Assistants in Face-to-Face and Virtual STEM Courses

Moderator
Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo

Speakers
Laura Ríos, California Polytechnic State University, San Luis Obispo
Dr. Benjamin David Lutz, California Polytechnic State University, San Luis Obispo

M299P·The Evolution of Tools in Enabling Effective Remote Laboratory Delivery in Engineering Curricula

Speakers
Mr. Mark William Thoren, Analog Devices Inc.
Robin Getz, Analog Devices Inc.
Dr. Robert John Bowman, Rochester Institute of Technology

M299Q·Research-Based Strategies to Advising Graduate Students

Moderator
Dr. Juan M. Cruz, Rowan University

Speakers
Dr. Stephanie G. Adams, University of Texas at Dallas
Dr. Holly M. Matusovich, Virginia Polytechnic Institute and State University
Dr. Mayra S. Artiles, Arizona State University
Dr. Juan M. Cruz, Rowan University

M299R·Equity-Minded, Asset-Based Mentoring for Students and Faculty: Strengths Training from a Social Justice Perspective

Moderator
Dr. Jane L. Lehr, California Polytechnic State University, San Luis Obispo

ASEE online session locator can be found at www.asee.org/osl.
M299S·Teamwork: How Can Faculty Positively Influence Their Student Teams?

Speakers
Dr. Lisa Abrams P.E., Ohio State University
Dr. Jeffrey E. Froyd, Ohio State University
Dr. Adithya Jayakumar, Ohio State University
Ms. Lucille Sheppard, Ohio State University
Dr. Toni M. Calbert, Ohio State University

M299T·Engaging with MIDFIELD Data

Moderator
Dr. Susan M. Lord, University of San Diego

Speakers
Dr. Matthew W. Ohland, Purdue University
Dr. Marisa K. Orr, Clemson University
Dr. Richard A. Layton, Rose-Hulman Institute of Technology

M299U·Techniques to Identify Appropriate NSF Funding Programs and Prepare Competitive NSF Engineering Education Research Proposals

Moderator
Vinod Lohani, National Science Foundation

Speakers
Dr. Monica E. Cardella, Purdue University, NSF Program Director, Division of Research on Learning in Formal and Informal Settings

M299V·Appropriate Evaluations of Applicants’ Diversity Statements for Improved Inclusivity and Convergent Thinking

Speakers
Dr. P.K. Imbrie, University of Cincinnati
Dr. Stephanie G. Adams, University of Texas at Dallas
Dr. Teri Kristine Reed, University of Cincinnati
Dr. Carmen Sidbury, National Action Council for Minorities in Engineering, Inc.
Dr. Bevlee A. Watford P.E., Virginia Polytechnic Institute and State University
Dr. Karan Watson P.E., Texas A&M University

M299W·Future Engineering “Classrooms” - Lessons Learned from the Pandemic

Moderator
Dr. Clayton Byers

Speakers
Dr. Christine S. Grant, North Carolina State University at Raleigh, NSF Program Director, Division of Engineering Education and Centers for the Broadening Participation in Engineering Program
Dr. Abiodun A. Ilumoka Nwabuzor, University of Hartford, NSF Program Director, Division of Undergraduate Education
Dr. John Jackman, NSF Program Director, Division of Undergraduate Education
Dr. Jumoke ‘Kemi’ Ladeji-Osias, Morgan State University, Program Director, Division of Engineering Education and Centers
Prof. Jill K. Nelson, George Mason University, NSF Program Director, Division of Undergraduate Education
Dr. Eric J. Sheppard, Hampton University, NSF Program Director, Division of Undergraduate Education
Dr. Margaret Hjalmarson, National Science Foundation, NSF Program Director, Division of Research on Learning in Formal and Informal Settings
M499·Distributed FPGA Lab Between UW and Other Universities Using the LabsLand Network - Presented by Intel

MONDAY, JULY 26, 2021 1:15 TO 1:55 P.M.
Speakers: Mr. Lawrence David Landis, Intel Corporation; Dr. Rania Hussein, University of Washington; Pablo Orduña, LabsLand

COVID-19 has forced the necessity of learning with virtual electronics lab environments. Intel has made great strides in offering an integrated working environment for learning FPGAs remotely. Intel offers free instructional material, board donations, and methods to utilize Intel® FPGA development tools and kits/accelerator cards in a remote environment. This talk will focus on how to teach undergraduate-level courses using RTL/Schematics/Prebuilt IP and accessing FPGA development kits in the classroom or from home. Topics covered are network setup, installation, compilation and download. The second half of the workshop will focus on graduate-level heterogeneous computing teaching and research on the Intel® FPGA Devcloud. The Intel® FPGA Devcloud runs RTL, OpenCL, OneAPI and OpenVino workloads in a Xeon+FPGA development environment available free to the academic community.

Additionally, the University of Washington and LabsLand will present the LabsLand network of Intel FPGAs. This network is a global collaboration with FPGAs located in universities from the U.S., Spain, Malaysia, and Brazil (and growing!) being used for education by universities worldwide.

M599·Utilizing FPGAs for Teaching in the Classroom or Virtualized Lab - Presented by Intel

MONDAY, JULY 26, 2021 3:50 TO 4:30 P.M.

T299·What Is Generative Design and How to Integrate It Into Your Curriculum - Presented by Autodesk

TUESDAY, JULY 27, 2021 9:45 TO 10:20 A.M.
Speaker: Kevin Lee, Autodesk, Inc.

Generative design harnesses the power of machine learning to propose hundreds of solutions to a design or engineering challenge. In this session, you will get an overview of generative design and identify the best resources to help you incorporate it in the classroom. You will see how generative design can help students connect the knowledge they learned in Materials Science and Statics courses into real life solutions throughout their academic careers and beyond.

T399·Growing the Domestic Pool of Diverse Graduate Students in Engineering - Presented by EngineeringCAS

TUESDAY, JULY 27, 2021 12:20 P.M. TO 1:00 P.M.
Speaker: Ms. Catherine “Kitty” Didion, Liaison International

The need to increase the numbers of underrepresented graduate students in engineering who matriculate and graduate has been a topic of discussion for several years within the Minorities in Engineering Division as well as other divisions of ASEE. 2020 was a challenging year for all, including engineering education. Do the constraints and reality of the COVID-19 pandemic and its potential impact on the size of the pool of international graduate students provide an unforeseen opportunity for organizations (including institutions of higher education, engineering societies, and corporations) to reimagine what the broader engineering community can do to engage and support the domestic pool of students with an emphasis on reaching underrepresented students who are considering graduate programs in engineering?
Are there proven practices or models that can be scaled and expanded? What role do professional engineering societies, including ASEE, play in recruiting a greater pool of diverse graduate students? Given that many of the mechanisms of outreach to potential graduate students (e.g., campus visits, national conferences) are not feasible during the pandemic, what are some viable means of outreach and engagement? The panel will consist of representatives from engineering societies who have an established record and proven practices in working with diverse student populations as well as a representative of institutions of higher education with current programs and policies on growing their pool of diverse graduate students.

Engineering for US All (e4usa) is an NSF-funded high school engineering program that opens engineering to a new generation of students and educators. Core to the e4usa mission is the nationwide expansion of student and teacher access to engineering, with intentional efforts to reach populations traditionally underrepresented in the field. To date, e4usa involves 55 participating high schools with approximately 2,000 students. Current e4usa students are 42% female, 30% Hispanic, and 37% Black/African American. e4usa students explore engineering in society, develop professional skills, and engage in community-focused engineering design experiences, all aimed at helping them see themselves as engineers.

During this session, we will provide an overview of the e4usa program as well as discuss progress and future work in the areas of curriculum development, professional development, partnerships, and research. Join us to learn more about how e4usa is demystifying engineering and making it accessible to all.

In this webinar, Lauren Poplawski, editor of Mechanical Engineering, Wiley; Aileen Storry, publisher of Electrical Engineering, Wiley, will discuss the signs that you should write a new advanced textbook and how to go about planning it. The session will cover the process of book publishing, recent feedback on learning materials from instructors and students, what Wiley looks for in a textbook, and how to develop your ideas and pedagogy. All questions and feedback welcome!

Do you want to be able to teach your engineering students the skills that employers value most, but your current lab equipment is outdated or basic? Electrical engineering, after all, is at the heart of just about every technology revolution, including autonomous vehicles, quantum computing, and smart energy, and hands-on labs are critical to exposing students to the tools needed to enable future innovations. Imagine a showcase lab with modern, hybrid-ready, fully functional oscilloscopes, function generators, digital multimeters, and power supplies—the same test instruments used by industry. Picture prospective students and parents marveling at the impressive display, while the dean pats you on the back for staying under budget. Join our session to learn best practices for incorporating...
industry-focused curriculum and to hear from some of your peers who have made this dream a reality.

**W299C·Pearson Digital Learning Platforms for Your Undergrad Engineering Courses (Intro through Advanced) - Presented by Pearson**

**WEDNESDAY, JULY 28, 2021  9:45 TO 10:25 A.M.**

Speakers: Holly Stark, Terry Austin, and Wayne Stephens, Pearson Education

MyLab Engineering and Mastering Engineering are the teaching and learning platforms that empower you to reach every student. Whether you are enlightening first-year students on engineering fundamentals or diving deeper into engineering mechanics and circuits, these flexible digital platforms offer the unrivaled content, online assessments, and customizable features you need to personalize learning and improve results, one student at a time.

In this session, you’ll hear first-hand how Pearson allows instructors to maximize the unique benefits and personalized tools in MyLab Engineering and Mastering Engineering. We will walk you through how the new MATLAB Grader functionality in MyLab Engineering is designed to be used with the new 5th edition of Thinking Like an Engineer text. We will also explore the Mastering Engineering platform and learn about classroom performance analytics, early alert systems for student productivity, tutorial homework problems, and more.

**W299D·Engineering Assessment Strategies for Remote Course Delivery - Presented by Wiley**

**WEDNESDAY, JULY 28, 2021  9:45 TO 10:25 A.M.**

Speakers: Kellie Grasman and Dr. Jeff Thomas P.E., Missouri University of Science and Technology

Problem-based engineering courses yield unique challenges when assessment must be completed online. This session explores the challenges of remote engineering assessment and offers an overview of alternative and traditional assessment approaches for online. We also take a deep dive into a proven strategy to deliver frequent problem-based assessments, mapped to Bloom’s taxonomy, using powerful algorithmic coded questions.

**W299E·Advancements in Test and Measurement Equipment for Teaching Labs - Presented by Rohde & Schwarz**

**WEDNESDAY, JULY 28, 2021  9:45 TO 10:25 A.M.**

Speaker: Rich Markley, Rhode & Schwarz

Over the past few years, there have been many advancements in test and measurement gear and how it can best be used in teaching labs. In this presentation, we will review these new capabilities and how they could be used to make your students’ experiences better—and your life easier!

**W299F·Instruction Success with a New Hands-On, Personal Control System - Presented by STMicroelectronics**

**WEDNESDAY, JULY 28, 2021  9:45 TO 10:25 A.M.**

Speaker: Prof. William J. Kaiser, University of California, Los Angeles

A new personal, hands-on control systems platform, the Edukit system has proven successful in instruction for first year through senior multidisciplinary engineering students along with remarkable developments by student independent research programs. The Edukit system is the first low cost, open source, complete control system platform available for any student. The Edukit system includes both stable and unstable plant configuration and introduces exciting and critical state-of-the-art digital motor actuators and digital sensors. The real-time system is available as an open-source distribution. A Real Time Control System Workbench operating on each student’s computer provides visualization of the operation of their Edukit as well as providing instantaneous control algorithm and configuration updates. Open-source tools support design of Output Feedback and Full State Feedback. Data acquisition and processing tools enable performance evaluation, including frequency response of all sensitivity...
functions. Finally, a set of online tutorials provides a full range of student guidance and development examples. Lecture and laboratory courses have successfully applied Edukit systems with both fully remote and in-person instruction. This presentation will describe the Edukit system, exciting design and operation methods, remarkable student successes, and the open-source guidance resources for instructors and students.

W299G·Using the FE Exam for Effective Outcomes Assessment - Presented by NCEES

WEDNESDAY, JULY 28, 2021 10:35 TO 11:15 A.M.

Speakers: David L. Whitman, University of Wyoming; Bobby G. Crawford, Quinnipiac University

This session highlights best practices in outcomes assessment using the NCEES Subject Matter Reports to provide participants with information about the strengths and weaknesses of students in a program. The presentation will specifically focus on using the FE results as one of a program’s direct measures in assessing student outcomes. Attend and learn more about how the FE exam can be an effective tool for your program.

W299I·Learn Faster. Do More. Utilizing Digital Twins in Manufacturing and Education - Presented by Siemens Digital Industries Software

WEDNESDAY, JULY 28, 2021 10:35 TO 11:15 A.M.

Speakers: Max Kirkpatrick, Siemens Digital Industries Software; Dr. Ramy Harik, University of South Carolina

Join Max Kirkpatrick, a 2018 graduate, Siemens engineer, and master’s degree-seeking student, and University of South Carolina research adviser Dr. Ramy Harik, an associate professor of mechanical engineering, as they discuss researching and creating a fully autonomous robotic manufacturing cell representing future factories, complete with real-time scoring and analysis of machine performance, AI-assisted decision making, and a live digital twin. Hear how their experiences have blended Industry 4.0 with research and engineering education.

W299J·Demystifying Partnership: Leadership Advice and Challenges for the Future of Higher Education - Presented by HackerU

WEDNESDAY, JULY 28, 2021 10:35 TO 11:15 A.M.

Moderator: Jim Fong

Speakers: Ms. Diane Landsiedel, Executive Director, Nexus at the University of Michigan Engineering, Ann Arbor; Mr. Paul Andrew Marca, Managing Member, Parallax Global Advisors, LLC; Mr. Edward G. Borbely, Associate Dean, College of Engineering, University of Wisconsin-Madison

In this session, we explore how to:

- Enhance teaching and student engagement in AI with MATLAB
- Easily integrate AI using domain-specific toolboxes and apps
- Use MATLAB tools for a complete AI workflow
- Accelerate bringing AI to your course—whether it is online, hybrid, or in person—with teaching resources.
Join us for an exclusive session sponsored by HackerU, to discuss how leaders from across the country approach continuing education partnerships. Learn more about how business techniques have evolved amid the COVID-19 pandemic and how partnerships are playing a role in today’s higher education.

This session will explore the challenges we faced in the past year and the changes we’re anticipating in the years to come. Jim Fong, Chief Research Officer and Director of the Center for Research and Strategy at UPCEA, will be leading this panel discussion featuring some of our own industry leaders:

Diane Landsiedel, University of Michigan Engineering  
Paul Marca, Parallax Global Advisors, LLC  
Ed Borbely, University of Wisconsin-Madison

The panel will share some of the key lessons higher education leaders have learned in 2020 and open a discussion on what business will look like for the rest of 2021 and beyond. This panel will explore the role partnerships will play in overall business strategy moving forward.

Attend the Demystifying Partnership: Leadership Advice and Challenges for the Future of Higher Education panel to learn more about:

- The role of partnerships in overall strategy
- Key considerations when choosing a potential partner
- How to gain buy-in and support for partnerships
- Services provided and which are most important
- Department lessons learned from the global pandemic
- Challenges and opportunities for the upcoming academic year

**W299K·The 3 Cs of Post-Pandemic Engineering Admissions - Presented by EngineeringCAS**

**WEDNESDAY, JULY 28, 2021 10:35 TO 11:15 A.M.**

Speakers: Ron Hyman, EngineeringCAS; Tandilyn R. Morrel, Texas A&M University College of Engineering; David T. Poole, University of Miami College of Engineering

Engineering programs face unprecedented changes in 2021 and beyond as public health, immigration, and economic factors have converged in a perfect storm for higher education. Where will your next class come from, and how will you reach prospective students?

During this session, our presenters will share the three C’s of post-pandemic engineering admissions (Continuity, Communication, Community) to help your program weather the current storm—and thrive in the years to come.

**W299L·Rethinking Assessment: How Gradescope can help Improve Student Outcomes Presented by Gradescope by Turnitin**

**WEDNESDAY, JULY 28, 2021 10:35 TO 11:15 A.M.**

Speaker: Dr. Yeow Siow, The University of Illinois at Chicago

**R199·Presented by Edibon USA**

**THURSDAY, JULY 29, 2021 8:00 TO 8:40 A.M.**

Speaker: Nils Dardonville, Edibon USA LLC
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**SPONSOR TECHNICAL SESSIONS**  

**R299A·Advance Your Research Agenda with Keysight - Presented by Keysight Technologies**  
**THURSDAY, JULY 29, 2021  9:45 TO 10:25 A.M.**  
**Speakers:** Noah Schmitz and Roger Benjamin Stancliff, Keysight Technologies

Most of the world’s top technology R&D companies utilize next generation hardware and software tools from Keysight. As a global leader in quantum computing, 6G wireless, e-mobility, cybersecurity, and AI, Keysight enables university researchers to push the frontiers of science and innovation. If you want to compete for new federal research grant funding from the NSF, DoD, and DoE, you need to have access to high-performance instrumentation and metrology. Attend this session to learn about new Keysight measurement solutions in quantum, mmWave, cyber, machine learning, and electric/autonomous vehicles.

**R299B·How to Write an Incredible LinkedIn Profile as an Engineering Student - Presented by Rubin**  
**THURSDAY, JULY 29, 2021  9:45 TO 10:20 A.M.**  
**Speaker:** Danny Rubin, Rubin

Do you want to help your students create LinkedIn profiles that turn heads and lead to instant opportunities? Don’t miss this fast-paced virtual workshop led by Danny Rubin, the founder of Rubin (a leader in online curriculum for business communication skills -- rubineducation.com). Danny will walk you through exercises that cover the LinkedIn professional headline (the title under your name), profile summary, experience section, LinkedIn invitation, best practices, and more.

The Rubin company has provided LinkedIn profile lessons to top engineering students at Texas A&M, Michigan State, NYU, and other schools. Give your students an edge on LinkedIn and in the professional world with this can’t-miss session.

**R299C·Engineering zyVersions: Bringing Interactivity to Engineering Textbooks - Presented by zyBooks**  
**THURSDAY, JULY 29, 2021  9:45 TO 10:25 A.M.**  
**Speakers:** Dr. Ryan Barlow, Oscar Rios, and Yasaman Adibi, ZyBooks

The increase in online delivery of engineering courses necessitates increased interactivity in engineering textbooks. Rather than creating new online textbooks from scratch, interactivity has been added to traditional print textbooks in the form of animations and learning questions. The purpose of the animations and learning questions is to clarify, add to, or replace the existing text, figures, or examples from the print textbook to promote student learning.

**R299D·Tools for Post-pandemic Flexible Course Delivery: Cloud-based CAD/CAM Platform Best Practices - Presented by Autodesk**  
**THURSDAY, JULY 29, 2021 10:35 TO 11:15 A.M.**  
**Speakers:** Dan Banach and Gaby Waldman-Fried, Autodesk

Autodesk’s Fusion 360 is the world’s first cloud-based 3D CAD, CAM, and CAE platform. This session will explore how to use Fusion 360 to teach design in a hybrid learning environment. Fusion 360 allows students to work virtually anywhere, with anyone.

**R299E·Low-Code Development: Turning Learners into Makers - Presented by Siemens Digital Industries Software**  
**THURSDAY, JULY 29, 2021 10:35 TO 11:15 A.M.**  
**Speakers:** Emma DiPrizio and Dr. Carrie Saarinen, Mendix
Today’s students are looking for a hands-on Agile experience needed for successful technology and technology-adjacent careers. Join this session to hear how an enterprise Low-Code development platform empowers all learners to build web and mobile apps without coding skills.

**R299F·Improving Persistence in Spatial-Visualization Training through Automatic Grading of Student Sketches with Spatial Vis Software - Presented by eGrove Education Inc.**

**THURSDAY, JULY 29, 2021 10:35 TO 11:15 A.M.**

*Speakers: Dr. Lelli Van Den Einde, University of California, San Diego; Dr. Nathan Delson, University of California, San Diego*

Spatial visualization (SV) refers to the ability to manipulate geometric shapes in one’s mind. Studies have shown that SV skills are learnable and a key for success in STEM. Additionally, CAD/Design requires students to think in 3D, and freehand sketching of orthographics and isometrics is fundamental to improving SV skills and becoming proficient in CAD.

SV skill training has been shown to be especially beneficial for women and other underrepresented minorities in STEM. The Spatial Vis software has been developed by eGrove Education to make SV training easier to teach and more engaging to learn through automatic grading and personalized feedback of students’ sketches.

A critical attribute of effective learning is persistence, where students are challenged but continue to work on an assignment until they achieve the correct solution. Classroom trials with the Spatial Vis software have shown that students who retry sketches on their own have increased gains on a standardized SV test (PSVT:R). Moreover, when the Spatial Vis software was modified to reward persistence, further student gains were achieved. The current software version allows instructors to identify students who would benefit from increased persistence. In addition, the latest feedback provides very small, personalized hints to elicit the productive struggle which is also tied to effective learning.

The Spatial Vis software has been used in the classroom since 2017. Over 3 million student sketches have been automatically graded and used to identify common student mistakes. This knowledge is incorporated into the Spatial Vis grading algorithm so that specific feedback is provided when a common mistake is made to further increase student engagement and persistence.

Participants in this technical session will learn about the benefits and best practices of using the Spatial Vis software in Intro to Engineering, Engineering Graphics, and summer bridge courses. The software now runs on any computer web browser as well as mobile iOS and Android devices. In this workshop, we will demo the software, discuss implementation of best practices, and introduce the Teacher Interface, where instructors specify assignments and track student performance. Participants will be given a free teacher license to use the software on their own phone, tablet, or computer.

**R299G·Simplifying Hands-on Learning of New Engineering Skills - Presented by Coursera**

**THURSDAY, JULY 29, 2021 9:45 TO 10:25**

*Speakers: Akansha Singh and Ayman Kotob, Coursera*

Why does it remain a challenge for many engineering graduates to find a suitable job? COVID-19 accelerated the already rapid pace of technological disruption, driving the creation of new digital jobs and changes in the skills required for success. How do you ensure your next graduating class of engineers will be equipped with the skills they need so that they are indeed workplace-ready upon graduation? How can students get practical, industry-level experience virtually? Join us to explore research on in-demand engineering skills and see how engineering departments are finding success in bringing those job-relevant skills to life online.
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R299H·Preparing Students for the FE Exam - Presented by Kaplan

THURSDAY, JULY 29, 2021 10:35 TO 11:15 A.M.

Speaker: Jenny Sligh, PPI

Are your students prepared to pass the FE exam? In this session, you will learn how to implement a low-cost, highly effective FE exam training program with PPI’s FE Prep University. Give your students the tools they need to pass their FE exam the first time!

R299I·Presented by the Ohio State University

THURSDAY, JULY 29, 2021 10:35 A.M. TO 11:15 A.M.

Speaker: Dr. Julie P. Martin, Ohio State University

Join us for an engaging session with Dr. Julie Martin, associate professor and associate chair in the Department of Engineering Education, who will discuss the burgeoning Department of Engineering Education and unique opportunities that Ohio State and the department offer for faculty, staff, and students.

R399A·Reading Between the Lines: Advanced AI/ML Predictive Models for Engineering Program Success - Presented by EngineeringCAS

THURSDAY, JULY 29, 2021 12:20 TO 1:00 P.M.

Speaker: Andy Hannah, Orthot

Looking for ways to improve undergraduate and graduate enrollment in your engineering program? How are you identifying “best-fit” students to ensure retention and success? As competition for students escalates, many institutions are struggling to find the answers but are still relying on outdated strategies like regression-based predictive models. Find out how advanced analytics—driven by artificial intelligence and machine learning—recalculates in real-time to:

• provide up-to-the-minute views into your enrollment and retention activity;
• prescribe the appropriate actions and financial aid awards based on each individual’s profile;
• maximize net tuition revenue from domestic and international students.

This session will demonstrate the latest AI tools and how your institution can start to leverage advanced modeling to improve enrollment and student success in undergraduate and graduate engineering programs.

R399B·Invention to Impact - Presented by NSF ASF

THURSDAY, JULY 29, 2021 11:30 A.M. TO 12:10 P.M.

Speaker: Katie Bratlie, National Science Foundation

Innovation programs at the National Science Foundation (NSF) advance ideas from the laboratory to the marketplace to strengthen America’s economy, health, and security. The Division of Industrial Innovation and Partnerships (IIP) in the Engineering Directorate leads several programs to translate fundamental research into market solutions. IIP supports and trains researchers with promising technologies, as well as funding high-tech start-ups. Learn about NSF’s central role in accelerating the growth of the national ecosystem and hear about specific funding opportunities.
R499A·Innovations Worth Advancing: Big Ideas and Putting Them into Action - Presented by the University of Maryland

THURSDAY, JULY 29, 2021 1:45 TO 3:00 P.M.

Speakers: Dr. Amitava ‘Babi’ Mitra, Massachusetts Institute of Technology; Dr. Rea Lavi, Massachusetts Institute of Technology; Dr. Charles W. Schwartz, University of Maryland; Prof. Craig Zilles, University of Illinois at Urbana-Champaign; Dr. Stacy S. Klein-Gardner, Vanderbilt University; Mr. Ramsey Jabaji, University of Maryland; Jennifer Keup, University of South Carolina

This distinguished lecture will explore innovations that engineering colleges have advanced in recent years to provide students with high-quality education, a meaningful college experience, and broader professional outlook in a time of large-scale societal transition. It will focus on three types of such developments: the creation and rollout of innovative new curricula; assessment tools to evaluate student design portfolios; and onboarding programs that strengthen community climate and culture. The session will begin with a panel of experts who will provide an overview of the specific innovations they have contributed to. Panelists and participants will then move into breakout rooms to dive deeper into these new areas of development and the challenges in adopting associated tools and practices. Participants will share their own experiences and insights as well as consider how they could promote similar positive change in engineering programs at their institutions.
ASEE would like to acknowledge the generous support of our premier corporate partners. ASEE is proud to work closely with these strategic partners in pursuit of a shared vision to ensure, advance, and promote excellence in all aspects of engineering and engineering technology education.

Join these innovative engineering and technology organizations in showcasing a commitment to furthering excellence in engineering education—become an ASEE annual conference sponsor today!

For more information, please visit www.asee.org or contact Ashley Krawiec, Manager of Event Sales, at 202-649-3838 or a.krawiec@asee.org

Contact the Conferences Department for more information Follow us on Twitter @ASEEConferences
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2021 ASEE Virtual Conference
Registration Information and Fees

Registration Fees Included in Your Registration:

<table>
<thead>
<tr>
<th>Program</th>
<th>Business Meetings</th>
<th>Exhibits and Sponsor Demos</th>
<th>Plenaries</th>
<th>Technical Sessions</th>
<th>Distinguished Lectures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Member/Non-Member Full Registration</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<td>K-12 Teacher</td>
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K-12 Teachers
K-12 teacher rate of $125 applies to the entire conference. Please email conferences@asee.org to complete your registration.

Note: School ID is required.

ASEE Membership
Please be advised that the non-member professional rate does not include ASEE membership.

Industry Day
The industry day rate is only available to members of industry who otherwise would not attend the ASEE Annual Conference and is valid for Wednesday, July 28, 2021 only. ASEE members/(co)-authors are not eligible.

Cancellation Policy
Registration and ticket cancellations must be made in writing and received by ASEE Annual Conference staff via e-mail: conferences@asee.org on or before Monday, July 12, 2021.

Americans with Disabilities Act (ADA)
Registrants with special needs who participate in our conference will be accommodated to the fullest extent possible. If you need special arrangements, please advise us at the time you register at conferences@asee.org.
**Session Code Guide:**

The following is a guide to understanding the codes identifying the technical sessions, workshops, and ticketed events listed in this program. Sessions are listed according to the day they are scheduled and in numerical order based on the time of session. In most cases, session numbers represent the following:

<table>
<thead>
<tr>
<th>FIRST LETTER = CONFERENCE DAY</th>
<th>SECOND DIGIT = TIME OF DAY</th>
<th>LAST DIGITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>M MONDAY</td>
<td>1 8:00 A.M. – 9:30 A.M.</td>
<td>These digits represent numbers assigned to sponsoring divisions or committees.</td>
</tr>
<tr>
<td>T TUESDAY</td>
<td>2 9:45 A.M. – 11:15 A.M.</td>
<td></td>
</tr>
<tr>
<td>W WEDNESDAY</td>
<td>3 11:30 A.M. – 1:00 P.M.</td>
<td></td>
</tr>
<tr>
<td>R THURSDAY</td>
<td>4 1:30 P.M. – 3:00 P.M.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 3:15 P.M. – 4:45 P.M.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 5:00 P.M. – 6:00 P.M.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7, 8, 9 EVENING SESSIONS</td>
<td></td>
</tr>
</tbody>
</table>

For example: Session W314 = Wednesday, 11:30 a.m. - 1:00 p.m., Educational Research and Methods Division

**Monday morning workshops start at 9:00 a.m. Pacific Standard Time**
### 2021 ASEE Program Chairs

ASEE would like to acknowledge and thank the 2021 ASEE Program Chairs for their tireless efforts and dedication to our organization.

<table>
<thead>
<tr>
<th>Division</th>
<th>Program Chair Name</th>
<th>Program Chair Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerospace Engineering</td>
<td>Dr. Michael C. Hatfield</td>
<td>University of Alaska Fairbanks</td>
</tr>
<tr>
<td>Architectural Engineering</td>
<td>Prof. John J. Phillips P.E.</td>
<td>Oklahoma State University</td>
</tr>
<tr>
<td>Biological and Agricultural Engineering</td>
<td>Prof. Heidi A. Diefes-Dux</td>
<td>University of Nebraska–Lincoln</td>
</tr>
<tr>
<td>Biomedical Engineering</td>
<td>Dr. Aileen Huang-Saad</td>
<td>University of Michigan</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>Dr. Vincent J. Tocco</td>
<td>University of Florida</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>Dr. Matthew D. Lovell P.E.</td>
<td>Rose-Hulman Institute of Technology</td>
</tr>
<tr>
<td>College-Industry Partnerships</td>
<td>Dr. Charles E. Baukal Jr. P.E.</td>
<td>John Zink Co.</td>
</tr>
<tr>
<td>Community Engagement Division</td>
<td>Dr. Joan B. Schuman</td>
<td>Missouri University of Science &amp; Technology</td>
</tr>
<tr>
<td>Computers in Education</td>
<td>Dr. Steven F. Barrett P.E.</td>
<td>University of Wyoming</td>
</tr>
<tr>
<td>Computing and Information Technology</td>
<td>Dr. Afsaneh Minaie</td>
<td>Utah Valley University</td>
</tr>
<tr>
<td>Construction Engineering</td>
<td>Dr. Rachel Mosier P.E.</td>
<td>Oklahoma State University</td>
</tr>
<tr>
<td>Continuing Professional Development</td>
<td>Dr. Keith Plemons P.E.</td>
<td>MBAS Inc. and VAB Group LLC</td>
</tr>
<tr>
<td>Cooperative and Experiential Education (co-chairs)</td>
<td>Dr. Katherine McConnell</td>
<td>University of Colorado Boulder</td>
</tr>
<tr>
<td>Design in Engineering Education</td>
<td>Dr. Huihui Qi</td>
<td>University of California–San Diego</td>
</tr>
<tr>
<td>Educational Research and Methods</td>
<td>Dr. Kerrie A. Douglas</td>
<td>Purdue University</td>
</tr>
<tr>
<td>Electrical and Computer Engineering</td>
<td>Prof. Huihui Wang</td>
<td>St. Bonaventre University</td>
</tr>
<tr>
<td>Energy Conversion, Conservation, and Nuclear Engineering</td>
<td>Dr. Robert J. Kerestes</td>
<td>University of Pittsburgh</td>
</tr>
<tr>
<td>Engineering and Public Policy</td>
<td>Dr. Deanna H. Matthews</td>
<td>Carnegie Mellon University</td>
</tr>
<tr>
<td>Engineering Design Graphics (co-chairs)</td>
<td>Dr. Lulu Sun</td>
<td>Embry-Riddle Aeronautical University–Daytona Beach</td>
</tr>
<tr>
<td>Engineering Economy</td>
<td>Dr. Ona Egbue</td>
<td>University of South Carolina, Upstate</td>
</tr>
<tr>
<td>Engineering Ethics</td>
<td>Dr. Qin Zhu</td>
<td>Colorado School of Mines</td>
</tr>
<tr>
<td>Engineering Leadership Development (co-chairs)</td>
<td>Dr. Meagan R. Kendall</td>
<td>University of Texas at El Paso</td>
</tr>
<tr>
<td>Engineering Libraries</td>
<td>Ms. Kari Kozak</td>
<td>University of Iowa</td>
</tr>
<tr>
<td>Engineering Management</td>
<td>Dr. John P. Richards P.E.</td>
<td>U.S. Army Corps of Engineers</td>
</tr>
<tr>
<td>Engineering Physics and Physics</td>
<td>Dr. Robert A. Ross</td>
<td>University of Detroit Mercy</td>
</tr>
<tr>
<td>Engineering Technology</td>
<td>Prof. Christopher David Leblanc</td>
<td>University of New Hampshire</td>
</tr>
<tr>
<td>Division</td>
<td>Program Chair Name</td>
<td>Program Chair Organization</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>------------------------</td>
<td>---------------------------------------------------------</td>
</tr>
<tr>
<td>Entrepreneurship &amp; Engineering Innovation</td>
<td>Dr. Prateek Shekhar</td>
<td>New Jersey Institute of Technology</td>
</tr>
<tr>
<td>Equity, Culture &amp; Social Justice in Education</td>
<td>Dr. James Holly, Jr.</td>
<td>Wayne State University</td>
</tr>
<tr>
<td>Environmental Engineering</td>
<td>Dr. Fethiye Ozis P.E.</td>
<td>Northern Arizona University</td>
</tr>
<tr>
<td>Experimentation and Laboratory-Oriented Studies</td>
<td>Dr. Jacob Bishop</td>
<td>Southern Utah University</td>
</tr>
<tr>
<td>Faculty Development</td>
<td>Dr. Karen A. High</td>
<td>Clemson University</td>
</tr>
<tr>
<td>First-Year Programs</td>
<td>Mr. Timothy J. Hinds</td>
<td>Michigan State University</td>
</tr>
<tr>
<td>Graduate Studies</td>
<td>Dr. Diane L. Peters P.E.</td>
<td>Kettering University</td>
</tr>
<tr>
<td>Industrial Engineering</td>
<td>Dr. Raymond Smith III</td>
<td>East Carolina University</td>
</tr>
<tr>
<td>Instrumentation</td>
<td>Dr. Herbert L. Hess, P.E.</td>
<td>University of Idaho</td>
</tr>
<tr>
<td>International</td>
<td>Dr. Phillip Albert Sanger</td>
<td>Purdue University</td>
</tr>
<tr>
<td>Liberal Education/Engineering &amp; Society</td>
<td>Dr. Juan C. Lucena</td>
<td>Colorado School of Mines</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>Dr. Irina Nicoleta</td>
<td>Drexel University</td>
</tr>
<tr>
<td>Materials</td>
<td>Lessa Grunenfelder</td>
<td>University of Southern California</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Dr. Jeffrey Lloyd Hieb</td>
<td>University of Louisville</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>Dr. Rungun Nathan</td>
<td>Pennsylvania State University – Berks Campus</td>
</tr>
<tr>
<td>Mechanics</td>
<td>Dr. Julian Ly Davis</td>
<td>University of Southern Indiana</td>
</tr>
<tr>
<td>Military and Veterans</td>
<td>Dr. David Blake Stringer</td>
<td>Kent State University</td>
</tr>
<tr>
<td>Minorities in Engineering</td>
<td>Miss Kristin Imhoff</td>
<td>St. Joseph’s University</td>
</tr>
<tr>
<td>Multidisciplinary Engineering</td>
<td>Dr. Cynthia Wise Barnicki</td>
<td>Milwaukee School of Engineering</td>
</tr>
<tr>
<td>New Engineering Educators</td>
<td>Dr. Derek Breid</td>
<td>St. Vincent College</td>
</tr>
<tr>
<td>Ocean and Marine Engineering</td>
<td>Dr. Lynn A. Albers</td>
<td>Hofstra University</td>
</tr>
<tr>
<td>Pre-College Engineering Education</td>
<td>Dr. Katey Shirey</td>
<td>EduKatey</td>
</tr>
<tr>
<td>Software Engineering Division</td>
<td>Dr. Robert W. Hasker</td>
<td>Milwaukee School of Engineering</td>
</tr>
<tr>
<td>Student (program chair)</td>
<td>Miss Adrianne J. Wheeler</td>
<td>Project SYNCERE</td>
</tr>
<tr>
<td>Student (program co-chairs)</td>
<td>Elizabeth Rose Pollack</td>
<td>Michigan State University</td>
</tr>
<tr>
<td></td>
<td>Susan Sajadi</td>
<td>Arizona State University</td>
</tr>
<tr>
<td></td>
<td>Dr. Bryan Mesmer</td>
<td>University of Alabama at Huntsville</td>
</tr>
<tr>
<td>Systems Engineering</td>
<td>Dr. John R. Reisel P.E.</td>
<td>University of Wisconsin–Milwaukee</td>
</tr>
<tr>
<td>Technological and Engineering Literacy/Philosophy of Engineering (co-chairs)</td>
<td>Dr. Stephen T. Frezza</td>
<td>Gannon University</td>
</tr>
<tr>
<td>Two-Year College</td>
<td>Mr. Philip J. Regalbuto</td>
<td>Trident Technical College</td>
</tr>
<tr>
<td>Women in Engineering</td>
<td>Dr. Kristi J. Shryock</td>
<td>Texas A&amp;M University</td>
</tr>
</tbody>
</table>
M143 - 2020/2021 ASEE Board of Directors Meeting - held outside of the virtual conference
8:00 A.M. - 3:00 P.M.
Sponsor: ASEE Board of Directors

PLEASE NOTE: Instructions to attend will be sent directly to Board members.

M178 - UEC Associate Deans’ Meeting
10:00 A.M. - 1:00 P.M.
Sponsor: Undergraduate Experience Committee

Moderators: Mary Besterfield-Sacre, University of Pittsburgh; Jerome Lavelle, North Carolina State University at Raleigh

This annual session provides associate deans an opportunity to network and discuss current issues of interest.

M201 - MONDAY WORKSHOP: ASEE Satellite Workshop
9:00 A.M. - 12:00 P.M.
Sponsor: Aerospace Division

Moderators: Michael Hatfield, University of Alaska Fairbanks; Sharan Asundi, Old Dominion University
Speakers: Dr. Sharan Asundi, Old Dominion University; Dr. Michael C. Hatfield, University of Alaska Fairbanks

Hands-on workshop activity to familiarize instructors with a potential nanosatellite development kit for use in academics and research.

M213 - MONDAY WORKSHOP: Putting Students to Work: Using Findings From a Multi-University Study of Engineers’ First Year of Work to Enhance Design Education
9:00 A.M. - 12:00 P.M.
Sponsor: Design in Engineering Education Division

Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, Ohio State University
Speakers: Dr. Daria A. Kotys-Schwartz, University of Colorado Boulder; Dr. Marie C. Paretti, Virginia Polytechnic Institute and State University; Prof. Robin Ott, Virginia Polytechnic Institute and State University; Prof. Susannah Howe, Smith College; Prof. Julie Dyke Ford, New Mexico Institute of Mining and Technology; Dr. Beshoy Morkos, University of Georgia; Mr. Bob Rhoads P.E., Ohio State University

This workshop is for design educators at all levels who want to enhance their courses by drawing on the latest research about engineering work. The workshop leaders will share findings from their longitudinal study that followed approximately a hundred engineers from industry-oriented capstone design classes at four different universities through the first year of work. The data includes weekly survey data from these new engineers' first three months on the job, as well as interviews at three, six, and twelve months of work. Workshop participants will have the opportunity to read narratives, explore an interactive data dashboard, and learn about new engineers' workplace activities, challenges, and strategies for making a successful transition. The research team will share findings that focus on areas where the capstone course did and didn’t prepare these new engineers for work, highlight key transferable skills, identify areas for enhancement, and note potentially unbridgeable differences. Workshop participants will have opportunities to iteratively identify aspects of their own courses that map to the challenges and strategies seen in our study population and to identify areas for improving or enhancing their courses as they explore the data and results from this project. Participants will also receive materials that can be adapted to their own design courses to help their own students better prepare for engineering practice.
At the end of the workshop, participants will have the skills and resources to capture brain data, and the resources to contribute new theory and insight for engineering design education. This workshop will be relevant to any education researcher interested in measuring neurocognition in students.

**M214B - MONDAY WORKSHOP:**
Fostering Well-Being Amid Cycles of Professional Shame in Faculty-Student Interactions

9:00 A.M. - 12:00 P.M.

**Sponsor:** Educational Research and Methods Division

**Moderator:** Marcelo Guerra Hahn, Sound Commerce

**Speaker:** Marcelo Guerra Hahn, Sound Commerce

Format - A three-hour interactive workshop that will include short lectures, many interactive and participatory activities, and group discussions.

Learning Goals - After completing this course, instructors will be able to:

1. Use synchronous tools (conferencing, advanced screen sharing, breakout rooms, polling, collaborating on cloud documents, quizzes, and contests) to increase interaction in online environments.
2. Use asynchronous tools (i.e., discussion boards, auto-graded assignments, interactive tutorials) to keep students engaged.
3. Use continuous student feedback and automatic metrics to find issues with the class and make improvements.
4. Understand equity issues that arise in online environments.

Timeline:

**Synchronous Tools (1 hour)**

Questions: How to keep students engaged during lecture time? What tools are there available to interact with many students at a time? What is an example of a highly interactive lesson?

Activities: Run a simulated lesson on the basics of data analysis using all these mechanics: conferencing, advanced screen sharing, breakout rooms, polling, collaborating on cloud documents, quizzes, and contests.

**Asynchronous Tools (1 hour)**

Questions: How to keep students engaged outside of lecture time? What tools are there available to keep students engaged? What are some examples of using those tools?

Activities: Continuing with the same example, we'll look at discussion boards, auto-graded assignments, interactive tutorials.

**Feedback and Automatic Metrics (30 minutes)**

Questions: What feedback mechanisms are available to students? What measurements can Learning Management Systems take? How to use this data to improve courses?

Activities: Look at examples of weekly surveys to get continuous feedback from students. Look at examples of data that can be extracted from Learning Management Systems. Look at how to use those together.

**Equity in Online Environments (30 minutes)**

Questions: What can we do and stop doing to make online learning more equitable?

Activities: Group discussion on the central issues affecting equity in online learning.
In this workshop, we seek to advance academic well-being in engineering courses by supporting faculty in navigating difficult emotional experiences within teacher-student relationships. We facilitators will draw on our empirically and theoretically informed perspectives of shame in engineering and other academic settings to provide participants with a guiding framework for navigating moments of professional shame—as experienced by faculty or students—in engineering courses. We conceptualize professional shame as a painful emotional state that occurs when one perceives themselves to have failed to meet socially constructed expectations or standards that are relevant to their identity in a professional domain.

The workshop will be highly interactive but also provide participants with opportunities to learn new content. The content of the workshop will be organized in two ways. First, facilitators will draw on their own investigations to introduce the nuanced constructs of professional shame (associated with becoming a professional) and academic shame (associated with academic performance). More significantly, the facilitators will guide the workshop so that participants may internalize, contextualize, and apply the content to their specific engineering courses.

This workshop is an exhibition of Sketchtivity focusing on understanding and experiencing the tool through three lenses: (1) Educational impacts - classroom implementation and empirical learning outcomes, (2) Software functionality - how the software identifies, processes, and evaluates freehand sketches to provide meaningful feedback, and (3) Software experience - freehand sketching lessons followed by an opportunity to practice on Sketchtivity*. Sketchtivity sets a model for providing feedback on skills that previously have required more hands-on, qualitative instruction. This workshop presents a unique format that allows researchers to see the impacts of this tool through analysis and first-hand experience.

*Attendees are invited to bring their own tablets with pens—these are the ideal tools to experience the software to its fullest. After the workshop, attendees will still be granted access to the software to continue to explore its different features and practice their sketching skills.

**M218 - MONDAY WORKSHOP:**
Teaching More Skills in the Same Amount of Time – Sketchtivity, an AI-Based Tutoring Platform for Free-Hand Sketching While Also Learning Spatial Visualization

9:00 A.M. - 12:00 P.M.
Sponsor: Engineering Design Graphics Division
Moderator: Julie Linsey, Georgia Institute of Technology
Speakers: Dr. Tracy Anne Hammond, Texas A&M University; Dr. Julie S. Linsey, Georgia Institute of Technology; Dr. Kerrie A. Douglas, Purdue University at West Lafayette; Dr. Vimal Kumar Viswanathan, San Jose State University; Mr. Blake Williford

Sketching is a crucial skill in engineering, yet sketching education has continued to take a smaller role in engineering curriculum since the transition to Computer-Aided Design (CAD). There is a critical need for an educational solution that can both teach sketching effectively and provide the necessary human-like feedback without additional burden to or expertise needed by the engineering instructor. Using artificial intelligence (AI) and machine learning (ML), a sketch-recognition-based tutoring system allows students to sketch just as they would with pencil and paper while also providing iterative, real-time, and personalized feedback on their sketching ability. Sketchtivity is a tutoring system for teaching engineering students the critical skill of freehand sketching.

The Online Ethics Center for Engineering and Science (OEC) has recently launched several Communities of Practice (CoPs). This ASEE workshop will serve to launch “Teaching Ethics,” the newest CoP.

**M220 - MONDAY WORKSHOP:**
Launching the OEC's Engineering Ethics Educators Community of Practice: A Workshop to Share Strategies and Discuss Goals

9:00 A.M. - 12:00 P.M.
Sponsor: Engineering Ethics Division
Moderator: Rosalyn Berne, University of Virginia
Speakers: Dr. Rosalyn W. Berne, University of Virginia; Dr. Laura R. Grossenbacher, University of Wisconsin - Madison; Dr. Rider W. Foley, University of Virginia; Dr. Karin Ellison, Arizona State University; Ms. Kelly Laas

The Online Ethics Center for Engineering and Science (OEC) has recently launched several Communities of Practice (CoPs). This ASEE workshop will serve to launch “Teaching Ethics,” the newest CoP.
CoPs are an interactive feature of the OEC, able to host functions such as case writing groups, discussion boards, webinar series, syllabus design workshops, or other activities deemed of interest and value to CoP members. The OEC provides a wealth of resources in support of those who are teaching ethics. This latest CoP will serve to host and support those who have an interest in ethics instruction in engineering, whether they are new to teaching ethics or seasoned veterans. The “Teaching Ethics” CoP will evolve as it grows, reflecting the interests and needs of its members, becoming an active space for the exchange of ideas and to incubate potential collaborations in ethics instruction and research. Workshop participants will play a significant role in its inception.

**M227 - MONDAY WORKSHOP:**
Helping First-Year Students Catalyze Success: How to Productively Bring Serendipity, Risk, and Failure Into the Classroom

9:00 A.M. - 12:00 P.M.

**Sponsor:** First-Year Programs Division

**Moderators:** Timothy Hinds, Michigan State University; Kaitlin Mallouk, Rowan University

**Speakers:** Dr. Jessica A. Kuczenski, Santa Clara University; Dr. Robert Schaffer, Mission College; Mr. Timothy J. Hinds, Michigan State University; Dr. Kaitlin Mallouk, Rowan University

In this workshop, we will present activities, discussions, and strategies that assist in this process. Workshop topics will include: growth mindset, productive failure, imposter syndrome, stereotype threat, cultivating a healthy relationship with risk, catalyzing serendipity, and more.

**M233 - MONDAY WORKSHOP:**
What Makes a Project an “Engineering” Project

9:00 A.M. - 12:00 P.M.

**Sponsor:** Pre-College Engineering Education Division

**Moderator:** Katey Shirey, EduKatey

**Speakers:** Dr. Laura Bottomley, North Carolina State University; Dr. Tameshia Ballard Baldwin, North Carolina State University at Raleigh; Dr. Evelyn C. Brown, North Carolina State University at Raleigh; Dr. Tamecia R. Jones, North Carolina State University at Raleigh; Dr. Katey Shirey, EduKatey

As excitement surrounding K-12 and engineering builds, we need to be mindful of the nuances between science, engineering, and related demonstration activities and art and construction projects, as well as distinctions between engineering design and design thinking. Workshop participants will engage in lively debate and hands-on activities to help elucidate differences and commonalities for teachers in this space. The contents of this workshop have been designed specifically for this audience and conference, and are not a rehash of material you will find online.

**Takeaways:**
- A "kit" (per the workshop description) sent prior to the workshop to people who register by 7/1/21
- Presentations and posters customizable for use in classrooms
- Activity write-ups
- Ties to International Technology and Engineering Educators Association, National Council of Teachers of Mathematics, Next Generation Science Standards

**M233B - MONDAY WORKSHOP:**
Engineering For Us All (e4usa): “Us All” Includes You!

9:00 A.M. - 12:00 P.M.

**Sponsor:** Pre-College Engineering Education Division

**Moderator:** Stacy Klein-Gardner, Vanderbilt University

**Speakers:** Dr. Stacy S. Klein-Gardner, Vanderbilt University; Dr. Kenneth Reid, University of Indianapolis; Mr. Kevin Calabro, University of Maryland College Park

The NSF-funded Engineering For Us All (e4usa) project is an advanced high school course in engineering intended for broadening participation and democratization of the field. The workshop will begin with an overview of e4usa and its accomplishments to date. Workshop participants will be provided two opportunities for learning, participation, and action during the workshop. First, the e4usa team will share models that partner universities use for providing credit and placement to high school students who complete the e4usa curriculum. We will draw upon these models and work collaboratively during the workshop to create a
2021 ASEE VIRTUAL CONFERENCE
MONDAY, JULY 26th SESSIONS

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Plan for new institutions to start the process of awarding such credit. Second, e4usa will present the EDPPSR, a useful tool for evaluating engineering design work for high school and university students (Groves, Abts, Goldberg, 2014). EDPPSR houses 14 elements of engineering design for evaluating “student performance in the underlying knowledge and skill areas to be reliably and repeatedly rated” (Groves, Abts, Goldberg, 2014, p.24.1321.4). We will share a complete engineering design portfolio and participants will learn to score various design steps with reliability and ease.

**M242 - MONDAY WORKSHOP:** Educational Evaluation Skills for Improving Your Teaching and Outreach

9:00 A.M. - 12:00 P.M.

Sponsor: New Engineering Educators Division

Moderators: Derek Breid, Saint Vincent College; Kerry Widder, Milwaukee School of Engineering

Speakers: Dr. Joni Lakin, University of Alabama; Dr. Karen E. Rambo-Hernandez, Texas A&M University; Dr. Derek Breid, Saint Vincent College; Dr. Kerry R. Widder, Milwaukee School of Engineering

One of the challenges of implementing educational innovations is planning and carrying out evaluations of the impact of programs on students. Many professionals trained in engineering have little experience with theories and methods of educational research. In this workshop, we will introduce principles of survey and assessment design for evaluating the impact of educational interventions. We will discuss how logic models for program evaluation can be aligned to common educational theories. We will also look at measuring short- and long-term outcomes, which may include existing national survey instruments or developing assessments specific to your project. We will also cover basic reliability and validity information for improving your assessments and sharing findings with the engineering education community. Examples will also be shared of successful evaluation plans for NSF grants, including CAREER outreach components.

**M242B - MONDAY WORKSHOP:** Developing Facilitators of Learning for a Holistic-Style STEM Professional

9:00 A.M. - 12:00 P.M.

Sponsor: New Engineering Educators Division

Moderators: Derek Breid, Saint Vincent College; Kerry Widder, Milwaukee School of Engineering

Speakers: Dr. Pedro E. Arce, Tennessee Technological University; Andrea Arce-Trigatti; Dr. Stephanie Jorgensen; Dr. Robby Sanders, Tennessee Technological University; Dr. Derek Breid, Saint Vincent College; Dr. Kerry R. Widder, Milwaukee School of Engineering

Leading organizations such as the National Academy of Engineering (NAE) (2004) have championed the development of a new type of engineer: holistically skillful, adaptable to work with lean resources, impactful to society’s challenges, and entrepreneurial. These skills required of holistic STEM professionals are aligned with composer-like traits (i.e., the ability to identify and resolve problems using innovative and interdisciplinary strategies), which is a considerable departure from the classical professional whose traits are aligned with conductor-like skills (i.e., focused on executing well-designed content-specific solutions proposed by others) (Arce, 2009). In accordance, the training of holistic STEM professionals requires a different learning environment and instructional approach that necessitates collaboration, is student-centered, and has a focus on innovation and fluency in interdisciplinary fields (Jorgensen et al., 2019). While educational research is available to indicate methods of instruction appropriate for the development of holistically-trained engineers (Arce & Schreiber, 2004; Felder & Brent, 2015; Grasso & Burkins, 2012), few efficient platforms exist to assist with the implementation of said instruction and even fewer guidelines are available to develop the necessary skills aligned with a facilitator of learning specific to this type of holistic STEM professional. At TTU, we have developed and assessed a pedagogical learning platform, the Renaissance Foundry Model (herein, the Foundry) (Arce et al., 2015; Jorgensen et al., 2019) that has received several university awards and recognitions from ASEE and other international organizations as an effective platform to guide the development of holistic-style STEM professionals. This workshop will introduce the Foundry and train educators interested in becoming effective facilitators of learning in applying this platform.
The primary audience for this workshop is engineering educators interested in learning about active learning or inquiry learning concepts. It is open to new and experienced faculty, administrator, or program directors and coordinators. All participants will achieve the following: a) a basic understanding of working with the Foundry; b) a knowledgeable level in designing and implementing courses guided by the Foundry; and c) an initial understanding of the various aspects involved when facilitating courses guided by the Foundry. Our goal for this workshop is that participants will receive extensive training that will be helpful for their self-learning in developing skills associated with becoming effective facilitators of learning geared towards the development of holistic-style STEM professionals as guided by the Foundry.

Take-home materials: Participants will receive examples of implementation materials from previous courses where the Foundry has been used. They will receive links for additional materials in order to support their development as well as coaching to develop and implement Foundry-guided strategies in their own courses. Case studies featured in this workshop will also include examples of student team projects (e.g., prototypes of innovative technology, the protection of their IP, and organization of a start-up company).

M245 - MONDAY WORKSHOP: Projects-Based Arduino/ Raspberry Pi Activities
9:00 A.M. - 12:00 P.M.
Sponsor: Engineering Physics and Physics Division
Moderator: Robert Ross, University of Detroit Mercy
Speakers: Dr. Carl K. Frederickson, University of Central Arkansas; Dr. Bala Maheswaran, Northeastern University; Dr. Robert A. Ross, University of Detroit Mercy

A basic knowledge of Arduinos, Rasperry Pis, or other similar systems is essential to any engineering program and engineering projects in the ever-evolving electronic world. Engineering and science students are often using these control systems in class activities and projects. This workshop will focus on introducing the Arduino and Raspberry Pi systems as the data acquisition platforms in freshman engineering physics and engineering courses. The workshop will emphasize how these systems can be used in the laboratory portion of the introductory physics and engineering courses. An overview of the systems will be presented along with hardware necessary to interface with equipment already available in many freshman laboratories. A number of sample projects will be presented. Some interactive, hands-on activities will demonstrate how to apply the knowledge. Participants will need a computer with the Arduino IDE installed and will use the Arduino sketch software. This software is available as a free download at https://www.arduino.cc/en/Main/Software.

M246 - MONDAY WORKSHOP: Expressing Computing Competency Statements
9:00 A.M. - 12:00 P.M.
Sponsor: Software Engineering Division
Moderator: Robert Hasker, Milwaukee School of Engineering
Speakers: Dr. Stephen T. Frezza, Gannon University; Dr. Robert W. Hasker, Milwaukee School of Engineering

The workshop will model sample computing competency statements using the CC2020 Model, group competency statements by discipline, have participants outline assessment mechanisms for structured statements based on the first two steps, and integrate these into a CC2020 prototype tool to facilitate comparing results.

M257 - MONDAY WORKSHOP: Transform Your Institution’s Faculty Development with the ASPIRE Inclusive Professional Framework for Faculty (IPF: Faculty)
9:00 A.M. - 12:00 P.M.
Sponsor: Faculty Development Division
Moderators: Karen High, Clemson University; Jacqueline El-Sayed, American Society for Engineering Education
Speakers: Dr. April Dukes, University of Pittsburgh; Dr. Jacqueline A. El-Sayed, American Society for Engineering Education; Dr. Karen A. High, Clemson University

This informational and interactive workshop will introduce a set of research-based attitudes, knowledge,
and skills that will provide faculty with a core set of best practices to improve inclusive engagement with students and colleagues. Participants will explore the ASPIRE Inclusive Professional Framework for Faculty (IPF: Faculty) and how to incorporate it into already existing or new faculty development programs. The goal of the workshop is to reinforce inclusive, culturally sensitive practices for the many roles that faculty manage at their institutions: inclusive teaching, mentoring in a research setting, academic advising, and being an inclusive colleague. Participants will engage in exercises in which they will practice various domains of the IPF: Faculty and explore aligned case studies. Participants will leave the session prepared to initiate incorporating the IPF: Faculty into their faculty development programs to move the needle toward a more inclusive campus.

**M299B - MONDAY WORKSHOP: Visual, Creative Problems for Any Engineering Course: Student-Created Problems that Reverse Engineer YouTube Videos**

9:00 A.M. - 12:00 P.M.

Sponsor: Sponsored Sessions

Moderator: Matthew Liberatore, University of Toledo

Speaker: Prof. Matthew W. Liberatore, University of Toledo

Most students enrolled in higher education today have grown up with access to computers, handheld digital devices, and the Internet. This workshop demonstrates how a pedagogy originally called YouTube Fridays can be used to engage this generation of digital natives and be a source of new course material.

YouTube Fridays devoted a small fraction of class time to student-selected videos related to the course topic, e.g., thermodynamics. Later adoptions had students write and solve a homework-like problem based on the events in a video. Numerous recent pilots involving hundreds of students have developed a database of videos and questions that reinforce important class concepts, such as energy balances and phase behavior. The workshop will include dissemination of key results of the National Science Foundation-sponsored project (DUE1712186).

**M299C - MONDAY WORKSHOP: America Learns Mathematics**

9:00 A.M. - 12:00 P.M.

Sponsor: Sponsored Sessions

Moderator: Andrew Grossfield, Vaughn College

Speaker: Andrew Grossfield, Vaughn College

Why isn’t mathematics as popular among Americans as soccer? Those familiar with mathematics see fascinating puzzles, games, patterns, and amazing facts. Could mathematics be introduced in such a way as to appear more appealing, accessible, and understandable to everyone? Could mathematics be introduced in such a way that more students take pleasure in studying math and figuring it out?

Conventional pre-calculus and calculus texts are designed by mathematicians with an aim of deriving logical proofs. On the other hand, our society needs more people capable of performing analytical jobs and making decisions based on mathematical facts and statistics.

This workshop is planned as a forum to address these societal needs by providing more acceptable and reasonable alternative explanations.

Example topics:

- Why are we using letters? What is x?
- Are variables and unknowns the same or is there a difference?
- Can high school algebra really predict the future?
- What are functions? What are inverse functions?
- What is pi? How can sine and cosine be explained?
- What are the three most important words in differential calculus?

Topics raised by attendees will receive top priority. The workshop is comprised mostly of uncluttered slides displaying ideas for teachers to bring to their classes.

Mathematics can do much more for our society than serve as a vehicle for conveying proofs.

Mathematics is a science and should be every child’s first science—the science of quantity, order, structure, proximity, separation, symbol manipulation, and patterns. The objects of mathematics—numbers, variables, equations, curves, vectors, etc.—are as real, as interesting, and as worthy of
study as are the plant and insect life in the jungle’s interior, the animals in the arctic, moon rocks, or cyclones.

**M299D - MONDAY WORKSHOP:**
**Tips and Tools to Integrate Sociotechnical Thinking in the Classroom for the Next Generation of Engineering Professionals**

**9:00 A.M. - 12:00 P.M.**

**Sponsor: Sponsored Sessions**

*Moderator: Kathryn Johnson, Colorado School of Mines*

*Speakers: Dr. Kathryn Johnson, Colorado School of Mines; Dr. Jon A. Leydens, Colorado School of Mines; Dr. Stephanie Claussen, San Francisco State University; Dr. Janet Y. Tsai, University of Colorado Boulder; Prof. Jennifer Blacklock, University of Colorado Boulder; Dr. Barbara M. Moskal, Colorado School of Mines*

In this workshop, we will help our colleagues expand sociotechnical thinking opportunities within their classes. We will share findings from our four-year National Science Foundation-sponsored research project and prior work in the literature, including what we wish we had known when we started, what we know now, and what we recommend to facilitate integration. Our findings are drawn from three engineering classes at two public universities at the first-, second-, and third-year levels in both the engineering science core and engineering design. Select examples from these classes will be provided in the workshop to inspire novel course application ideas among workshop participants.

Our target audience is college- and university-level engineering educators. Interested professors will include those who may want to find new ways to promote intrinsic motivation among a more diverse student body, those interested in responding to student requests for more “real world” examples, those who want to help shape the future of engineering, and those looking for more ways to address the sociotechnical elements of ABET review. We encourage participants to bring the syllabus for one or more of their classes so they can use the workshop to develop specific integration plans within these classes.

The workshop structure will involve short faculty presentations alternating with time for attendees to work on their class plans. Participants will be organized in small groups so they can share ideas during these work times, and our five facilitators will circulate around the tables to provide additional support. We will encourage workshop participants to share “eureka!” moments and crowdsource problems or concerns to support all of the classes being considered.

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**M299E - MONDAY WORKSHOP:**
**Growing Our Research Community, One Reviewer at a Time**

**9:00 A.M. - 12:00 P.M.**

**Sponsor: Sponsored Sessions**

*Moderator: Lisa Benson, Clemson University*

*Speakers: Dr. Lisa Benson, Clemson University; Dr. Nadia N. Keiham, Arizona State University; Dr. Sarah E. Zappe, Pennsylvania State University*

In this session, participants will consider best practices and generate practical advice for reviewing manuscripts in the field of engineering education research. After introductions and an overview of journal aims, scope, review criteria, and review processes, facilitators will form small groups that are diverse in terms of levels of reviewing experience. Each group will respond to discussion prompts, including questions about working with issues related to race, gender, sexual orientation, ageism, ableism, and other issues related to diversity. Groups will discuss various aspects of reviewing and conduct a mock review of a journal paper (abstract only). Each group will then develop a poster called “Advice for Reviewers” and present their posters, followed by a whole-group discussion. Workshop facilitators (journal editors) will synthesize the discussion and provide additional resources to help participants apply their newly acquired reviewing expertise to their own scholarship. Participants will be provided with instructions for signing up to review for engineering education research journals and also for accessing workshop materials and resources.
M299F - MONDAY WORKSHOP: 
Hands-on Interactive Learning in Fluid Mechanics and Heat Transfer with Virtual Options

9:00 A.M. - 12:00 P.M.

Sponsor: Sponsored Sessions

Moderator: Bernard Van Wie, Washington State University
Speakers: Prof. Bernard J. Van Wie, Washington State University; David B. Thiessen, Washington State University; Dr. Olusola Adesope, Washington State University; Dr. Prashanta Dutta, Washington State University; Dr. Kristin Bryant; Jacqueline Gartner, Campbell University; Mr. Olufunso Oje; Kitana Kaiphanliam, Washington State University; Mrs. Olivia Reynolds, Washington State University; Aminul Islam Khan, Washington State University

Participants will be trained in use of hands-on interactive pedagogy, with virtual options, for teaching concepts in fluid mechanics and heat transfer. We will focus on rationale, actual hands-on sessions, data reliability, assessment, and prospects for getting involved in a national dissemination effort.

M299G - MONDAY WORKSHOP: 
Tools for Equitable and Impactful Pre-College Outreach

9:00 A.M. - 12:00 P.M.

Sponsor: Sponsored Sessions

Moderator: Merredith Portsmore, Tufts University
Speakers: Dr. Merredith D. Portsmore, Tufts University

• Participants will explore data that repositions the work of outreach through an asset-oriented lens and discuss problematic deficit framings for outreach work.

• Participants will look at video data that can support outreach ambassadors in taking a more asset-oriented and relationship-building stance toward their interactions with students.

• Participants will try out and discuss new tools, like Engineering Notebooks, that support outreach ambassadors in developing more meaningful relationships with students and helping develop students’ engineering self-efficacy.

• Participants will provide feedback to facilitators for continued improvement of project resources.

M299H - MONDAY WORKSHOP: 
Broadening Participation in Engineering through Community Colleges: Lessons Learned from the Black Engineering Student Transfer (BEST) Project

9:00 A.M. - 12:00 P.M.

Sponsor: Sponsored Sessions

Moderator: Bruk Berhane, Florida International University
Speakers: Dr. Bruk T. Berhane, Florida International University; Dr. Shannon Hayes Buenaflor, University of Maryland College Park; Dr. Sharon Fries-Britt

While a substantial volume of engineering education literature focuses on expanding the participation of Black undergraduates across engineering disciplines, the majority of these studies are based at four-year Predominately White Institutions. By contrast, only a few studies have explored the pathways of Black students who begin their post-secondary careers in community colleges. In this workshop, investigators leading the Black Engineering Student Transfer (BEST) Project will present findings from their three-year National Science Foundation-funded study of African-diasporic collegians who have transferred or plan to transfer from community colleges to four-year engineering programs. The BEST Project examines undergraduate engineering experiences in post-secondary institutions in the Mid-Atlantic region of the United States, and, given the multicultural diversity of this region, also reveals differences in the perspectives of both foreign-born and domestic Black undergraduates in engineering.

Workshop attendees will have the opportunity to review and respond to results related to themes generated from undergraduate participant responses and perspectives such as: 1) Institutional supports that lead to persistence at both community colleges as well as four-year programs; 2) Programs and individual student strategies that support transfer processes; and 3) Differences in outcomes as reported by foreign-born and domestic respondents in the study.

Attendees will discuss these and/or other findings associated with the BEST project in a “roundtable” format, having the chance to move from one “table” to another to explore different findings or themes. Roundtables will be arranged based on registration information such that community college and four-year institution representatives sit together.
in order to promote collaboration across institutional types. Topics discussed across roundtables will vary. For example, one roundtable may be focused on articulation agreements between community colleges and four-year schools, while another might explore cultural and institutional climate differences that students experience after transfer. All attendees will be provided with infographics that provide visual representations of themed findings. During the workshop, participants will be asked to situate the applicability of BEST Project outcomes within their own institutional and geographic context, as a way of identifying the feasibility of implementing change within their particular colleges or universities. Upon conclusion of the workshop, facilitators will synthesize and organize attendee responses and reactions to these outcomes into a working document, which will be shared with attendees for them to potentially employ in their home institutions.

**M2991 - MONDAY WORKSHOP: Task-based Educational Interventions on Design for Additive Manufacturing**

*9:00 A.M. - 12:00 P.M.*

**Sponsor: Sponsored Sessions**

**Moderator:** Rohan Prabhu, Pennsylvania State University

**Speakers:** Dr. Nicholas Meisel, Pennsylvania State University; Dr. Stephanie Cutler, Pennsylvania State University; Prof. Timothy W. Simpson, Pennsylvania State University; Dr. Scarlett Rae Miller P.E., Pennsylvania State University; Mr. Rohan Prabhu, Pennsylvania State University

Advances in additive manufacturing (AM) processes have resulted in these technologies becoming ubiquitous both in design and in manufacturing. Moreover, we have seen an increased interest among educators in integrating AM in engineering education, from cornerstone to capstone courses across various disciplines.

The goal of this workshop is to help participants integrate DfAM in their courses through task-based interventions. First, we aim to encourage participants to reflect on the educational objectives they wish to achieve when introducing DfAM in their educational practice. Second, we aim to introduce participants to variations in a task-based educational intervention that can be employed to achieve the desired educational objectives. Finally, we aim to introduce participants to evaluation tools that can be used to assess students’ learning and DfAM use when implementing DfAM educational interventions.

The workshop will comprise multiple hands-on activities to increase participant engagement. Specifically, participants will be asked to complete a short design task to experience the educational intervention from the students’ perspective. Additionally, participants will be asked to design an educational intervention based on the educational objectives they wish to achieve from the said intervention.

Participants with prior DfAM/AM educational experience will be encouraged to reflect on their past experiences and identify opportunities to (re)design their intervention in light of our research findings (conducted as part of the National Science Foundation Grant #CMMI-1712234). The workshop is intended for design and manufacturing educators, but practicing designers and researchers in the design research and manufacturing domains are also welcome, as are participants interested in integrating AM/DfAM in their educational practice, irrespective of prior AM/DfAM experience. Participants without prior AM/DfAM experience will be encouraged to brainstorm new courses or modules to integrate DfAM in their educational practice.

**M299K - MONDAY WORKSHOP: Contemplative Pedagogies: A Way of Democratizing Engineering Education**

*9:00 A.M. - 12:00 P.M.*

**Sponsor: Sponsored Sessions**

**Moderator:** Yevgeniya Zastavker, Franklin W. Olin College of Engineering

**Speakers:** Dr. Yevgeniya V. Zastavker, Franklin W. Olin College of Engineering; Dr. Madhvi Jayalakshmi Venkatesh

Contemplative pedagogies have been used in the higher education context to shift the focus of teaching and learning from “third person” or didactic methods to approaches that integrate “first person” ways of knowing. This shift in focus allows learners to delve deeper into understanding and integrate their lived, embodied experiences and those of others into their learning processes. This workshop will provide engineering educators with a toolbox of contemplative pedagogies and demonstrate examples of the ways in which engineering classrooms might look and feel when they engage mindful, affective, and embodied
ways of knowing. Participants will gain an experiential understanding of how this educational paradigm supports the co-creation of learning communities, generation of deeper understanding of learners’ sense of selves and others, and engagement in embodied learning of engineering content.

M299L - MONDAY WORKSHOP: Collaborative Learning in Online Professional Development Engineering Courses

9:00 A.M. - 12:00 P.M.
Sponsor: Sponsored Sessions
Moderator: Tiantian Li, Purdue University at West Lafayette
Speakers: Dr. Kerrie A. Douglas, Purdue University at West Lafayette; Dr. Andrew Hurt, Purdue University at West Lafayette; Dr. Wanju Huang, Purdue University at West Lafayette; Ms. Tiantian Li, Purdue University at West Lafayette

With rapidly increasing technological advancements, practicing engineers need opportunities to learn in environments that will increase their ability to translate the new knowledge into application. Cognitive science and learning sciences research have shown that people learn at deeper levels when given the opportunity to solve authentic problems with others. In professional development, though, learners are typically full-time employees with many responsibilities – both personal and professional. In addition, learners may be located in many different time zones, further decreasing the feasibility of learners being able to work synchronously together. Thus, most online courses designed for professional engineers are generally highly individual to provide flexibility with little to no opportunities for collaborations among learners. The purpose of this workshop is to inform instructors, instructional team members, and support staff on the importance of collaborative learning, instructor presence, and how to facilitate them while still allowing learners flexibility.

Community of Inquiry (CoI) is a framework that is commonly used to guide the development of learning community within online courses. It includes three elements: social presence, teaching presence, and cognitive presence. Social presence refers to the relationships that learners and their instructor develop and the interactions that learners have among themselves and with the instructor within the course. Teaching presence focuses on how the instructor shares their expertise with the learners through creating learning content, designing learning activities, and facilitating learning. Cognitive presence emphasizes the capabilities that learners have to synthesize and create knowledge.

The presenters of this workshop advocate using the Community of Inquiry to guide the design, delivery, and improvement of online courses. Concrete and specific examples that the audience can apply in their courses will be provided. In addition, the presenters will discuss and demonstrate how the carefully and intentionally engineered design and delivery processes can enable instructors to assess learning outcomes and assist the instructors and/or instructional designers in making data-informed decisions to improve the course. This workshop will introduce some innovative teaching pedagogies for instructors to facilitate collaborations in online professional development programs and explain why it is important to do so.

Preliminary Timeline (subject to revision)
9:00 - 9:20 Discussion about role of instructor in professional development courses
9:20 - 9:40 Introduce importance of collaborative learning and CoI framework
9:40 - 10:00 Apply applications of the CoI framework to the design of professional development online courses (attendees to work on their own courses)
10:00 - 10:20 Attendees share
10:20 - 10:30 Break
10:30 - 10:50 Challenges to collaborative learning in professional development contexts
10:50 - 11:10 Apply applications of the CoI to the delivery of the professional development online courses (attendees to work on their own courses)
11:10 - 11:30 Attendees share
11:30 - 11:50 Share resources on best practice for instructors
11:50 - 12:00 Summary of content and wrap-up

M299M - MONDAY WORKSHOP: Designing a High School Biomedical Engineering Curriculum for Differentiated In-person, Virtual, and Hybrid Classroom Environments

9:00 A.M. - 12:00 P.M.
One of the biggest challenges in developing and teaching a biomedical engineering course at the high school level is differentiating a very broad subject area for students with a range of backgrounds in science, math, and engineering. In the first part of the workshop, we will learn techniques for differentiating content and assessments in a biomedical engineering curriculum and how to scaffold course modules. We will also discuss successes and challenges that we have encountered with developing and teaching a biomedical engineering curriculum at the high school level at the North Carolina School of Math and Science and the South Carolina Governor’s School for Math and Science. In the second part of the workshop, we will discuss best practices for translating a traditional face-to-face course to a virtual or hybrid course. We will end the workshop with hands-on demonstration of biomedical engineering activities in biomechanics and bioelectricity that can be incorporated into the curriculum as design or research projects.

M299N - MONDAY WORKSHOP:
New Digital Frontiers:
Understanding Our Place in the Changing Landscape of Higher Education

9:00 A.M. - 12:00 P.M.

Sponsor: Sponsored Sessions
Moderator: Sarah Appelhans, University at Albany-SUNY
Speakers: Dr. Alan Cheville, Bucknell University; Dr. Atsushi Akera, Rensselaer Polytechnic Institute; Thomas De Pree, Rensselaer Polytechnic Institute; Sarah Appelhans, University at Albany-SUNY; Melissa Shuey, Rensselaer Polytechnic Institute

In March 2020, campus closures across the United States mandated a sharp turn toward online teaching. While online courses have been growing in popularity for decades, during the COVID-19 pandemic this trend has accelerated, resulting in rapid, perhaps inelastic, changes in the educational ecosystem. In this workshop, we invite faculty, administrators, students, and EdTech industry representatives to come together after a long year of uncertainty and reflect upon the future landscape of engineering education.

Over the past year, our research team has observed the response of the engineering education ecosystem during this time of great uncertainty and rapid change. Funded by an NSF-EAGER award (DUE-1745922), we have viewed the pandemic as an opportunity to understand the potential opportunities and pitfalls of new online educational technologies. Moments of crisis illuminate the fractures within systems, as well as provide a means for transformation. Thus far, we have collected 60+ interviews with key academic stakeholders including engineering educators, administrators, and students, along with engineers working in industry and experts in educational technology (EdTech) firms. Moving beyond prior theories of pipelines and pathways, we theorize engineering education as a complex ecosystem with a variety of stakeholders with differing motivations and goals. Darwin’s concept of “entangled banks” reveals the living world as having both stable and competitive components, oscillating between periods of stability and chaos. Within our ecosystem, we have discovered that the intentions between different stakeholders (students v. faculty, faculty v. admin) are often misinterpreted, resulting in miscommunications, misalignments, and unintended outcomes.

This workshop will have four key components: First, we will briefly present our understanding of the engineering ecosystem and the impact of digital technologies on higher ed, which have facilitated greater connectivity and decreased reliance upon physical location. Next, we will ask attendees to create maps of their own ecosystems, pre- and post-COVID, with particular attention to connections, resources, and support structures that enable successful education in engineering. Third, we will invite participants to critically reflect upon the benefits and drawbacks of online learning and the current trajectory of higher education. Where do online methods lead to increased understanding? What features of in-person learning do we wish to preserve? Finally, we will summarize the key takeaways from our discussions and directions for the future. We will endeavor to include the perspectives of a variety of stakeholders (students, faculty, admin, industry) in each small group to illustrate tensions and provide an opportunity to enhance communication between stakeholders. We hope this workshop will be valuable in providing broader perspective on the changes underway in engineering education and enable attendees to evaluate and make decisions that will improve undergraduate learning experiences.
M299O - MONDAY WORKSHOP: Using Learning Assistants in Face-to-Face and Virtual STEM Courses

9:00 A.M. - 12:00 P.M.

Sponsor: Sponsored Sessions

Moderator: Brian Self, California Polytechnic State University, San Luis Obispo

Speakers: Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo; Laura Ríos, California Polytechnic State University, San Luis Obispo; Dr. Benjamin David Lutz, California Polytechnic State University, San Luis Obispo

The workshop will begin with interactive demonstrations of using active learning techniques, along with evidence on the benefits of these practices. Throughout this portion, workshop organizers will act as Learning Assistants (LAs), modeling how undergraduate students can be used as LAs. We will then discuss why LAs can be so effective, including the benefits of near-peer instructional guidance. The logistics of setting up an LA program will be discussed, including training the undergraduate LAs to teach by questioning and not by telling. Our team will also present some of our research on LA epistemological development and LA growth during their experiences. Finally, we will model how to use LAs during virtual class sessions and how valuable they can be during online breakout rooms during collaborative student activities.

M299P - MONDAY WORKSHOP: The Evolution of Tools in Enabling Effective Remote Laboratory Delivery in Engineering Curricula

9:00 A.M. - 12:00 P.M.

Sponsor: Sponsored Sessions

Moderator: Mark Thoren, Analog Devices, Inc.

Speakers: Mr. Mark William Thoren, Analog Devices, Inc.; Robin Getz, Analog Devices, Inc.; Dr. Robert John Bowman, Rochester Institute of Technology

A hands-on introductory class in practical engineering skills was developed by Dr. Robert Bowman at RIT and has been employed since 2003. This class has a proven record of increasing retention by providing first-year students with an intuitive bridge between abstract textbook concepts and the lab bench. However, the natural world has recently imposed severe restrictions on traditional in-person lab instruction, forcing creative ways of maintaining hands-on pedagogy.

In this workshop led by Dr. Bowman and Analog Devices University Program engineers, attendees will explore how advances in modern, low-cost instrumentation not only enable but also enhance hands-on pedagogy, allowing students to perform labs anywhere, anytime.

Before the workshop, attendees will put themselves into the students' shoes and go through an intermediate-level lab exercise on their own, which will include:

- Construction of an oscillator circuit
- Measuring the circuit with a low-cost USB-based test instrument
- Relating results back to textbook theory

The workshop event will be an active discussion on attendees' experiences and concerns (and maybe even some real-time circuit debugging). We'll then review additional exercises (both freely available and commercial) that follow a similar strategy. Dr. Bowman will review some of the pitfalls he has experienced over 17 years in offering remote lab exercises and suggest approaches to make the remote lab sessions effective for all students.

Advance preparation for this workshop is essential: Instructions, parts kits, and USB-based test instruments will be provided to up to 50 attendees ahead of time. Attendees are encouraged to prepare questions and comments based on their experience performing the experiment.

M299Q - MONDAY WORKSHOP: Research-Based Strategies to Advising Graduate Students

9:00 A.M. - 12:00 P.M.

Sponsor: Sponsored Sessions

Moderator: Juan Cruz, Rowan University

Speakers: Dr. Stephanie G. Adams, University of Texas at Dallas; Dr. Holly M. Matusovich, Virginia Polytechnic Institute and State University; Dr. Mayra S. Artiles, Arizona State University; Dr. Juan M. Cruz, Rowan University

The strategies that we will share in our workshop stem...
from an NSF-funded project titled the Dissertation Institute. The Dissertation Institute is a week-long intervention for minority students in the final phases of the doctorate. During this intervention, students are given a series of workshops and tools for succeeding in the doctoral pursuit as well as time to practice these skills, particularly those relevant to writing. We also conduct research on motivational factors affecting students' experiences in pursuing a doctorate.

Using these data, we have studied commonalities that have led us to develop a series of strategies for helping doctoral students succeed in their doctorate by providing them with a more accurate support to their necessities. Through the use of discussion and cases, participants will be able to learn and practice strategies on the following topics:

- Scaffolding students into independent research
- Building trust and rapport with the graduate students
- Leveraging opportunities to sustain degree process
- Motivational strategies to help students get unstuck
- Managing the writing process
- Encouraging mental health awareness

This workshop is designed for all faculty who currently advise graduate students. Early-career faculty are particularly encouraged to attend.

**M299R - MONDAY WORKSHOP:**
**Equity-Minded Asset-Based Mentoring for Students and Faculty: Strengths Training From a Social Justice Perspective**

**9:00 A.M. - 12:00 P.M.**

**Sponsor: Sponsored Sessions**

**Moderator:** Jane Lehr, California Polytechnic State University, San Luis Obispo

**Speakers:** Dr. Jane L. Lehr, California Polytechnic State University, San Luis Obispo; Dr. Brissa Yazmin Quiroz, California State University, Fresno; Dr. Daniel Almeida, California Polytechnic State University, San Luis Obispo

During this workshop, participants will learn about and practice with a new asset-based approach to mentoring that is currently being utilized, studied, and further developed in two NSF-funded projects: an S-STEM project designed to support pre-transfer, low-income, academically talented engineering and computer science students and an AGEP project designed to support new tenure-line and lecturer faculty from minoritized and underrepresented groups in STEM.

The mentoring model integrates assets- or strengths-based approaches in positive psychology with critical mentoring (Weiston-Serdan, 2017) and equity-mindedness. Bensimon, Dowd & Witham (2016) describe equity-mindedness as an approach that is “color-conscious”; recognizes “that beliefs, expectations, and practices assumed to be neutral can have outcomes that are racially disadvantageous”; takes institutional “responsibility for the elimination of inequality”; and is “[a]ware that while racism is not always overt, racialized patterns nevertheless permeate policies and practices in higher education institutions.”

Some colleges and universities have introduced the concept of strengths-based student mentoring to challenge a “deficit cognitive frame” (Bensimon, 2005) in mentor/mentee relationships “in which underserved and underrepresented students from low-income backgrounds are portrayed as ‘high risk,’ 'high maintenance,' 'underprepared,' or 'culturally deprived’” (Rendón, Nora, and Kanagala, 2014). However, many implementations of assets-based approaches – for example, the CliftonStrengths model, when used by itself – continue to ignore the specific historical and institutional contexts of inequality that contribute to student non-retention. In addition, strengths-based and other assets-focused models of mentoring in engineering, computer science, and other STEM fields – even those that integrate a social justice perspective – often ignore the ways in which engineering, computing, and other STEM disciplinary cultures, themselves, assume that students are “in deficit” – particularly those from groups that are underrepresented and, in some cases, are explicitly designed to identify these “deficit students” and weed them out (Riley, 2017). Similar issues exist in many faculty mentoring programs.

In contrast, our implementation utilizes a “social justice perspective of strengths-based educational work” (Gardner & Toope, 2011, p. 86) in which mentors and mentees engage in activities focused on power, privilege, and oppression that are informed by Critical Race Theory in education (e.g., Yosso, 2005; Saetermoe, et al 2017) to explore the intersections of student and faculty strengths with their social and cultural identities and collaboratively examine higher educational institutions and STEM disciplinary cultures as contributing to faculty and student non-success and, indeed, oppression. Lastly, following from Weiston-
Serdan (2017) and others, we understand mentor/mentee relationships and mentoring as a site to “address root causes” rather than just “manage symptoms” of the highly stratified and oppressive worlds in which we live, learn, and work. This approach to mentoring is designed to position mentors and mentees to take action – as institutional actors – to create more equitable conditions at their institutions and disciplines.

**M299S - MONDAY WORKSHOP: Teamwork: How Can Faculty Positively Influence Their Student Teams**

*9:00 A.M. - 12:00 P.M.*

**Sponsor: Sponsored Sessions**

**Moderator:** Lisa Abrams, Ohio State University  
**Speakers:** Dr. Lisa Abrams P.E., Ohio State University; Dr. Jeffrey E. Frayd, Ohio State University; Dr. Adithya Jayakumar, Ohio State University; Ms. Lucille Sheppard, Ohio State University; Dr. Toni M. Calbert, Ohio State University

This interactive workshop will allow participants to learn, discuss, and share strategies to form, facilitate, monitor, and evaluate student teams.

**M299T - MONDAY WORKSHOP: Engaging With MIDFIELD Data**

*9:00 A.M. - 12:00 P.M.*

**Sponsor: Sponsored Sessions**

**Moderator:** Susan Lord, University of San Diego  
**Speakers:** Dr. Susan M. Lord, University of San Diego; Dr. Matthew W. Ohland, Purdue University at West Lafayette; Dr. Marisa K. Orr, Clemson University; Dr. Richard A. Layton

The main goal of the workshop is making MIDFIELD more accessible to the ASEE community. The workshop introduces midfieldr (a package in the R software environment) that provides access to a MIDFIELD student-record data sample and tools to analyze and graph persistence metrics such as graduation rates. The workshop is designed for R beginners.


**Materials:**

Pre-workshop software (R) installed using device that you will be using at the workshop.

**M299U - MONDAY WORKSHOP: Techniques to Identify Appropriate NSF Funding Programs and Prepare Competitive NSF Engineering Education Research Proposals**

*9:00 A.M. - 12:00 P.M.*

**Sponsor: Sponsored Sessions**

**Moderator:** Vinod Lohani, National Science Foundation  
**Speakers:** Dr. Monica E. Cardella, Purdue University at West Lafayette; Dr. Christine S. Grant, North Carolina State University at Raleigh; Dr. Abiodun A. Ilumoka Nwabuzor, University of Hartford; Dr. John Jackman; Dr. Jumoke ‘Kemi’ Ladeji-Osias, Morgan State University; Prof. Jill K. Nelson, George Mason University; Dr. Eric J. Sheppard, Hampton University; Dr. Margret Hjalmarson, National Science Foundation; Vinod Lohani, National Science Foundation

Program directors from the National Science Foundation will conduct this workshop for members of the engineering education community. There are multiple funding programs at the foundation that invest in leading-edge engineering education research that advances our understanding of learning, teaching, equitable participation in engineering, and institutional change in engineering education at all education levels and in diverse settings. Selecting the right NSF program for your new idea and writing a compelling narrative are two critical steps in making your proposal competitive.

The program directors will provide guidance on how to identify appropriate funding programs and enhance the quality of proposals submitted to engineering education funding opportunities in the Division of Undergraduate Education (DUE), Division of Graduate Education (DGE), Division of Research on Learning in Formal and Informal Settings (DRL), and Engineering Education and Centers (EEC). Participants will learn about the proposal submission and administration processes as well as how to write better proposals. Additionally, participants will engage with Principal Investigators (PIs) of previously funded NSF projects to better understand the process of planning, crafting, and submitting engineering education
research proposals from the PI perspective. Participants will leave the workshop with a better understanding of the engineering education research programs available as well as strategies to improve their proposals.

**M299V - MONDAY WORKSHOP:**
**Appropriate Evaluations of Applicants’ Diversity Statements for Improved Inclusivity and Convergent Thinking**

*9:00 A.M. - 12:00 P.M.*

**Sponsor:** Sponsored Sessions  
**Moderator:** P.K. Imbrie, University of Cincinnati  
**Speakers:** Dr. Stephanie G. Adams, University of Texas at Dallas; Dr. P.K. Imbrie, University of Cincinnati; Dr. Teri Kristine Reed, University of Cincinnati; Dr. Carmen Sidbury, National Action Council for Minorities in Engineering, Inc.; Dr. Bevlee A. Watford P.E., Virginia Polytechnic Institute and State University; Dr. Karan Watson P.E., Texas A&M University

Engineering educators are going to enhance students’ abilities to develop their professional skills with convergence norms driving creativity and innovation. NSF has defined such thinking in research as:

> “the convergence paradigm intentionally brings together intellectually-diverse researchers to develop effective ways of communicating across disciplines by adopting common frameworks and a new scientific language, which may, in turn, afford solving the problem that engendered the collaboration, developing novel ways of framing research questions, and opening new research vistas.”

However, the idea of convergent thinking as a crucial step in meaningful creativity has been around for many years. For example, Isaksen and Treffinger in 1982 listed the guidelines for convergent thinking to get to the most creative and best solutions as:

- **Be Deliberate** – Allow decision-making the time and respect it requires.
- **Check Your Objectives** – Verify choices against your objectives in each step.
- **Improve Your Ideas** – Not all ideas are workable solutions. Even promising ideas must be honed and strengthened.
- **Be Affirmative** – Even in convergence, it’s important to first consider what’s good about an idea and judge for the purpose of improving, rather than eliminating, ideas.
- **Consider Novelty** – Do not dismiss novel or original ideas.

These are still useful guidelines when we want to create a team of professionals with diverse backgrounds and ways of framing, or thinking about, a situation. The ultimate goal being to appreciate and utilize convergent thinking to generate a new framing instead of choosing only one profession's way of framing.

Bourke and Titus found in their research on inclusive leadership six recurring characteristics: visible commitment, humility, awareness of bias, curiosity about others, cultural intelligence, and effective collaboration. While these characteristics differ from convergence guidelines, it is easy to see how the characteristics would aid someone with convergence thinking.

One tool emerging when assessing a new employee or team member is diversity statements. However, academia search committees often do not understand how to evaluate these statements, not only for the sake of diversity and inclusion, but also to enhance convergence thinking as desired in NSF research. The Abura Group principles would propose that, when properly evaluated, such statements are not merely "tie breakers" for qualified applicants, they are fundamental to insights about the applicants’ attitude, skills, and knowledge concerning working in a truly inclusive, diverse, and convergent environment. Therefore, this workshop proposes to lead participants in understanding

- the relationship between diversity statements and convergent thinking;
- the general and unique characteristics of the organizational culture the applicant desires to enter;
- the expectations for different levels of leadership in the organizational culture;
- and finally, the development of rubrics for judging the strength of candidates’ diversity statements depending on the convergence culture and leadership position needed.

**M299W - MONDAY WORKSHOP:**
**Future Engineering "Classrooms"**
Lessons Learned from the Pandemic

9:00 A.M. - 12:00 P.M.

Sponsor: Sponsored Sessions

Moderator: Clayton Byers, Trinity College

The Canadian Academy of Engineering, in partnership with Western University, is organizing a “Global Conference on Engineering Education – Challenges and Opportunities.” This conference consists of a series of symposia, held online, organized with different parties. The first symposium, “Future Perspectives of Engineering Education and the Impact of the Pandemic,” was held during the AGM of the Canadian Academy of Engineering on June 15 and this is the second symposium.

This Symposium at ASEE on July 26 will focus on the future of our engineering classrooms with a perspective from the lessons we’ve learned throughout the pandemic. This session builds on last year’s ASEE webinar series on “Emerging Insights: Navigating Remote Instruction” and seeks to build off the experiences of a number of those panelists. This three-hour session within the 2021 ASEE Annual Meeting will focus on a few major themes to discuss how we can move forward in our classrooms. Experts have been invited to present in these themes, which will be followed by a Q&A panel discussion.

GREET THE STARS!
New Members and First-time Attendees Orientation

12:00 P.M. - 1:00 P.M.

Sponsor: ASEE Headquarters

Moderator: Nathan Kahl, American Society for Engineering Education

Speaker: Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo

Aerospace personnel development and retention

Critical Analyses of Representation and Success Rates of Marginalized Undergraduate Students in Aerospace Engineering

Dr. Corin L. Bowen, University of Michigan
Dr. Aaron W. Johnson, University of Colorado Boulder
Prof. Kenneth G. Powell, University of Michigan

Migrator Stories in an Aerospace Engineering Program

Dr. Devayan D. Bir, Loras College

Identifying the Proactive Actions of Newly Hired Engineers During the Socialization Period

Ms. Yun Dong, Iowa State University
Mr. Subhanwit Roy, Iowa State University
Dr. Lorenzo D. Baber, Loyola University, Chicago
Dr. Benjamin Ahn, Iowa State University

A Comprehensive Review of U.S. Minor Degrees in Aerospace, Aeronautical, and Astronautical Engineering and Unmanned Air Systems

Dr. Thomas A. Ward, Cedarville University
Ms. Corinna Megan Ward, Capital Group

Convergence in Engineering and Architectural Design Education: Mission-driven Integrated Design Studio

Dr. Ryan Solnosky P.E., Pennsylvania State University
Prof. Moses Ling, Pennsylvania State University
Lisa D. Iulo
Mr. David Eric Goldberg, Pennsylvania State University

Schedule subject to change. Please go to https://2021.asee.pathable.co/ for up-to-date information.
2021 ASEE VIRTUAL CONFERENCE
MONDAY, JULY 26th SESSIONS

Dr. Sez Atamturktur, Pennsylvania State University

A Hybrid and Flexible Model for Structural Engineering Courses: Lessons Learnt During the Covid-19 Global Pandemic
Prof. Miguel X. Rodriguez-Paz, Tecnológico de Monterrey
Mr. Jorge A. Gonzalez-Mendivil, Tecnológico de Monterrey
Prof. Israel Zamora-Hernández, Tecnológico de Monterrey
Dr. J. Asuncan Zarate-Garcia, Tecnológico de Monterrey
Prof. Martha Elena Nuñez, Tecnológico de Monterrey
Dr. Gibrán Sayeg-Sánchez, Tecnológico de Monterrey

Structural System Selection for a Building Design Based on Energy Impact
Prof. John J. Phillips, Oklahoma State University
Dr. Tom Elliott Spector
Prof. Khaled Mansy, Oklahoma State University
Prof. Jeanne M. Homer, Oklahoma State University
Mr. William Crawford

State University at Raleigh
Exploration of a Nontraditional Assessment Method Using a Participatory Approach
Dr. Tamara Floyd Smith, Tuskegee University

How We Teach: Kinetics and Reactor Design
Dr. Laura P. Ford, University of Tulsa
Dr. Janie Brennan, Washington University in St. Louis
Dr. David L. Silverstein P.E., University of Kentucky
Dr. Lucas James Landherr, Northeastern University
Dr. Christy Wheeler West, University of South Alabama
Dr. Stephen W. Thiel, University of Cincinnati
Dr. Kevin D. Dahm, Rowan University
Dr. Jennifer Cole, Northwestern University
Prof. Marnie V. Jamieson, University of Alberta

Introducing Partial Differential Equations and Their Numeric Solution Prior to Transport Courses
Dr. Jason C. Ganley, Colorado School of Mines

Problem Solving and Difficulty Perception in YouTube Problems Involving Reacting Systems with Recycle
Uchenna Asogwa, University of Toledo
Mr. Timothy Ryan Duckett, University of Toledo
Dr. Amanda Portis Malefyt, Trine University
Dr. Gale A. Mentzer, Acumen Research and Evaluation, LLC
Prof. Matthew W. Liberatore, University of Toledo

Work in Progress: Creative Projects Supplementing Exams So Students Can Better Demonstrate Their Understanding
Dr. Lucas James Landherr, Northeastern University

M404 - Biomedical Engineering Speed Networking
1:15 P.M. - 2:45 P.M.
Sponsor: Biomedical Engineering Division
Moderators: Sarah Rooney, University of Delaware; Michael Rust, Western New England University; Aileen Huang-Saad, Northeastern University; Renata Ramos, Rice University

This speed networking event kicks off the Biomedical Engineering Division (BED) programming at the ASEE conference. The goal of this session is to develop connections and build community among educators in biomedical engineering. The format will consist of 1-on-1 pairings followed by small-group discussion. Bring your preferred drink and join new and returning members of the BED community to exchange ideas and expand your professional network.

M405 - Learning Outcomes and Assessment Within Chemical Engineering
1:15 P.M. - 2:45 P.M.
Sponsor: Chemical Engineering Division
Moderators: VJ Tocco; Matthew Cooper, North Carolina State University

This session includes papers that cover classroom adaptations as a result of the Covid-19 pandemic. Authors share lessons learned and student perceptions of course modifications.

M406 - Holy Cow! We’re Going Online When?
1:15 P.M. - 2:45 P.M.
Sponsor: Civil Engineering Division
Moderators: David Saftner, University of Minnesota Duluth; Monica Palomo, California State Polytechnic University, Pomona; Matthew Lovell, Rose-Hulman Institute of Technology; Steven Burian, University of Utah

Covid-19 and Virtual Learning: Challenges, Implementation, and Student Perception of Online Course Delivery Formats
Dr. George Okere, University of Cincinnati

Development of Innovative, Adaptable Video Learning Modules for the Civil Engineering Classroom
Dr. Sarah K. Bauer, Rowan University
Prof. Cheng Zhu, Rowan University
Dr. Gilson R. Lomboy, Rowan University
Prof. Mohammad Jalayer

From Face-To-Face to a Virtual Classroom in Three Days
Dr. Monica Palomo P.E., California State Polytechnic University, Pomona
Dr. Bettina Jeanine Casad, University of Missouri - St. Louis

Gratitude and Graph Theory in the Time of Coronavirus
Prof. Gerald J. Wang, Carnegie Mellon University

Understanding the Academic Shock of Covid-19: How are Students' Perceptions of Online Learning Evolving Over Time?
Dr. Masoud Ghodrat Abadi, California State University, Sacramento

Prof. Frank Vahid, zyBooks; University of California, Riverside
Prof. Roman Lysecky, University of Arizona; zyBooks
Dr. Bailey Alan Miller, University of California, Riverside
Lyssa Vanderbeek, zyBooks

Work in Progress: Effects of Computational Aspects of Differential Equations (DE) Course Delivery on Students’ Computing Experience in Engineering Instruction
Mrs. Johannah Lynn Crandall, Washington State University

Work-in-Progress: Incorporating Computational Thinking Instruction into K-12 Using 3D Weather
Dr. Pat Ko, Mississippi State University
Dr. Mahnas Jean Mohammadi-Aragh, Mississippi State University
Mr. Jonathan G. Harris, Northern Gulf Institute
Dr. Jamie Lee Dyer, Mississippi State University
Dr. Yan Sun, Mississippi State University

M408A - Computers in Education 1 - Programming 1

1:15 P.M. - 2:45 P.M.
Sponsor: Computers in Education Division
Moderators: Mattox Beckman, University of Illinois at Urbana - Champaign; Steven Barrett, University of Wyoming; Afrin Naz, West Virginia University Institute of Technology

This session will focus on papers related to teaching students how to program computers in the realm of programming courses.

Coding is the New Coal: A History of Integrating Computer Science Across Wyoming’s K-12 Curriculum
Prof. Astrid K. Northrup P.E., Northwest College
Dr. Raymond Edward Floyd, Northwest College
Dr. S. Renee Dechert, Northwest College
Dr. Andrea Carneal Burrows, University of Wyoming

Connecting Entrepreneurial Mindset to Software Development
Prof. Ben Tribelhorn, University of Portland
Dr. Heather Dillon, University of Washington Tacoma
Dr. Andrew M. Nuxoll, University of Portland
Dr. Nicole C. Ralston, University of Portland

Coding Trails: Concise Representations of Student Behavior on Programming Tasks

M408B - Computers in Education 2 - Programming 2

1:15 P.M. - 2:45 P.M.
Sponsor: Computers in Education Division
Moderators: Ivan Mosley, Tennessee State University; Steven Barrett, University of Wyoming; Afrin Naz, West Virginia University Institute of Technology

This session will focus on papers related to teaching students how to program computers in the realm of programming courses.

VolumeVisual: Design and Evaluation of an Educational Software Tool for Teaching and Learning Volume Visualization
Mr. Xueyi Bao, Notre Dame University
Mr. Jun Han, University of Notre Dame
Dr. Chaoli Wang, University of Notre Dame

Common Logic Errors for Programming Learners: A Three-decade Literature Survey
Nabeel Alzahrani, University of California, Riverside
Prof. Frank Vahid, University of California, Riverside

Work in Progress: A Seamless, Customizable e-Book for Introductory Programming Courses
Prof. Petra Bonfert-Taylor, Dartmouth College
Mr. Simon Ethan Oster, Dartmouth College

Measuring Awareness of Computational Thinking in Kuwaiti Educational Institutions
Safia Malallah, Kansas State University
Mr. Khaled Nasser Alsalmi, The Public Authority for Applied Education and Training
Dr. Joshua Levi Weese, Kansas State University

Ms. Sneha Subramanian, Siebel Center for Design

Impact of Educators Changing Student Motivation: A Study of Transient Factor Correlation and Orthogonality
Devanshi Shah, University of Georgia
Dr. Elisabeth Kames, Florida Polytechnic University
Dr. Beshoy Morkos, University of Georgia

M410 - CPDD Executive Board Meeting
1:15 P.M. - 2:45 P.M.
Sponsor: Continuing Professional Development Division
Moderator: Keith Plemmons

M413A - Design Mental Frameworks
1:15 P.M. - 2:45 P.M.
Sponsor: Design in Engineering Education Division
Moderator: Bob Rhoads, Ohio State University

DEED technical session
Assessing the Engineering Identity in CAD Simulated Engineering Design Challenge
Dr. Tugba Karabiyik, Purdue University at West Lafayette
Ms. Ying Ying Seah, Purdue University at West Lafayette
Dr. Alejandra J. Magana, Purdue University at West Lafayette
Xudong Huang, Concord Consortium
Dr. Shannon Hsianghan-Huang Sung, Institute for Future Intelligence
Dr. Charles Xie, Institute for Future Intelligence

Storytelling with Machines: Innovative Approach of Developing Creative Mindset and Teaching About Mechanisms Through Stories
Dr. Shraddha Joshi, James Madison University

Am I Creative? The Impact of Creativity Intervention on Design Outcomes and Self-perception of Creativity
Andrea MacGregor, James Madison University
Dr. Shraddha Joshi, James Madison University

Design-learning Preferences of First-year Electrical and Computer Engineering Students
Dr. Christopher D. Schmitz, University of Illinois at Urbana Champaign
Mr. Jake Fava, Siebel Center for Design

Impact of Educators Changing Student Motivation: A Study of Transient Factor Correlation and Orthogonality
Devanshi Shah, University of Georgia
Dr. Elisabeth Kames, Florida Polytechnic University
Dr. Beshoy Morkos, University of Georgia

M413B - Design Methodologies 1
1:15 P.M. - 2:45 P.M.
Sponsor: Design in Engineering Education Division
Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, Ohio State University

DEED technical session
Building Self-efficacy and Interest in Engineering Through Design
Dr. Vicki V. May P.E., Dartmouth College
Dr. John P. Collier, Dartmouth College
Dr. Ryan Michael Chapman, Dartmouth College

Mechanical Engineering Students’ Self-limiting Behaviors in Concept Generation
Dr. Jin Woo Lee, California State University, Fullerton
Dr. Shanna R. Daly, University of Michigan

The Educatve Design Problem Framework: Relevance, Sociotechnical Complexity, Accessibility, and Nondeterministic High Ceilings
Dr. Vanessa Svihla, University of New Mexico
Ms. Madalyn Wilson-Fetrow, University of New Mexico
Dr. Yan Chen, University of New Mexico
Prof. Eva Chi, University of New Mexico
Dr. Abhaya K. Datye, University of New Mexico
Prof. Sang M. Han, University of New Mexico
Dr. Linnea K. Ista
Dr. Jamie Gomez, University of New Mexico
Dr. Andrew Olewnik, University at Buffalo, the State University of New York

Work in Progress: A Framework for an Improv Intervention to Increase Psychological Safety and Sense of Belonging on Student Engineering Design Teams
Jenn Campbell, University of Virginia
Dr. Leidy Klotz, University of Virginia

Augmented Reality Computer-aided Design Education (ARCADE) Tool to Improve Student Motivation,
M413C - Empathy and Human-centered Design 1

1:15 P.M. - 2:45 P.M.

Engagement, and Spatial Cognition
Dr. Ulan Dakeev, Sam Houston State University
Dr. Reg Recayi Pecen, Sam Houston State University
Dr. Faruk Yildiz, Sam Houston State University
Ms. Y. Luong, Sam Houston State University

Engineering Design Courses at Liberal Arts Universities
Dr. Xi Wang P.E., University of Mount Union
Dr. Minhao Dai, Kennesaw State University
Miss Gabriella Cataloni, University of Mount Union

M414 - The Role of Peers in Promoting Learning and Persistence

1:15 P.M. - 2:45 P.M.

Building a Functional Cardiograph Over Four Semesters, Part 3: Estimating Heart Rate and Respiration Rate in the Time and Frequency Domains Using MATLAB
Dr. Gail Baura, Loyola University Chicago
Ms. Francisca Fils-Aime, Loyola University Chicago
Vincent Chen, Loyola University Chicago
Leanne Kallemeyn, Loyola University Chicago

What Do Mechanical Engineers Do? A Content Analysis of Mechanical Engineers’ Job Descriptions
Elizabeth Rose Pollack, Michigan State University
Gavan Alexander Sarrafian, Michigan State University
Dr. Michele J. Grimm, Michigan State University

Investigating Engineering Students’ Consideration of People During Concept Generation
Laura R. Murphy, University of Michigan
Dr. Shanna R. Daly, University of Michigan
Thanina Makhlouf, University of Michigan
Eytan Adar
Prof. Sophia Brueckner, University of Michigan
Dr. Colleen M. Seifert, University of Michigan

You Teach Us: Peer Teaching in the Engineering Classroom
Dr. Keilin Jahnke, University of Illinois Urbana - Champaign
Dr. Samantha Lindgren, University of Illinois Urbana - Champaign

Work in Progress: Evaluating Student Experiences in a Residential Learning Community: A Situated Learning Perspective
Ms. Aparajita Jaiswal, Purdue University, West Lafayette
Mr. Joseph A. Lyon, Purdue University, West Lafayette
Dr. Viranga Perera, Purdue University, West Lafayette
Dr. Alejandra J. Magana, Purdue University, West Lafayette
Ms. Ellen Gundlach, Purdue University, West Lafayette
Dr. Mark Daniel Ward, Purdue University, West Lafayette

Work in Progress: An Investigation of the Influences of Peer Networks on Engineering Undergraduate Performance Outcomes
Mr. Jack Elliott, Utah State University
Dr. Angela Minichiello P.E., Utah State University
Dr. Joshua D. Marquit, Penn State Brandywine

Study Partners Matter: Impacts on Inclusion and Outcomes
Ms. Neha Prabhu, University of Illinois Urbana - Champaign
2021 ASEE VIRTUAL CONFERENCE
MONDAY, JULY 26th SESSIONS

Prof. Michelle Perry, University of Illinois Urbana - Champaign
Mr. Renato F. L. Azevedo, University of Illinois Urbana - Champaign
Prof. Lawrence Angrave, University of Illinois Urbana - Champaign
Prof. Suma Bhat, University of Illinois Urbana - Champaign

What Do Students Need from Other Students? Peer Support During Remote Learning
Neha Kardam, University of Washington
Ms. Shruti Misra, University of Washington
Ms. Morgan Anderson, University of Washington
Ziyan Bai, University of Washington
Dr. Denise Wilson, University of Washington

M414B - Studies of Classroom Assessment: Exam Wrappers, Equitable Grading, Test Anxiety, and Use of Reflection

1:15 P.M. - 2:45 P.M.
Sponsor: Educational Research and Methods Division
Moderators: Justin Major, Purdue University at West Lafayette; Hillary Merzdorf, Purdue University at West Lafayette

Examining the Efficacy of Exam Wrappers in a Computer Science Course
Dr. Karen C. Davis, Miami University

Who Benefits from Equitable Grading? A Case Study from a Core Electrical and Computer Engineering Course
Ms. Lauren Singelmann, North Dakota State University

Test Anxiety and Its Impact on Diverse Undergraduate Engineering Students During Remote Learning
Dr. David A. Copp, University of California, Irvine
Prof. Alexander J. Headley, University of Memphis

Work in Progress: Examining Engineering Seniors Students’ Perception of Justice and Fairness of Grading Practices
Dr. Kaela M. Martin, Embry-Riddle Aeronautical University, Prescott
Todd M. Fernandez, Georgia Institute of Technology
Prof. Richard Mangum, Embry-Riddle Aeronautical University, Prescott

What Sticks When the Dust Settles: Evaluating the Retention of Concepts and Thought Processes with Think-Aloud Interviews
Dr. Soheil Fatehiboroujeni, Cornell University
Dr. Matthew Jordan Ford, Cornell University
Dr. Hadas Ritz, Cornell University
Prof. Elizabeth Mills Fisher, Cornell University

Creating Capacity to Explore What Students Learn from Reflection Activities: Validating the Knowledge-gain Survey
Kenya Z. Mejia, University of Washington
Dr. Jennifer A. Turns, University of Washington

M415 - Electrical and Computer Engineering Division Technical Session 1

1:15 P.M. - 2:45 P.M.
Sponsor: Electrical and Computer Engineering Division
Moderators: Huihui Wang, St. Bonaventure University; Nader Rafla, Boise State University; Sandip Das, Kennesaw State University; Ginger Yu, North Carolina State University at Raleigh

Students’ Performance in Remote Flipped Signals Classes
Prof. Ahmed Dallal, University of Pittsburgh

Online, Interactive Tool for Studying How Students Troubleshoot Circuits
Amy Fritz, Stanford University
Prof. Mark Horowitz, Stanford University
Mr. Atindra Jha, Stanford University

Feedback and Control Course Labs for Distance Learning
Dr. Jiahui Song, Wentworth Institute of Technology
Dr. Douglas Eric Dow, Wentworth Institute of Technology
Dr. Lili Ma, New York City College of Technology

Collaborative Problem Solving in a Virtual Electrical Circuits Class
Dr. Shiny Abraham, Seattle University
Mr. Richard Brown Bankhead III, Seattle University
Dr. Jennifer M. Dorsey, University of Texas at Austin

Remote Versus In-hand Hardware Laboratory in Digital Circuits Courses
Dr. Rania Hussein, University of Washington
Dr. Denise Wilson, University of Washington
M416 - Energy Conversion and Conservation Division Technical Session 1: Mechanical and CAD Track

1:15 P.M. - 2:45 P.M.
Sponsor: Energy Conversion and Conservation Division
Moderators: Seyed Mousavinezhad, Idaho State University; Siamak Farhad, University of Akron

This technical session will focus on energy-related educational and research papers with topics falling under fluid mechanics, thermal systems, or CAD.

A Hands-on Learning Module Pipe-flow Velocity Profile Interrogator Laboratory Kit for Remote Online Fluid Mechanics Instruction
Ms. Nina T. Jones, University of Florida
Dr. Sean R. Niemi, University of Florida
Dr. Matthew J. Traum, Engineer Inc.

Hydro-Island: Undergraduate Research Modeling an Ocean Thermal Energy Conversion (OTEC) System
Ms. Leah Hope Sirkis, University of Pittsburgh
Dr. Tony Lee Kerzmann, University of Pittsburgh

Project-based Learning Program for Nuclear Workforce Development Phase II: Implementation
Dr. Hayrettin Bora Karayaka, Western Carolina University
Dr. Chip W. Ferguson, Western Carolina University
Dr. Amber C. Thompson, Western Carolina University

Integration of COMSOL Multiphysics into an Undergraduate Electrical Engineering Curriculum
Dr. Robert J. Kerestes, University of Pittsburgh
Mr. Anthony M. Popovski, University of Pittsburgh
Prof. Feng Xiong, University of Pittsburgh

M418 - Executive Committee Meeting: Engineering Design Graphics Division

1:15 P.M. - 2:45 P.M.
Sponsor: Engineering Design Graphics Division
Moderator: Holly Ault, Worcester Polytechnic Institute

This is a meeting of the executive committee of the Engineering Design Graphics Division, moderated by the chair, Holly Ault.

M419 - Engineering Economy Division Technical Session

1:15 P.M. - 2:45 P.M.
Sponsor: Engineering Economy Division
Moderator: Michael O’Connor, New York University

Including Risk in a Case Study of When to Start Social Security Benefits
Dr. Neal Lewis, University of Nebraska, Lincoln
Dr. Ted Eschenbach, University of Alaska Anchorage

Curriculum Element: Using the Wall Street Journal to Provide National and Global Perspectives in an Engineering Economy Course
Dr. James Burns, Western Michigan University
Dr. Bob White P.E., Western Michigan University

Curriculum Element: Economic Analysis Group Project Using VoiceThread
Kellie Grasman, Missouri University of Science and Technology

M421 - Engineering Libraries Division Lightning Talks 1

1:15 P.M. - 2:45 P.M.
Sponsor: Engineering Libraries Division
Moderators: Kari Kozak, University of Iowa; David Hubbard, Texas A&M University; Sylvia Jones, Southern Methodist University; Mel DeSart, University of Washington; Holly Surbaugh, University of New Mexico; Jennifer Long, University of Alabama at Birmingham

Please note: These talks are held outside the ASEE virtual platform. ELD members should check listservs or asee.org/eld to register for this event to receive links to access the session.

The lightning talks will be over 2 sessions with the format: 10 member talks, Q+A, break 10 member talks, Q+A, break 9 member talks, Q+A, break 6 sponsor talks, Q+A
2021 ASEE VIRTUAL CONFERENCE
MONDAY, JULY 26th SESSIONS

M423 - Engineering Technology Pedagogy 2

1:15 P.M. - 2:45 P.M.

**Sponsor:** Engineering Technology Division

**Moderators:** Byron Garry, South Dakota State University; Christopher Leblanc, University of New Hampshire; Clay Gloster, North Carolina Agricultural and Technical State University

**Focused Curricular Activities Designed to Improve Student Competency in Data-driven Process Improvement**

Mr. Clayton J. Hahola, Montana State University  
Prof. Kevin R. Cook, Montana State University  
Dr. William J. Schell IV P.E., Montana State University

**Graduate Curriculum in Mechatronics and Robotics: Development and Implementation Challenges for Engineering Technology**

Dr. Avimanyu Sahoo, Oklahoma State University  
Dr. Chulho Yang, Oklahoma State University  
Dr. Young Bae Chang P.E., Oklahoma State University

**Identifying the Need for Trained Machinists in the Greater Tri-cities Area: A Survey of Employers to Evaluate the Future of Machining**

Dr. Mohammad Moin Uddin P.E., East Tennessee State University  
Mr. Bradley Alan Stufflestreet, Northeast State Community College  
Dr. Keith V. Johnson, East Tennessee State University

**Integrating 3D Printing into Engineering Technology Curriculum**

Dr. Mert Bal, Miami University  
Dr. Farnaz Pakdel, Miami University

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M424 - Entrepreneurship and Engineering Innovation Division Technical Session 1

1:15 P.M. - 2:45 P.M.

**Sponsor:** Entrepreneurship & Engineering Innovation Division

**Moderator:** Nassif Rayess, University of Detroit Mercy

**How the Entrepreneurial Mindset Supported the COVID-19 Transition in Engineering Unleashed Faculty Development**

Dr. Douglas E. Melton, Kern Entrepreneurial Engineering Network

Dr. Heather Dillon, University of Washington Tacoma  
Dr. Mark L. Nagurka, Marquette University  
Mary Murphy

**Learning Social Innovations and Social Entrepreneurship During COVID-19 Pandemic: Lessons Learned**

Dr. Ajay P. Malshe, Purdue University, West Lafayette  
Dr. Salil T. Bapat, Purdue University, West Lafayette

**Entrepreneurial Vision Module: Lessons from the Pandemic**

Prof. Claudia Paz Gwynn, Universidad Andres Bello  
Prof. Genaro Zavala, Tecnologico de Monterrey; Universidad Andres Bello

**Mass-scale Online Synchronous Entrepreneurship Education for Engineers**

Prof. Ranji K. Vaidyanathan, Oklahoma State University  
Dr. Shalini Sabharwal Gopalkrishnan, Menlo College

**Reporting the Use of an Innovative Platform for Online Teaching and Teamwork**

Dr. Peter Golding P.E., University of Texas at El Paso  
Mr. Mike Thomas Pitcher, University of Texas at El Paso  
Dr. Diane Elisa Goldberg, University of Texas at El Paso  
Hector Erick Lugo Nevarez, University of Texas at El Paso  
Karla Alejandra Ayala, University of Texas at El Paso  
Mrs. Helen Elizabeth Geller  
Fernando Monroy Faudoa

**Work in Progress: Impact of the Entrepreneurial Mindset for Innovative Teaching (EMIT) Academy**

Dr. Sarah E. Zappe, Pennsylvania State University  
Dr. Stephanie Cutler, Pennsylvania State University  
Dr. Thomas A. Litzinger, Pennsylvania State University

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M425 - Environmental Engineering Division Technical Session 1: Intercultural Competency-infused Teaching

1:15 P.M. - 2:45 P.M.

**Sponsor:** Environmental Engineering Division

**Moderators:** Andrew Pfluger, United States Military Academy; Shannon Parks, University of Pittsburgh at Johnstown; Fethiyce Ozis, Northern Arizona University; Michelle Marincel Payne, Rose-Hulman Institute of Technology
**Work in Progress: Assessment of Reflective Thinking in Graduate Engineering Students: Human and Machine Methods**

Dr. Roman Taraban, Texas Tech University  
Dr. Micah Iserman, Texas Tech University  
Ms. Jessica C. Pittman, Texas Tech University  
Mr. Nigel Yeo, Texas Tech University  
Dr. Ryan C. Campbell, Texas Tech University  
Dr. Jeong-Hee Kim, Texas Tech University  
Dr. Danny D. Reible, Texas Tech University

**Investigating and Comparing Environmental Knowledge and Sustainable Behavior Among U.S. and Taiwanese Students**

Prof. Jane Lu Hsu, National Chung Hsing University, Taiwan  
Miss Yu-Kang Lai, National Chung Hsing University, Taiwan  
Mr. Tzu-An Tzeng, National Chung Hsing University, Taiwan  
Miss Yi-Hsuan Yu, National Chung Hsing University, Taiwan

**Short-term Study Abroad: Engineers Gaining Intercultural Competency**

Dr. Inez Hua, Purdue University, West Lafayette

**Integrating Global Sustainability Challenges in an Organizational Management Course**

Ing. Javiera Constanza Jofré, Universidad Andres Bello, Chile  
Prof. Angeles Dominguez, Tecnologico de Monterrey, Mexico; Universidad Andres Bello, Chile

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**M426 - Virtual Laboratories: Experimentation and Laboratory-oriented Studies**

1:15 P.M. - 2:45 P.M.  
Sponsor: Experimentation and Laboratory-Oriented Studies Division  
Moderators: Jacob Bishop, Southern Utah University; Sally Pardue, Tennessee Technological University

Presenters in this session focus on virtual laboratories and integrating virtual and hands-on experiments.

**An Interdisciplinary Glimpse into the Best Practices for Effective Student Engagement in the Virtual Laboratory**

Dr. Nathan L. Anderson, California State University, Chico  
Ms. Tiffani Anderson, California State University, Chico

**Combining a Virtual Tool and Physical Kit for Teaching**

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**M427 - First-Year Engineering Experience Executive Board Business Meeting**

1:15 P.M. - 2:45 P.M.  
Sponsor: First-Year Programs Division  
Moderators: Timothy Hinds, Michigan State University; Kaitlin Mallouk, Rowan University

Meeting of the 2021 FYEE Conference board

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**M427B - First-Year Programs: Computation in the First Year**

1:15 P.M. - 2:45 P.M.  
Sponsor: First-Year Programs Division  
Moderators: Andrew Bartolini, University of Notre Dame; Joshua Hertz, Northeastern University; Kaitlin Mallouk, Rowan University; Timothy Hinds, Michigan State University

**Introduction to MATLAB Programming in Fundamentals of Engineering Course**

Dr. Djedjiga Belfadel, Fairfield University  
Dr. Michael Zabinski, Fairfield University  
Dr. Isaac Macwan, Fairfield University
Driving Changes in Affect, Behavior, and Cognition in a First-year MATLAB Programming Course
   Dr. Bethany Luke, Valparaiso University
   Dr. Ruth E. H. Wertz, Valparaiso University

Learning a Second Language and Learning a Programming Language: An Exploration
   Ms. Jutshi Agarwal, University of Cincinnati
   Dr. Gregory Warren Bucks, University of Cincinnati
   Dr. Kathleen A. Ossman, University of Cincinnati
   Prof. Teri J. Murphy, University of Cincinnati
   Dr. Cijy Elizabeth Sunny, Baylor University

Using Programming Concept Inventory Assessments: Findings in a First-year Engineering Course
   Dr. Krista M. Kecskemety, Ohio State University
   Ada Barach, Ohio State University
   Connor Jenkins, Ohio State University
   Ms. Serendipity S. Gunawardena, Ohio State University

Towards Identifying Core Computational Literacy Concepts for Inclusion in a First-year General Engineering Course
   Dr. Darren K. Maczka, University of Tennessee at Knoxville
   Mr. Rehan Shah, University College London
   Dr. Andrew L. Gillen, University College London

M428 - Graduate Studies Division Technical Session 1
1:15 P.M. - 2:45 P.M.
Sponsor: Graduate Studies Division
Moderators: Diane Peters, Kettering University; Jeffrey Fergus, Auburn University

A Framework for Examining Engineering Doctoral Student Identity
   Ms. Anne Marguerite McAlister, University of Virginia
   Miss Sarah Catherine Lilly, University of Virginia
   Prof. Jennifer L. Chiu, University of Virginia

Challenges and Successes in Synchronous Cohort-Based International Education
   Dr. Timan Wolf, University of Massachusetts Amherst
   Russell Tessier, University of Massachusetts Amherst
   Prof. Yadi Eslami, University of Massachusetts Amherst
   Dr. Christopher V. Hollot, University of Massachusetts Amherst
   Mr. George Bryan Polivka, Shorelight Education

Early Detection of Delayed Graduation in Master's

Students
   Dr. David Ruete, Universidad Andres Bello
   Prof. Genaro Zavala, Tecnologico de Monterrey and Universidad Andres Bello
   Ing. Danilo Leal, Universidad Andres Bello
   Ms. Pilar López Lira, Universidad Andres Bello
   Mrs. Lilian Pamela San Martin Medina, Universidad Andres Bello
   Dr. Margarita Ercilia Aravena, Universidad Andres Bello
   Mrs. Giannina Costa, Universidad Andres Bello

Welcoming and Building Community for Graduate Students Through Remote Tech Environments
   Dr. Marianna Savoca, Stony Brook University
   Ms. Rachel F. Perlman, Stony Brook University
   Dr. Kimberly Bell, Stony Brook University
   Dr. Monica Bugallo, Stony Brook University

M429 - Industrial Engineering Division Technical Session 1
1:15 P.M. - 2:45 P.M.
Sponsor: Industrial Engineering Division
Moderators: Raymond Smith, East Carolina University; Ebisa Wollega, Colorado State University - Pueblo; Lisa Bosman, Purdue University at West Lafayette

An interesting assortment of papers with topics related to hybrid and virtual teaching, new online programs, course development, and integrating entrepreneurship in higher learning. All are welcome.

Lessons Learned From Hybrid Face-to-Face and Virtual Teaching of Various Industrial Engineering Courses During the COVID-19 Pandemic
   Dr. Xiaomei Wang, Texas A&M University
   Mr. Changwon Son, Texas A&M University
   Dr. Farzan Sasangohar, Texas A&M University
   Ms. Jukrin Moon, Texas A&M University

A New Course Development in Usability Engineering: Hands-On Learning Based on Research Work
   Mrs. Enas Aref, Western Michigan University
   Dr. Tycho K. Fredericks, Western Michigan University

Results of the First Six Years of a 2+2 Online BS Industrial Engineering Degree Pathway
   Robert Kelley Bradley, Lamar University
   Dr. James C. Curry, Lamar University
Dr. Victor Zaloom P.E., Lamar University
Dr. Brian Craig P.E., Lamar University
Dr. Berna Eren Tokgoz, Lamar University
Dr. Alberto Marquez P.E., Lamar University
Dr. Yueqing Li, Lamar University
Maryam Hamidi, Lamar University
Prof. Weihang Zhu, University of Houston
Dr. Xinyu Liu, Lamar University
Mr. Acyut Kaneria

Integrating the Entrepreneurial Mindset Throughout
Higher Education: A Case Application for the Industrial
Engineering Classroom

Dr. Lisa Bosman, Purdue University at West Lafayette
Dr. Nathalie Duval-Couetil, Purdue University at West Lafayette

HyFlex, Hybrid, and Virtual Synchronous Teaching in the
Engineering Classroom: An Autoethnographic Approach

Dr. Lisa Bosman, Purdue University at West Lafayette
Dr. Ebisa Wollega, Colorado State University - Pueblo

M431 - Instrumentation Division Technical Session
1:15 P.M. - 2:45 P.M.
Sponsor: Instrumentation Division
Moderators: Asad Yousuf, Savannah State University;
Herbert Hess, University of Idaho

On the Development of a Next-Generation Sensor/Actuator Module for Automation Labs
Mr. Bradley Lane Kicklighter, University of Southern Indiana

On the Development of a Portable Programmable Logic Controller (PLC) Trainer
Mr. Bradley Lane Kicklighter, University of Southern Indiana

MicroPython in a Wireless Communications Systems Course
Prof. David R. Loker, Pennsylvania State University, Behrend College
Nathan Wayne Brubaker, Pennsylvania State University, Behrend College
Mr. Daniel Albert Bobbot, Pennsylvania State University, Behrend College

Dr. Abhijit Nagchaudhuri, University of Maryland Eastern Shore
Dr. Madhumi Mitra, University of Maryland Eastern Shore
Travis Ford, University of Maryland Eastern Shore
Mr. Jesu Raj Pandya, University of Maryland Eastern Shore

Dr. Deborah Hecht, Center for Advanced Study in Education

Continuous Improvement in Academic Computing Programs Is Rarely Comprehensive
Mr. Abdullah Azzouni, Oregon State University
Dr. Jennifer Parham-Mocello, Oregon State University

Cross-cultural User Interface Design in a Global Marketplace: Building Appreciation for Diversity, Equity, and Inclusion
Ms. Irini Spyridakis, University of Washington

M430 - Computing and Information Technology Division Technical Session 1
1:15 P.M. - 2:45 P.M.
Sponsor: Computing and Information Technology Division
Moderators: Afsaneh Minaie, Utah Valley University;
Mudasser Wyne, National University; Elizabeth Milonas,
New York City College of Technology; Reza Sanati-Mehrizy,
Utah Valley University

This session presents papers on a variety of topics pertaining to computing and information technology.

Content Analysis of Two-year and Four-year Data Science Programs in the United States
Dr. Elizabeth Milonas, New York City College of Technology
Dr. Duo Li, Shenyang City University
Dr. Qiping Zhang, Long Island University

Private Platform for Teaching Blockchain at the Undergraduate Level
Dr. Emil H. Salib, James Madison University

Using Data Science to Create an Impact on a City Life and to Encourage Students from Underserved Communities to Get into STEM
Prof. Elena Filatova, City University of New York
2021 ASEE VIRTUAL CONFERENCE
MONDAY, JULY 26th SESSIONS

ALL SESSIONS ARE PACIFIC DAYLIGHT TIME

Work in Progress: Online Electrical Engineering Laboratories Sessions: Analysis, Challenges, and Border Environment
Martha L. Torres, University of Texas at El Paso
Dr. Virgilio Ernesto Gonzalez, University of Texas at El Paso

Computer Science Technology-Cyber Security Option
Dr. Asad Yousef, Savannah State University
Mr. Alberto G. De La Cruz, Savannah State University
Dr. Alex Kalu, Savannah State University
Prof. Frederick T. Sheldon, University of Idaho

M433 - Pre-College Engineering Education Division Technical Session 1
1:15 P.M. - 2:45 P.M.
Sponsor: Pre-College Engineering Education Division
Moderators: Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University; Pamela Lottero-Perdue, Towson University

Informal Education
Observing Empathy in Informal Engineering Activities with Girls Ages 7-14 (RTP, Diversity)
Dr. Susan M. Letourneau, New York Hall of Science
Ms. Dorothy Bennett, New York Hall of Science
Dr. ChangChia James Liu, New York Hall of Science
Ms. Yessenia Argudo, New York Hall of Science
Dr. Kylie Peppler, University of California, Irvine
Dr. Anna Keune, Ruhr-University Bochum
Dr. Maggie Dahm, University of California, Irvine
Katherine McMillan Culp, New York Hall of Science

Engineering Awareness at Design Challenge Exhibits (Fundamental)
Dr. Scott M. Randol, OMSI
Carla Herran, Oregon Museum of Science and Industry
Dr. Smirla Ramos-Montanez, OMSI
Todd Shagott
Dr. Marcie R. Benne, Oregon Museum of Science and Industry (OMSI)

Planting Seeds: Implementing Maker-Based Learning Programs for Urban Youth (Evaluation)
Dr. Foad Hamidi, University of Maryland Baltimore County

Andrew Coy, Digital Harbor Foundation
Ms. Amy L. Freeland, University of Maryland Baltimore County

M434 - Olmsted Awardees: Reflections on Liberal Education in Engineering Education
1:15 P.M. - 2:45 P.M.
Sponsor: Liberal Education/Engineering & Society Division
Moderators: Justin Hess, Purdue University at West Lafayette; Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University

For 35 years, the Sterling Olmsted Award of ASEE’s Division of Liberal Education/Engineering in Society (LEES) has served to commend individuals committed to humanistic education for engineers and to reflection on the broadest implications of engineering learning and work for society. This panel will bring forward perspectives of individual Olmsted awardees discussing their institutional and other experiences in negotiating the boundaries of engineering and liberal arts education; broader issues regarding the status of engineering education/humanities/social science scholarship in STEM settings under the current austerity regime in U.S. higher education; and issues surrounding such commendations including “brilliance narratives” and the reassertions of prestige they may perpetuate.

Recipients of the Olmsted Award will share their views on long-standing aims of humanities and social science (HSS) instruction in engineering, and ideas of how such aims may fit with today’s challenges in and beyond educational settings. From the earliest days of the American Society for Engineering Education and its predecessor, the Society for the Promotion of Engineering Education, engineering educators have recognized that preparation for engineering practice requires students to develop perspectives and abilities that are not deliberately cultivated in most STEM courses. Liberal education for engineers has been given serious consideration in all of the major reports the organization has published on engineering education as a whole: the Mann Report (1907), the Wickenden Study (1920s), and the Grinter Report (1955). More recently, the new approach to accreditation embodied in EC2000 incorporated many capabilities that can only be fully developed through well-resourced HSS instruction. Ideas about how these agendas have developed, and their implications for a world facing growing challenges in
health, economic, climate, and other areas, will frame the discussion.

We hope this session will initiate a robust conversation between LEES and the other divisions of ASEE regarding our shared mission of optimizing the contribution of the humanities and social sciences to engineering education. We welcome engagement from all divisions, from those at all education and career stages, and from those who may be joining us from beyond the STEM community.

**M435 - Manufacturing Division Session: Make-it!**

1:15 P.M. - 2:45 P.M.

**Sponsor:** Manufacturing Division

**Moderators:** Ismail Fidan, Tennessee Technological University; Irina Ciobanescu Husanu, Drexel University

This is not a poster session; it is a technical session.

**Making It Happen: Findings From Processes Implemented to Continue Operating a University Makerspace During the COVID-19 Pandemic**

- Dr. Samuel C. Lieber P.E., New Jersey Institute of Technology
- Mr. Justin T. Suriano, New Jersey Institute of Technology
- Mr. Daniel Brateris, New Jersey Institute of Technology

**A Capstone Experience Through the Development of a Powder Compaction System During COVID-19 Pandemic**

- Dr. Byul Hur, Texas A&M University
- Dr. Chao Ma, Texas A&M University
- Mr. Brey C. Caraway, Texas A&M University
- Jorge I. Roa, Texas A&M University
- Alejandro X. Trejos, Texas A&M University
- Pauline Davila, Texas A&M University

**Factory 4.0 Toolkit for Smart Manufacturing Training**

- Dr. Joseph Dennis Cuiffi, Pennsylvania State University, New Kensington
- Prof. Haifeng Wang, Pennsylvania State University, New Kensington
- Josephine Heim, Pennsylvania State University, New Kensington
- Dr. Brian W. Anthony, Massachusetts Institute of Technology
- Mr. Sangwoon Kim
- Dr. David Donghyun Kim, Massachusetts Institute of Technology

**M438 - How We Tackled the Pandemic**

1:15 P.M. - 2:45 P.M.

**Sponsor:** Mechanical Engineering Division

**Moderators:** Rungun Nathan, Pennsylvania State University, Berks Campus; Thomas DeNucci, United States Coast Guard Academy; Yucheng Liu, Mississippi State University

Papers and presentation related to how we tackled the pandemic-time classes.

**Adventures in Remote Learning: Communication Strategies for Active Engagement**

- Dr. Carl W. Luchies, University of Kansas
- Dr. Molly McVey, University of Kansas

**Challenges in Virtual Instruction and Student Assessment during the COVID-19 Pandemic**

- Dr. Amir Karimi P.E., University of Texas at San Antonio
- Dr. Randall D. Manteufel, University of Texas at San Antonio
- Dr. José Francisco Herbert Acero, University of Texas at San Antonio

**Continuity of Instruction, Cognitive Load, and the Middle Years Slump**

- Dr. Mary Katherine Watson, The Citadel
- Dr. Elise Barrella P.E., Wake Forest University
- Dr. Kevin Skenes, The Citadel
- Mr. Aidan Puzzio, The Citadel
- Mr. Benjamin Lawrence Kicklighter, The Citadel

**Evaluating STEM Course Re-Design Strategies in Light of COVID-19**

- Ulises Juan Trujillo Garcia, Boise State University
- Dr. Krishna Pakala, Boise State University
- Samantha Schauer, Boise State University
- Dr. Diana Bairaktarova, Virginia Polytechnic Institute and State University
- Prof. Bhaskar Chittoori P.E., Boise State University

**Far from Normal – Student Struggles with Health and Social Interaction Persist through Three Semesters of Education during the COVID-19 Pandemic**

- Dr. Ashley J. Earle, York College of Pennsylvania
- Dr. Alison R. Kennicutt, York College of Pennsylvania
M439 - The ABCs of FBDs
1:15 P.M. - 2:45 P.M.

Sponsor: Mechanics Division

Moderators: Laura Emerson, Oklahoma State University; Jakob Bruhl, United States Military Academy; Julian Davis, University of Southern Indiana; Masoud Rais-Rohani, University of Maine

This session investigates the strategies and technologies used to assist students in drawing free-body diagrams and how students' spatial abilities may affect those abilities.

Work-in-Progress: Ambiguous Reaction Couples: A Universal Approach to Analyzing Bearing and Hinge Support Reactions in 3D Statically-Determinate Problems

Dr. Amir H. Danesh-Yazdi, Rose-Hulman Institute of Technology
Dr. Shraddha Sangelkar, Rose-Hulman Institute of Technology
Dr. Eric Constans, Rose-Hulman Institute of Technology

Do They Need To See It To Learn It? Spatial Abilities, Representational Competence, and Conceptual Knowledge in Statics

Eric Davishahl, Whatcom Community College
Todd Haskell
Dr. Lee Singleton, Whatcom Community College
Matthew Parsons Fuentes

Task-Analysis-Guided Deliberate Practice for Learning Free-Body Diagrams

Dr. Yan Tang, Embry-Riddle Aeronautical University-Daytona Beach
Dr. Haiyan Bai, University of Central Florida
Dr. Richard Catrambone, Georgia Institute of Technology

The Relationship Between Spatial Skills and Solving Problems in Engineering Mechanics

Dr. Sheryl A. Sorby, University of Cincinnati
Sylvie Vieau
Dr. So Yoon Yoon, University of Cincinnati

Mechanix: An Intelligent Web Interface for Automatic Grading of Sketched Free-Body Diagrams

Matthew Runyon, Texas A&M University
Dr. Vimal Viswanathan, San Jose State University
Dr. Kimberly Grau Talley P.E., Texas State University
Dr. Tracy Anne Hammond, Texas A&M University
Dr. Julie S. Linsey, Georgia Institute of Technology

M440 - Minorities in Engineering Division Technical Session 1
1:15 P.M. - 2:45 P.M.

Sponsor: Minorities in Engineering Division

Moderators: Lisa Abrams, Ohio State University; Ashwith Chilvery, Xavier University of Louisiana; Kristin Imhoff, Saint Joseph’s University; Trina Fletcher, Florida International University

Classroom Practices that Support Minoritized Engineering Students’ Sense of Belonging (Research)

Miss Arielle Marie Rainey, Colorado School of Mines
Dr. Dina Verdin, Arizona State University, Polytechnic campus
Dr. Jessica Mary Smith, Colorado School of Mines

Lessons Learned as Lessons Were Learned: Teaching Engineering to a Minority Student Population Isolated by Geography but Crowded by Competition for Electronic Access (Experience)

Danny Luecke
Dr. Robert V. Pieri, North Dakota State University
Dr. Austin James Allard, Turtle Mountain Community College
Dr. Paula Comeau, North Dakota State College of Science
Mr. Michael Maloy Parker, Cankdeska Cikana Community College
Ann Vallie
Teri Ann Allery
Mr. Karl Haefner
Alexa D. Azure, United Tribes Technical College

The Rising Doctoral Institute: Preparing Minority Students for the Transition into the Engineering Ph.D.

Dr. Mayra S. Artiles, Arizona State University
Dr. Juan M. Cruz, Rowan University
Sarah Anne Blackowski, Virginia Polytechnic Institute and State University
Dr. Holly M. Matusovich, Virginia Polytechnic Institute and State University
Dr. Stephanie G. Adams, University of Texas at Dallas
Dr. Gwen Lee-Thomas, Quality Measures LLC

Transitioning to the Middle Years: Learning from RedShirt Engineering Students

Dr. Daniel Knight, University of Colorado Boulder
Dr. Beverly Louie, University of Colorado Boulder
Dr. Janet Y. Tsai, University of Colorado Boulder
M441 - Multidisciplinary Learning and Teaching Experiences

1:15 P.M. - 2:45 P.M.
Sponsor: Multidisciplinary Engineering Division
Moderators: Cynthia Barnicki, Milwaukee School of Engineering; Sahithya Reddivari, Georgia State University; Tracy Hammond, Texas A&M University

Please note the last author will not be presenting at the conference.

An Innovative Approach to Teaching Project Resource Leveling
- Dr. David S. Greenburg, The Citadel
- Dr. Nahid Vesali P.E., The Citadel
- Dr. Dimitra Michalaka P.E., The Citadel

Building STEAM for Global Engineering through Collaboration with the Social Sciences and Humanities during the COVID-19 Pandemic
- Dr. Ann-Perry Witmer P.E., University of Illinois at Urbana-Champaign
- Dr. José G. Andino Martinez, University of Illinois at Urbana-Champaign
- Dr. Olivia C. Coiado, University of Illinois at Urbana-Champaign
- Jessica Marie Mingee, University of Illinois at Urbana-Champaign
- Dr. Flavia Andrade, University of Illinois at Urbana-Champaign
- Dr. Tim Pollack-Lagushenko, University of Illinois at Urbana-Champaign

Educational Opportunities for Technical Writing in Engineering Education
- Dr. Susan J. Ely, University of Southern Indiana
- Mr. Jotam E. Chen, University of Southern Indiana

Work-in-Progress: Leveraging Interdisciplinary Topics in First-year Engineering
- Dr. Brett Hamlin, Michigan Technological University
- Dr. AJ Hamlin, Michigan Technological University
- Tori Claudette Reeder
- Josh Chase, Michigan Technological University
- Ms. Mary Raber, Michigan Technological University
- Ms. Laura Vidal-Chiesa, Michigan Technological University
- Modupe Omolara Yusuf, Michigan Technological University
- Dr. Abraham Romney, Michigan Technological University
- Dr. Marika Seigel, Michigan Technological University

Online Sharing Platform for Course Modules: Understanding Materials Use and Effectiveness
- Dr. Haolin Zhu, Arizona State University
- Amy Trowbridge, Arizona State University
- Mr. Keirien Taylor, Arizona State University
- Dr. Daniel J. Laxman, Arizona State University

Investigation on Students' Educational Experience with HyFlex Instruction Model in Two Engineering Courses
- Dr. Emine Celik Foust, York College of Pennsylvania
- Dr. Inci Ruzybayev, York College of Pennsylvania

M442 - Enhancing Teaching and Research

1:15 P.M. - 2:45 P.M.
Sponsor: New Engineering Educators Division
Moderators: Derek Breid, Saint Vincent College; Kerry Widder, Milwaukee School of Engineering; Janie Brennan, Washington University; Vimal Viswanathan, San Jose State University

Low-Barrier Strategies to Increase Student-Centered Learning
- Miss Nicole Erin Friend, University of Michigan
- Cassandra Sue Ellen Woodcock, University of Michigan
- Dr. Aileen Huang-Saad, Northeastern University

Building Research Skills through Being a Peer Reviewer
- Dr. Lisa Benson, Clemson University
- Prof. Rebecca A. Bates, Minnesota State University, Mankato
- Dr. Karin Jensen, University of Illinois at Urbana-Champaign
- Dr. Gary Lichtenstein, Arizona State University
- Kelsey Watts, Clemson University
- Ms. Mia Ko, University of Illinois at Urbana-Champaign
- Balsam Albayati

Investigating Student Retention of Surveying Course Material from Sophomore Year to Senior Year Using Pre- and Post-Tests
- Dr. Kweku Brown P.E., The Citadel
- Dr. Dimitra Michalaka P.E., The Citadel
- Dr. Nandan Hara Shetty, The Citadel
- Dr. William J. Davis P.E., The Citadel

Student Response System Best Practices for Engineering as Implemented in Plickers
- Dr. Timothy Aaron Wood, The Citadel
- Dr. Dan D. Nale P.E., The Citadel
- Dr. Kweku Tekyi Brown P.E., The Citadel
2021 ASEE VIRTUAL CONFERENCE
MONDAY, JULY 26th SESSIONS

M445 - Engineering Physics and Physics Division Technical Session 1

1:15 P.M. - 2:45 P.M.
Sponsor: Engineering Physics and Physics Division
Moderators: Robert Ross, University of Detroit Mercy; Bala Maheswaran, Northeastern University

Inclusive Writing: Pre- and Post-COVID-19
Dr. Teresa L. Larkin, American University

Horizontal Propulsion Using Model Rocket Engines (Part A)
Dr. Hüseyin Sarper P.E., Old Dominion University
Dr. Nebojsa I. Jaksic, Colorado State University, Pueblo

An International Study of Foucault’s Pendulum
Mr. Ezequiel Gerardo Celario Sedano, York College of Pennsylvania
Dr. Inci Ruzybayev, York College of Pennsylvania

Active Learning in Physics and Engineering Through UAV and Data Analytics
Dr. Cadavious M. Jones
Dr. Rajendran Swami, Alabama State University
Dr. Johnathan Barnett, Huntingdon College
Dr. Derrick Dean

M447 - Student Division Technical Session 1

1:15 P.M. - 2:45 P.M., VIRTUAL, ONLINE
Sponsor: Student Division
Moderators: Adrienne Wheeler, Project SYNCERE; Lynn Albers, Hofstra University; Louis Christensen, Ohio State University

An Examination of Professor-Student Interactions, Stem Learning Challenges, and Student Adaptation Decisions During Covid-19 Pandemic
Ms. Mercy Folashade Fash, North Carolina Agricultural and Technical State University
Dr. Andrea Nana Ofori-Boadu, North Carolina Agricultural and Technical State University
Ms. Rabiatu Bonku, North Carolina Agricultural and Technical State University
Mr. Wanya Alford, North Carolina Agricultural and Technical State University
Dr. Alesia Coralie Ferguson, North Carolina Agricultural and Technical State University

Student Experience with COVID-19 and Online Learning: Impact of Faculty’s Ability to Successfully Navigate Technological Platforms for Remote Instruction
Ms. Melissa Shuey, Rensselaer Polytechnic Institute
Dr. Atsushi Akera, Rensselaer Polytechnic Institute
Sarah Appelhans, University at Albany-SUNY
Dr. Alan Cheville, Bucknell University
Dr. Thomas De Pree, University of New Mexico
Dr. Soheil Fatehboroujeni, Cornell University

Understanding the Perspectives of Empathy Among Engineering Faculty Members
Mr. Bala Vignesh Sundaram, Arizona State University
Dr. Nadia N. Kellam, Arizona State University
Dr. Shawn S. Jordan, Arizona State University

Faculty Perceptions of STEM Student and Faculty Experiences During the COVID-19 Pandemic: A Qualitative Study (WIP)
Mr. Mehdil Lamssali, North Carolina A&T State University
Ms. Olivia Kay Nicholas, RAPID
Dr. Alesia Coralie Ferguson, North Carolina A&T State University
Dr. Andrea Nana Ofori-Boadu, North Carolina A&T State University
Dr. Angela M. White, North Carolina A&T State University

Poster: Methods for Investigating Teacher Professional Identities of Elementary Teachers of Engineering
Meg E. West, Ohio State University

M447B - Student Division Technical Session 4

1:15 P.M. - 2:45 P.M.
Sponsor: Student Division
Moderators: Adrienne Wheeler, Project SYNCERE; Jennifer Brown, Clemson University; Susan Sajadi, Arizona State University

Mind the Gap: Exploring the Perceived Gap Between Social and Technical Aspects of Engineering for Undergraduate Students
Regina Palero Aleman, University of San Diego
Mireya Becker Roberto
Dr. Joel Alejandro Mejia, University of San Diego
Dr. Susan M. Lord, University of San Diego
Dr. Laura Ann Gelles, University of Texas at Dallas
Dr. Diana Chen, University of San Diego
Prof. Gordon D. Hoople, University of San Diego

Complexity of Engineering Disciplines as an Engineering Gate Keeper? Exploring Literature Related to Students’ Selection of and Admittance into Engineering Majors

Tyler Milburn, Ohio State University
Dr. Krista M. Kecskemety, Ohio State University

Impact of Social and Programmatic Experiences on Students’ Interest in Pursuing a Graduate Degree in a Computing Field

Mrs. Maral Kargarmoakhar, Florida International University
Stephanie Jill Lunn, Florida International University
Dr. Monique S. Ross, Florida International University
Prof. Zahra Hazari, Florida International University
Dr. Mark A. Weiss, Florida International University
Dr. Michael Georgiopoulos, University of Central Florida
Dr. Ken Christensen P.E., University of South Florida
Mrs. Tiana Solis, Florida International University

WIP: Strategies to Increase Value and Retention for Undergraduates in Engineering

Mrs. Pearl Elizabeth Ortega-Darwin, Texas A&M University
Dr. Kristi J. Shryock, Texas A&M University

WIP: Overcoming Comfort Zones to Better the Self-Efficacy of Undergraduate Engineering Students (Tricks of the Trade)

Pasquale Sanfelice
Mia Erdenebileg
Dr. Doris J. Espiritu, Wilbur Wright College - One of the City Colleges of Chicago

M449 - TELPhE Division Technical Session 1: Expanding Technological and Engineering Literacies

1:15 P.M. - 2:45 P.M.

Sponsor: Technological and Engineering Literacy/Philosophy of Engineering Division

Moderators: Stephen Frezza, Gannon University; Muruganatham Ponussamy, Saintgits College of Engineering; Nancy Gertrudiz, Texas A&M University; John Reisel, University of Wisconsin - Milwaukee; Katherine Goodman, University of Colorado Denver

This session contains a number of papers addressing issues with increasing technological and engineering literacies, and how these issues impact engineering education.
2021 ASEE VIRTUAL CONFERENCE
MONDAY, JULY 26th SESSIONS

What is Lost When Education Is Decomposed into Outcomes? A Critical Look Across Disciplines
- Dr. Alan Cheville, Bucknell University
- Dr. John Heywood, Trinity College Dublin

The Concept of Technological Literacy Examined through the Lens of a Case Study Concerning the Boeing 737 Max Accidents
- Dr. John Heywood, Trinity College Dublin

Computerized Algorithmic Approaches for Evaluating Systems Thinking of Both Engineers and Non-Engineers
- Dr. John Krupeczak Jr., Hope College
- Dr. A. Mehran Shahhosseini, Indiana State University
- Dr. Darin R. Stephenson, Hope College

Freshman General Education Outcomes that Reinforce ABET Student Outcomes
- Dr. Robert J. Rabb P.E., The Citadel
- Dr. James Righter, The Citadel
- Dr. Nathan John Washuta P.E., The Citadel
- Dr. Kevin Skenes, The Citadel

The Challenge: The Role of the Student in Engineering and Technological Literacy Programs, Perspectives, Discussions, and Ideations
- Neelam Prabhu Gaunkar, Iowa State University of Science and Technology
- Sara Kaye Jones
- Dr. Mani Mina, Iowa State University of Science and Technology

Promote Engagement and Persistence for Women?
- Leanne Kallemeyn, Loyola University Chicago
- Dr. Gail Baura, Loyola University Chicago
- Ms. Francisca Fils-Aime, Loyola University Chicago
- Jana Grabarek
- Mr. Pete Livas Jr., Loyola University Chicago

Investigating Potential Gender Differences in First-Year Engineering Students’ Academic Motivation and Homework Submission Behavior
- Miss Cara Mawson, Rowan University
- Dr. Cheryl A. Bodnar, Rowan University

Building a Community of Empowerment for Women in STEM with a Focus on Community College Women
- Prof. Beth McGinnis-Cavanaugh, Springfield Technical Community College
- Ms. Isabel Huff, Springfield Technical Community College

What Strategies Do Diverse Women in Engineering Use to Cope with Situational Hidden Curriculum?
- Dr. Victoria Beth Sellers, University of Florida
- Dr. Idalis Villanueva, University of Florida

M452 - Community Engagement Division Technical Session 6
1:15 P.M. - 2:45 P.M.

Sponsor: Community Engagement Division
Moderators: Joan Schuman, Missouri University of Science and Technology; Marybeth Lima, Louisiana State University and A&M College

"Community engagement" is an umbrella term for service learning in engineering, humanitarian engineering, learning through service, community-based research, civically-engaged learners, technology-based social entrepreneurship, and more. Community organizations (either local or from abroad) partner with institutions of engineering education for the mutual benefit of communities and engineering students. Ideally, student teams and citizens work together via reciprocal partnerships for the shared purpose of completing community-identified projects aimed at increasing community assets.

Are Civil Engineers “Practicing What They Preach?”
- Nathalie Al Kakoun, Swansea University
- Dr. Frederic Boy, Swansea University
- Patricia Xavier, Swansea University

M451 - Women in Engineering Division Technical Session 7
1:15 P.M. - 2:45 P.M.

Sponsor: Women in Engineering Division
Moderators: Lily Gossage, California State Polytechnic University, Pomona; Marjorie Hubbard

Relationship Between Guided Interactive Activities and Self-concept in Engineering Students
- Dr. Ing. Giannina Costa, Universidad Andres Bello
- Dr. Juan Felipe Calderón, Universidad Andres Bello
- Dr. David Ruete, Universidad Andres Bello
- Ing. Danilo Leal, Universidad Andres Bello
- Mrs. Lilian Pamela San Martin Medina, Universidad Andres Bello

Engagement in Practice: Pedestrian Bridges as Engineering
2021 ASEE VIRTUAL CONFERENCE
MONDAY, JULY 26th SESSIONS

Service-learning Projects
Jay H. Arehart, University of Colorado Boulder
Kathryn Langenfeld, University of Michigan
Mr. Brenton Kreiger

Engagement in Practice: Creating an Enduring Partnership in a Mechanical Engineering Capstone Course
Ms. Shoshanah Cohen, Stanford University
Mr. Jeff Wood, Stanford University

Engagement in Practice: Evaluating and Enhancing the Global Capstone Course
Mr. Patrick Sours, Ohio State University
Dr. Michael J. Hagenberger, Ohio State University

Engagement in Practice: Capstone Design of a Real-world Transportation Interchange Project
Dr. Simon Thomas Ghanat P.E., The Citadel
Dr. William J. Davis P.E., The Citadel
Dr. Timothy W. Mays, The Citadel
Dr. Rebekah Burke P.E., The Citadel
Dr. Kweku Tekyi Brown P.E., The Citadel
Prof. John C. Ryan, The Citadel

Color in Engineering Academia
Dr. Sylvia L. Mendez, University of Colorado at Colorado Springs
Dr. Valerie Martin Conley, University of Colorado at Colorado Springs
Katie Johanson, University of Colorado at Colorado Springs
Richard Carroll Sinclair, www.leadingschoolsforward.org
Dr. Comas Lamar Haynes, Georgia Tech Research Institute
Dr. Rosario A. Gerhardt, Georgia Institute of Technology
Dr. Kinnis Goshia, Morehouse College

How to Promote Faculty Advancement for Nontenure-track Faculty
Dr. Heather Doty, University of Delaware
Dr. Shawna Vican, University of Delaware
Dr. Robin Andreassen, University of Delaware

Faculty Development for Research Inclusion: Virtual Research Experiences for Undergraduates
Dr. Patricia Morreale, Kean University
Dr. Ann C. Gates, University of Texas at El Paso
Dr. Elsa Q. Villa, University of Texas at El Paso
Dr. Sarah Hug, Colorado Evaluation and Research Consulting

M457 - Faculty Development 1: Social Justice Research
1:15 P.M. - 2:45 P.M.
Sponsor: Faculty Development Division
Moderators: John Tingerthal, Northern Arizona University; Karen High, Clemson University

This session focuses on social justice research in faculty development. Traditional 12-minute presentations will be given, followed by three minutes of clarifying questions. The final 15-30 minutes will be for the group to synthesize major lessons learned, feedback for presenters, and future directions for faculty development. The audience will be engaged through polls, chats, and other features to make the session enjoyable for all.

Faculty Perceptions of, and Approaches Towards, Engineering Student Motivation at Hispanic-serving Institutions
Henry Salgado, University of Texas at El Paso
Yamile A. Urquidi Cerros, University of Texas at El Paso
Dr. Meagan R. Kendall, University of Texas at El Paso
Dr. Alexandra Coso Strong, Florida International University

Goal-match Mentoring: A New Strategy for Faculty of...
Revolutionizing Grading: Implications on Power, Agency, and Equity
Dr. Melissa Ellen Ko, Stanford University

Creating an Inclusive Engineering Student Culture Through Diverse Teams: Instructor-led and Student-led Approaches
Dr. Heather Dillon, University of Washington Tacoma
Dr. Tammy VanDeGrift, University of Portland
Ms. Zulema Naegele, University of Portland

The Disconnect Between Engineering Students’ Desire to Discuss Racial Injustice in the Classroom and Faculty Anxieties
Dr. Tracy Anne Hammond, Texas A&M University
Samantha Ray, Texas A&M University
Dr. Paul Taele, Texas A&M University
Dr. Shawna Thomas, Texas A&M University
Dr. Karan Watson P.E., Texas A&M University
Dr. Christine A. Stanley, Texas A&M University
Mr. Seth Polsley, Texas A&M University

M459B - Critical Conversations on Being Valued
1:15 P.M. - 2:45 P.M.
Sponsor: Equity, Culture & Social Justice in Education Division
Moderator: James Holly, Jr., Wayne State University
An Analysis of Gendered Outreach Messages on the Engineer Girl Website: How Female Engineers Promote Engineering to Young Women
Dr. Emily Gwen Blosser, University of Louisiana at Lafayette

A Diversity, Equity, and Inclusion (DEI) Task Force within a Mechanical Engineering Department
Dr. Dustyn Roberts P.E., University of Pennsylvania
Prof. Robert W. Carpick, University of Pennsylvania

Engineering Students’ Experiences of Socially-mediated Exclusion and Inclusion: Role of Actors and Discourses
Ms. Minha R. Ha, York University
Jeffrey Harris, York University
Aleksander Czekanski, CEEA-ACEG

Traditional Prejudice, Modern Discrimination: An Examination of Microaggressions Targeting Male and Female Latinx Engineering Undergraduates
Dr. Kalynda Chivon Smith, North Carolina A&T State University

Dr. Cristina Poleacovschi, Iowa State University of Science and Technology
Dr. Scott Grant Feinstein
Dr. Stephanie Luster-Teasley, North Carolina A&T State University

Your Views Can Be My Views: Understanding Differences in Paradigms Held by Traditionally Marginalized Students in Engineering
Qualla Jo Ketchum, Virginia Polytechnic Institute and State University
Dr. Marie C. Parette, Virginia Polytechnic Institute and State University
Dr. Homero Murzi, Virginia Polytechnic Institute and State University
Dr. Andrew Katz, Virginia Polytechnic Institute and State University

M477 - Safe Zone Ally Training - Level 1
1:15 P.M. - 2:45 P.M.
Sponsor: ASEE Committee on Diversity, Equity & Inclusion
Moderators: Leonard Bohmann, Michigan Technological University; Rachelle Reisberg, Northeastern University
Speakers: Dr. Adrienne Minerick, Michigan Technological University; Prof. Anthony Butterfield, University of Utah

Did you know...
- 1 in 5 LGBTQIA+ students fear for their physical safety on college campuses?
- 1 in 3 LGBTQIA+ students are made to feel uncomfortable in our classrooms?
- LGBTQIA+ engineering students are more likely than women, underrepresented minorities, and non-LGBTQ peers to report a chilly climate?
- STEM departments are lagging way behind other disciplines in the adoption of LGBTQIA+-inclusive practices?

You can help change this! Safe Zone Ally Training is a series of interactive workshops for students, faculty, and the professional community, during which participants will build the knowledge and skills needed to create a more inclusive and affirming environment for LGBTQIA+ individuals in engineering. The workshops have been developed by a community of science and engineering...
professionals and students, specifically for a STEM audience.

Safe Zone Level 1 focuses on understanding LGBTQIA+ concepts and the coming-out process, responding to bias, and adopting simple strategies for building an inclusive environment. For more advanced content, look for Safe Zone 2 or 3 sessions.

M477B - Diversity, Equity, and Inclusion: 100
1:15 P.M. - 2:45 P.M.
**Sponsor:** ASEE Committee on Diversity, Equity & Inclusion

**Moderators:** C. Lilley, University of Illinois at Chicago; Rachelle Reisberg, Northeastern University

**Speakers:** Dr. Meagan C. Pollock, Engineer Inclusion; Ms. Hoda Ehsan, Georgia Institute of Technology; Dr. Kaitlin Mallouk, Rowan University; Dr. Eric Specking, University of Arkansas

Diversity, equity, and inclusion starts with us. The session aims to answer the questions: What is DEI? Why should I care about it? What work do I need to do to become a more equitable educator? In this workshop, participants will identify ways in which we can expand our awareness through self-analysis. Participants will engage in learning activities that provide an introductory overview of DEI, including reflection on their identities, privileges, biases, spheres of influences, and beliefs related to diversity, equity, and inclusion.

M478 - Silver Linings – Positive Changes to Keep and Embrace Post-COVID
1:15 P.M. - 2:45 P.M.
**Sponsor:** Undergraduate Experience Committee

**Moderators:** Mary Besterfield-Sacre, University of Pittsburgh; Jenna Carpenter, Campbell University

This session will feature flash talks about pandemic changes that have turned out positively and how institutions will leverage these moving forward.

M499 - SPONSORED SESSION: Distributed FPGA Lab Between UW and Other Universities Using the LabsLand Network - Presented by Intel
1:15 P.M. - 1:55 P.M.
**Sponsor:** Sponsored Sessions

**Speakers:** Mr. Lawrence David Landis, Intel Corporation; Dr. Rania Hussein, University of Washington; Pablo Orduña, LabsLand

COVID-19 has forced the necessity of learning with virtual electronics lab environments. Intel has made great strides in offering an integrated working environment for learning FPGAs remotely. Intel offers free instructional material, board donations, and methods to utilize Intel® FPGA development tools and kits/accelerator cards in a remote environment. This talk will focus on how to teach undergraduate-level courses using RTL/Schematics/Prebuilt IP and accessing FPGA development kits in the classroom or from home. Topics covered are network setup, installation, compilation and download. The second half of the workshop will focus on graduate-level heterogeneous computing teaching and research on the Intel® FPGA Devcloud. The Intel® FPGA Devcloud runs RTL, OpenCL, OneAPI and OpenVino workloads in a Xeon+FPGA development environment available free to the academic community.

Additionally, the University of Washington and LabsLand will present the LabsLand network of Intel FPGAs. This network is a global collaboration with FPGAs located in universities from the U.S., Spain, Malaysia, and Brazil (and growing!) being used for education by universities worldwide.

M499B - Faculty Focus Group
1:15 P.M. - 2:45 P.M.
**Sponsor:** Sponsored Sessions

**Moderator:** Donald Visco, University of Akron
M502 - Architectural Engineering Division Technical Session 2

3:00 P.M. - 4:30 P.M.

Sponsor: Architectural Engineering Division
Moderator: Sanjeev Adhikari

Technical session that includes topics of interest to the architecture, engineering, and construction industries.

Development of a Structural Loadings Course for Architectural Engineering Students

- Prof. Christina McCoy P.E., Oklahoma State University
- Prof. John J. Phillips, Oklahoma State University
- Prof. Carisa H. Ramming, Oklahoma State University
- Charlotte Guyer

Deep Learning for Safer School Infrastructure: An Interdisciplinary and Cross-organizational Collaboration

- Sydney Nguyen, California Polytechnic State University, San Luis Obispo
- Gabriel Medina-Kim, Rensselaer Polytechnic Institute
- Prof. Franz J. Kurfess, California Polytechnic State University, San Luis Obispo
- Dr. Elise St. John, California Polytechnic State University, San Luis Obispo
- Dr. Jingzhe Wu, The World Bank
- Prof. Gudrun Socher, Hochschule München University of Applied Sciences
- Anurag Uppuluri, California Polytechnic State University, San Luis Obispo
- Angie Paola Garcia Arevalo, The World Bank
- Prof. Erin Sheets, California Polytechnic State University, San Luis Obispo

The Academic and Emotional Impact of Virtual Construction Site Visits on Students During a Pandemic Period

- Ing. Luis Horacio Hernandez-Carrasco, Tecnologico de Monterrey
- Ing. Monica Daniela Hernandez-Sanchez, Tecnologico de Monterrey
- Prof. Miguel X. Rodriguez-Paz, Tecnologico de Monterrey

Virtual Lab Modules for Undergraduate Courses Related to Building Energy Systems

- Yanmei Xie, North Dakota State University
- Dr. Huojun Yang, North Dakota State University

M505 - Experiential Learning in Chemical Engineering

3:00 P.M. - 4:30 P.M.

Sponsor: Chemical Engineering Division
Moderators: VJ Tocco; Ashlee Ford Versypt, University at Buffalo, the State University of New York

Impact of Immersive Training on Senior Chemical Engineering Students’ Prioritization of Process Safety Decision Criteria

- Jeffrey Stransky, Rowan University
- Caleb Hill
- Robert John McErlean, Rowan University
- Jacob Willetts, Rowan University
- Landon Bassett, University of Connecticut
- Dr. Daniel D. Anastasio, Rose-Hulman Institute of Technology
- Dr. Daniel D. Burkey, University of Connecticut
- Dr. Matthew Cooper, North Carolina State University at Raleigh
- Dr. Cheryl A. Bodnar, Rowan University

Incorporation of Sustainability Education into the Ammonia Synthesis Process Design of the Chemical Engineering Senior Design Course

- Dr. Jia Li, California State Polytechnic University, Pomona

Integrating a Laboratory into a First-semester Introduction to Chemical Engineering Course

- Dr. Susan M. Stagg-Williams, University of Kansas
- Dr. Molly McVey, University of Kansas
- Mr. Andrew David Yancey, University of Kansas
- Mr. Akash Anand, University of Kansas
- Mr. Arthur A. Lee, University of Kansas

Qualitative Analysis of Skills in a ChE Laboratory Course

- Dr. Heather C. S. Chenette, Rose-Hulman Institute of Technology
- Dr. Daniel D. Anastasio, Rose-Hulman Institute of Technology
- Dr. Gregory T. Neumann, Rose-Hulman Institute of Technology

Virtual Fluidization Labs to Assist Unit Operations Courses

- Prof. David R. Wagner, San Jose State University
- Fanny Huang

M506 - Tech Tools and Tips

3:00 P.M. - 4:30 P.M.

Sponsor: Civil Engineering Division

ASEE online session locator can be found at www.asee.org/osl.
2021 ASEE VIRTUAL CONFERENCE
MONDAY, JULY 26th SESSIONS

Authors in this session will present methods for integrating a variety of technologies in the civil engineering classroom.

Beyond Continuity of Instruction—Innovating a Geomatics Course Using Problem-based Learning and Open-source Software

Dr. Kweku Tekyi Brown P.E., The Citadel
Dr. Mary Katherine Watson, The Citadel
Dr. Elise Barrella P.E., Wake Forest University

Design of a Novel Undergraduate/Graduate Course on Terrestrial LiDAR

Dr. Gustavo O. Maldonado, Georgia Southern University
Dr. Shahnam Navaee, Georgia Southern University
Dr. Marcel Maghiar, Georgia Southern University

Educational Technology Platforms and Shift in Pedagogical Approach to Support Computing Integration Into Two Sophomore Civil and Environmental Engineering Courses

Dr. Sotiria Koloutsou-Vakakis, University of Illinois at Urbana-Champaign
Prof. Eleftheria Kontou, University of Illinois at Urbana-Champaign
Prof. Christopher W. Tessum, University of Illinois at Urbana-Champaign
Prof. Lei Zhao, University of Illinois at Urbana-Champaign
Hadi Meidani, University of Illinois at Urbana-Champaign

Employing Augmented Reality Throughout a Civil Engineering Curriculum to Promote 3D Visualization Skills

Dr. Kevin A. Waters P.E., Villanova University
Jonathan Hubler, Villanova University
Dr. Kristin M. Sample-Lord P.E., Villanova University
Dr. Virginia Smith, Villanova University
Andrea L. Welker, Villanova University

Leveraging Mixed Reality for Augmented Structural Mechanics Education

Dr. Mohamad Alipour, University of Virginia
Prof. Devin K. Harris, University of Virginia
Dr. Mehrdad Shafiei Dizaji, University of Massachusetts Lowell
Mr. Zachary Bilmen, University of Virginia
Ms. Zijia Zeng, University of Virginia

M507 - CIPD Board Meeting
3:00 P.M. - 4:30 P.M.
Sponsor: College Industry Partnerships Division
Moderators: Charles Boukal, John Zink Co. LLC; Magdalini Lagoudas, Texas A&M University
Meeting of the CIPD Board

M508 - Computers in Education 3 - Modulus I
3:00 P.M. - 4:30 P.M.
Sponsor: Computers in Education Division
Moderators: Mahnas Mohammadi-Aragh, Mississippi State University; Steven Barrett, University of Wyoming; Afrin Naz, West Virginia University Institute of Technology
In computing, the modulus operator stands for remainder. This session will highlight some of the papers that simply did not fit into the themes of the other technical sessions.

Towards Designing an Interactive System for Accelerated Learning and Assessment in Engineering Mechanics: A First Look at the Deforms Problem-solving System

Mr. Arinjoy Basak, Virginia Polytechnic Institute and State University
Mr. Todd Patrick Shuba, Virginia Polytechnic Institute and State University
Mr. Jianqiang Zhang, Virginia Polytechnic Institute and State University
Dr. Sneha Patel Davison, Virginia Polytechnic Institute and State University
Prof. David A. Dillard, Virginia Polytechnic Institute and State University
Dr. Jacob R. Grohs, Virginia Polytechnic Institute and State University
Dr. Nicole P. Pitterson, Virginia Polytechnic Institute and State University
Dr. Clifford A. Shaffer, Virginia Polytechnic Institute and State University

Game Research Trends at the Annual ASEE Conference: A 15-year Content Analysis

Dr. Larysa Nadolny, Iowa State University of Science and Technology
Mr. Md Imtiajul Alam, Iowa State University of Science and Technology

Schedule subject to change. Please go to https://2021asee.pathable.co/ for up-to-date information.
Mr. Michael Geoffrey Brown, Iowa State University of Science and Technology
Dr. Monica H. Lamm, Iowa State University of Science and Technology

**Implementation of Hands-on, Home-based Laboratory for Two Electrical Engineering Courses (A Pilot Study)**
Dr. James Kretzschmar, University of Wyoming
Dr. Robert F. Kubichek, University of Wyoming
Dr. Cameron H. G. Wright P.E., University of Wyoming
Dr. Steven F. Barrett, University of Wyoming
Dr. Jeffrey R. Anderson, University of Wyoming

**Engaging High School Students in Computer Science Through Music Remixing: An EarSketch-based Pilot Competition and Evaluation**
Dr. Roxanne Moore, Georgia Institute of Technology
Dr. Sunni Haag Newton, Georgia Institute of Technology
Dr. Meltem Alemdar, Georgia Institute of Technology
Sabrina Grossman, Georgia Institute of Technology
Jason Freeman, Georgia Institute of Technology
Jason Brent Smith, Georgia Institute of Technology
Tom Berry, Amazon Future Engineer

**Lemons into Lemonade!**
Dr. Thad B. Welch, Boise State University
Dr. Cameron H. G. Wright P.E., University of Wyoming
Mr. Michael G. Morrow, University of Wisconsin - Madison

**M510 - CPDD Executive Board Meeting**
3:00 P.M. - 4:30 P.M.
*Sponsor: Continuing Professional Development Division*
*Moderator: Keith Plemmons*
Business meeting

**M513A - Design Pedagogy**
3:00 P.M. - 4:30 P.M.
*Sponsor: Design in Engineering Education Division*
*Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, Ohio State University*
DEED technical session

**Design Review: A Teaching Tool for Project-based Learning**
Leandra Ramos, United States Military Academy
Heather J. Yoshii, United States Military Academy
Kyle Beyer, United States Military Academy
Morgan R. Corliss, United States Military Academy
Lt. Col. Brad C. McCoy, United States Military Academy
Col. Aaron T. Hill Jr., United States Military Academy
Lt. Col. Kevin P. Arnett P.E., United States Military Academy

**Providing an Enriching Learning Experience for Underresourced Academic Programs Through MOOCIBL**
Stanley Shie Ng, Biola University
Ryan Striker P.E., North Dakota State University
Mr. Enrique Alvarez Vazquez, North Dakota State University
Ellen M. Swartz, North Dakota State University
Ms. Lauren Singelmann, North Dakota State University
Mary Pearson, North Dakota State University
Mrs. Grace Sangalang Ng, Biola University

**Design and Build at Home: Development of a Low-cost and Versatile Hardware Kit for a Remote First-year Mechanical Engineering Design Class**
Tania K. Morimoto, University of California, San Diego
Mr. He Liu
Mr. Cristian H. Tharin
Dr. Carolyn L. Sandoval, University of California, San Diego
Christopher John Cassidy, University of California, San Diego
Dr. Huihui Qi, University of California, San Diego

**Providing Meaningful Hands-on Design Experience in the Remote-learning Environment with a Miniature Mechanical Testing Kit**
Miss Xinyue (Crystal) Liu, University of Toronto
Dr. Yasaman Delaviz, York University
Dr. Scott Ramsay, University of Toronto

**Work in Progress: On Teaching Requirements in Engineering Design**
Mr. Alexander Pagano, University of Illinois at Urbana - Champaign
Dr. Molly H. Goldstein, University of Illinois at Urbana - Champaign
Dr. Anthony M. Jacobi, University of Illinois at Urbana - Champaign

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MONDAY, JULY 26th SESSIONS

M513B - Impact of COVID-19 on Design Education 1
3:00 P.M. - 4:30 P.M.
Sponsor: Design in Engineering Education Division
Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, Ohio State University

Resilience and Innovation in Response to COVID-19: Learnings from Northeast Academic Makerspaces
- Prof. Victoria Bill, New York University, Tandon School of Engineering
- Ms. Anne-Laure Fayard, New York University, Tandon School of Engineering

Building a Sense of Community in a Multidisciplinary, Split-level Online Project-based Innovation Design Course
- Dr. Melissa Mae White, University of Florida
- Ms. Megan Stowers, University of Florida

Virtual Hands-on: Taking a Design Lab Online
- Clarke Snell, Stevens Institute of Technology
- Mr. Emil Pitz, Stevens Institute of Technology
- Mr. Louis Oh, Stevens Institute of Technology

Teaching the First-Year, Hands-on Engineering Design Experience Online
- Dr. Amanda Simson, The Cooper Union
- Dr. Martin S. Lawless, The Cooper Union
- Dr. Cynthia Lee, The Cooper Union
- Dr. Lisa Shay P.E., The Cooper Union
- Dr. Toby John Cumberbatch, The Cooper Union
- Austin Wade Smith, The Cooper Union
- Dr. Neveen Shlayan, The Cooper Union

Impact of Online Worksheets Versus In-class Printed Worksheets on Students’ Learning Outcomes and Content Mastery
- Dr. Paniz Khanmohammadi Hazaveh, Michigan Technological University
- Dr. Linda Wanless, Michigan Technological University

Work in Progress: Exploring Before Instruction Using an Online GeoGebra Activity in Introductory Engineering Calculus
- Dr. Jeffrey Lloyd Hieb, University of Louisville
- Dr. Marci S. DeCaro, University of Louisville
- Dr. Raymond Chastain

Development of WeBWorK Prelab Problem Sets to Support Student Learning
- Ms. Sheena Miao Ying Tan, Simon Fraser University
- Taco Niet, P.Eng., School of Sustainable Energy Engineering, Simon Fraser University
- Ms. Kamaria Kuling, Simon Fraser University

Self Reflection of Engineering Majors in General Chemistry II
- Dr. Patricia Muisener, Stevens Institute of Technology
- Dr. Guillermo D. Ibarrola Recalde, Stevens Institute of Technology
- Dr. Gail P. Baxter, Stevens Institute of Technology

HydroLearn: Improving Students’ Conceptual Understanding and Technical Skills in a Civil Engineering Senior Design Course
- Dr. Melissa Ann Gallagher, University of Houston
- Ms. Jenny Byrd, University of Louisiana at Lafayette
- Dr. Emad Habib P.E., University of Louisiana at Lafayette
- Prof. David Tarboton, Utah State University
- Prof. Clinton S. Willson, Louisiana State University

A Protocol to Follow-up with Students in Large-enrollment Courses
- Mr. Matias Alonso Piña, Pontificia Universidad Católica de Chile
- Miss Isabel Hilliger P.E., Pontificia Universidad Católica de Chile
- Jorge A. Baier, Pontificia Universidad Católica de Chile
- Miss Constanza Melian, Pontificia Universidad Católica de Chile
- Dr. Cristian Ruz, Pontificia Universidad Católica de Chile
- Mr. Tomás Andrés González, Pontificia Universidad Católica de Chile

M514 - Tools to Enhance Student Learning of Undergraduate Engineering Content
3:00 P.M. - 4:30 P.M.
Sponsor: Educational Research and Methods Division
Moderators: Hector Erives, University of Texas at El Paso; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach
M514B - Studies of Student Teams and Student Interactions

3:00 P.M. - 4:30 P.M.

Sponsor: Educational Research and Methods Division

Moderators: Kenya Mejia, University of Washington; Kerrie Douglas, Purdue University at West Lafayette

Student Perceptions of Project Management and Team Culture Within Capstone Projects

- Mrs. Nourhan Emad El-Atky, Rowan University
- Dr. Smitesh Bakrania, Rowan University

Work in Progress: Development of a Simplistic Agent-based Model to Simulate Team Progress Within an Innovation-based Learning Course

- Ellen M. Swartz, North Dakota State University
- Ms. Lauren Singelmann, North Dakota State University
- Ryan Striker P.E., North Dakota State University
- Mary Pearson, North Dakota State University
- Mr. Enrique Alvarez Vazquez, North Dakota State University
- Stanley Shie Ng, Biola University

Exploring the Properties and Growth of Student Interaction Networks on Twitter: Insights on STEM Learning and Engagement

- Md Nizamul Hoque Mojumder, Florida International University
- Dr. Arif Mohaimin Sadri, Florida International University

How Can We Identify Teams at Risk of Marginalizing Minoritized Students, at Scale?

- Dr. Darryl A. Dickerson, Florida International University
- Stephanie Masta, Purdue University, West Lafayette
- Dr. Matthew W. Ohland, Purdue University, West Lafayette
- Dr. Alice L. Pawley, Purdue University, West Lafayette

Examining the Me in Team-based Projects: Students’ Perceptions of Time and Tasks

- Dr. Marcia Gail Headley, University of Delaware
- Dr. Amy Trauth, University of Delaware
- Dr. Haritha Malladi, University of Delaware
- Prof. Jenni Buckley, University of Delaware

Examining the Impact of Interpersonal Interactions on Course-level Persistence Intentions Among Online Undergraduate Engineering Students

- Javeed Kittur, Arizona State University
- Dr. Samantha Ruth Brunhaver, Arizona State University

Dr. Jennifer M. Bekki, Arizona State University
Dr. Eunsil Lee, Florida International University

Work in Progress: Investigating the Effectiveness of an Orchestration Tool on the Nature of Students’ Collaborative Interactions During Group Work

- Miss Taylor Tucker, University of Illinois at Urbana - Champaign
- Dr. LuEttaMae Lawrence, Carnegie Mellon University
- Dr. Emma Mercier

M515 - Electrical and Computer Engineering Division Technical Session 2

3:00 P.M. - 4:30 P.M.

Sponsor: Electrical and Computer Engineering Division

Moderators: Huihui Wang, St. Bonaventure University; Nader Rafia, Boise State University; Amardeep Kaur, Southern Illinois University Edwardsville

Switching from Hands-on Labs to Exclusively Online Experimentation in Electrical and Computer Engineering Courses

- Dr. Dominik May, University of Georgia
- Dr. Beshoy Morkos, University of Georgia
- Dr. Andrew Jackson, University of Georgia
- Dr. Fred Richard Beyette Jr., University of Georgia
- Dr. Nathaniel Hunsu, University of Georgia
- Dr. Joachim Walther, University of Georgia
- Amy Ingalls, University of Georgia

Work in Progress: Activating Computational Thinking by Engineering and Coding Activities Through Distance Education

- Salih Sarp, Virginia Commonwealth University
- Hilmi Demirhan, University of North Carolina Charlotte
- Mr. Ahmet Akca
- Mr. Fatih Balki
- Mrs. Selva Ceylan

Work in Progress: Interactive Introductory Online Modules on Wireless Communications and Radio-frequency Spectrum Sharing

- Carl B. Dietrich, Virginia Polytechnic Institute and State University
- Dr. Nicholas F. Polys, Virginia Polytechnic Institute and State University
Factors Influencing Conceptual Understanding in a Signals and Systems Course
Caroline Crockett, University of Michigan
Dr. Cynthia J. Finelli, University of Michigan

Cloud-based Instruction Model for Electrical Engineering Courses: A Rapid Response to Enable Fully Online Course Delivery
Dr. Praveen Meduri, California State University, Sacramento
Mr. Lawrence David Landis, Intel Programmable Solutions Group
Prof. Perry L. Heedley, California State University, Sacramento
Mr. Tyler Sheaves, Intel Corporation

M515B - Electrical and Computer Engineering Division Technical Session 3
3:00 P.M. - 4:30 P.M.
Sponsor: Electrical and Computer Engineering Division
Moderators: Huihui Wang, St. Bonaventure University; Nader Rafia, Boise State University; Otilia Popescu, Old Dominion University; Stu Thompson, Bucknell University

Effectiveness of Remote Learning During the COVID-19 Pandemic in Spring 2020: A Survey of Engineering and Computer Science Students
Dr. Rick Hutley, University of the Pacific
Dr. Rahim Khoeie, University of the Pacific
Dr. Camilla M. Saviz P.E., University of the Pacific
Dr. Michael Doherty, University of the Pacific

A Framework for Remote Hardware Lab Course Delivery: Rapidly Adjusting to 2020
Mr. Matthew McConnell, Case Western Reserve University

Dr. Kenneth A. Loparo, Case Western Reserve University
Mr. Nicholas Barendt, Case Western Reserve University

Resilient Course Design for Teaching a Project-based Engineering Course Online
Dr. Xiaorong Zhang, San Francisco State University

Continuous Assessment Method Using Scientific Articles as Study Material for Distance Learning
Dr. Juhamatti Korhonen, Lappeenranta-Lahti University of Technology
Dr. Johanna Naukkarinen, Lappeenranta-Lahti University of Technology
Dr. Hanna Niemelä, Lappeenranta-Lahti University of Technology
Dr. Heikki Järvisalo, Lappeenranta-Lahti University of Technology
Prof. Perti Silventoinen, Lappeenranta-Lahti University of Technology

Virtual Technical and Professional Development Program for ECE Internship Preparation
Ms. Phuong Truong, University of California, San Diego
Dr. Karcher Morris, University of California, San Diego
Nicholas Stein, University of California, San Diego
Katie Hsieh, University of California, San Diego
Ravi D. Patel
Farnia Nafarifard, University of California, San Diego
Chen Du, University of California, San Diego
Mr. Kien Truong Nguyen, University of California, San Diego
Prof. Truong Nguyen, University of California, San Diego

M516 - International Collaboration in Teaching Sustainable Energy Solutions
3:00 P.M. - 4:30 P.M.
Sponsor: Energy Conversion and Conservation Division
Moderator: Herbert Hess, University of Idaho
Speakers: Dr. Robert J. Kerestes, University of Pittsburgh; Mr. Daniel Tyler Theis; Patrick Connor, University of Pittsburgh; Maiken Jakobsen, Technical University of Denmark

Panel session on an international collaborative course between the University of Pittsburgh and the Technical University of Denmark. This course featured three energy-based challenges which were developed in collaboration...
with Pitt, DTU, and six industry partners (3 in the US and 3 in Denmark). This panel will be a mix of faculty and students who participated in this collaborative international course over the summer of 2021. In this session, the faculty speakers will present this course and field questions regarding the logistics and outcomes of such a course. In addition, the student speakers will present their experience and the impact that this course had on their academic careers.

**M521 - Lightning Talks 2: Held Outside ASEE Virtual Platform**

**3:00 P.M. - 4:30 P.M.**

**Sponsor:** Engineering Libraries Division

**Moderators:** Kari Kozak, University of Iowa; David Hubbard, Texas A&M University; Jennifer Long, University of Alabama at Birmingham; Holly Surbaugh, University of New Mexico; Mel DeSart, University of Washington; Sylvia Jones, Southern Methodist University

Please note: Engineering Libraries Division members should check listservs or asee.org/eld to register for this event to receive links to access session.

The lightning talks will be held over two sessions with the following format:

- 10 member talks, Q&A, break
- 10 member talks, Q&A, break
- 9 member talks, Q&A, break
- 6 sponsor talks, Q&A

**M523 - Engineering Technology Curriculum and Programs**

**3:00 P.M. - 4:30 P.M.**

**Sponsor:** Engineering Technology Division

**Moderators:** James Tangorra, Drexel University; Christopher Leblanc, University of New Hampshire; Clay Gloster, North Carolina Agricultural and Technical State University

**Active Experiential Learning at a Distance**

- Zach Schreiber, Purdue University, West Lafayette
- Prof. Robert J. Herrick, Purdue University, West Lafayette
- Dr. Anne M. Lucietto, Purdue University, West Lafayette

A Comparative Analysis of Challenges Encountered in Achieving Student Outcomes When Teaching a Senior Engineering Technical Core Course Online and Face-to-Face

- Dr. Riem Rostom, Indiana State University
- Dr. A. Mehran Shahhosseini, Indiana State University
- Dr. Sheikh Fahad Ferdous, Indiana State University

Choose Ohio First—IMProving REtention and Student Success in Computing (COF-IMPRESS-C): First-year Progress Report

- Dr. Nasser Alaraje, University of Toledo

Developing Engineering Technology Programs to Address the Workforce Skills Gaps in Robotics and Advanced Manufacturing

- Dr. Mert Bal, Miami University

Design and Evaluation of Undergraduate Feedback-control System Course in Distance Learning

- Dr. Chen Xu, New York City College of Technology
- Dr. Lili Ma, New York City College of Technology

**M524 - Entrepreneurship & Engineering Innovation Division Technical Session 2**

**3:00 P.M. - 4:30 P.M.**

**Sponsor:** Entrepreneurship & Engineering Innovation Division

**Moderator:** Sandra Clavijo, Stevens Institute of Technology

**Virtual Creative Problem-solving Workshops**

- Dr. Abdullah Konak, Pennsylvania State University, Berks Campus
- Dr. Sadan Kulturel-Konak, Pennsylvania State University, Berks Campus
- Mrs. Kathleen Marie Hauser P.E., Pennsylvania State University, Berks Campus
- Dr. Marietta R. Scanlon, Pennsylvania State University, Berks Campus

**To Inhibit or Invite: Collaboration from Far Away**

- Dr. Barbara A. Karanian, Stanford University
- Dr. Ville M. Taajamaa, City of Espoo
- Prof. Mona Eskandari, University of California, Riverside

**Developing Intrapreneurship in the Next Generation of Engineering Innovators and Leaders**

- Dr. Tim Dallas P.E., Texas Tech University
- Dr. Heather Greenhalgh-Spencer, Texas Tech University
2021 ASEE VIRTUAL CONFERENCE
MONDAY, JULY 26th SESSIONS

ALL SESSIONS ARE PACIFIC DAYLIGHT TIME

Dr. Kelli M. Frias, American University
Development of a Direct Assessment for Measuring Students’ Ability to Make Connections
Meg West, Ohio State University
Dr. Meagan Eleanor Ita, Ohio State University
Laine Rumreich, Ohio State University
Dr. Rachel Louis Kajfez, Ohio State University
Dr. Krista M. Kecskemety, Ohio State University

The MOOCiBL Platform: A Custom-made Software Solution to Track the Innovation Process with Blockchain Learning Tokens
Mr. Enrique Alvarez Vazquez, North Dakota State University
Ryan Striker P.E., North Dakota State University
Ms. Lauren Singelmann, North Dakota State University
Mary Pearson, North Dakota State University
Ellen M. Swartz, North Dakota State University
Stanley Shie Ng, Biola University
Dr. Dan Ewert, Minnesota State University, Mankato

M526 - Bring Your Own Experiment: Experimentation and Laboratory-Oriented Studies
3:00 P.M. - 4:30 P.M.
Sponsor: Experimentation and Laboratory-Oriented Studies Division
Moderators: Jacob Bishop, Southern Utah University; Sally Pardue, Tennessee Technological University

Authors for this session present a live, hands-on experiment.

BYOE: An Apparatus for Exploring Small-satellite Estimation and Control
Mr. Bobby F. Hodgkinson, University of Colorado Boulder
Mrs. Trudy Schwartz, University of Colorado Boulder

BYOE: Fabrication, Implementation, and Design of a Remote Lab Setup for a Sensors and Transducers Course
Dr. Mark Trudgen, University of Georgia
Dr. Dominik May, University of Georgia
Mr. Robert Oliver Zanone III, University of Georgia

BYOE: Individual Lab Kit Options for Analog and Digital Circuits Suitable for In-class or At-home Experiments
Dr. Yanjun Yan, Western Carolina University
Dr. Robert D. Adams, Western Carolina University
Mr. Jerry Denton

Dr. Paul M. Yanik, Western Carolina University
Dr. Hugh Jack, Western Carolina University
Dr. Andrew Ritenour, Western Carolina University
Dr. Hayrettin B. Karayaka, Western Carolina University

BYOE: An Evaporative Cooler with Virtual Connectivity
Prof. Ahmet Can Sabuncu, Worcester Polytechnic Institute
Prof. John M. Sullivan Jr., Worcester Polytechnic Institute
Miss Kerri Anne Thornton, Worcester Polytechnic Institute
Dr. Maqsood Ali Mughal, Worcester Polytechnic Institute
Mr. Peter Hefti, Worcester Polytechnic Institute

M527 - First-Year Programs Division Executive Board Business Meeting
3:00 P.M. - 4:30 P.M.
Sponsor: First-Year Programs Division
Moderators: Timothy Hinds, Michigan State University; Kaitlin Mallouk, Rowan University

This convening of the First-Year Programs Division Executive Board will conduct board business.

M528 - Graduate Studies Division Technical Session 2
3:00 P.M. - 4:30 P.M.
Sponsor: Graduate Studies Division
Moderators: Diane Peters, Kettering University; Jeffrey Fergus, Auburn University

Academic Writing at the Doctoral and Professional Level in Engineering: The Current State of the Field and Pathways Forward
Ms. Kate Caroline Batson, University of Georgia

Visualizing Arguments to Scaffold Graduate Writing in Engineering Education
Dr. Kristen Moore, University at Buffalo, the State University of New York
Casey E. Wright, Purdue University at West Lafayette
Dr. Erica M. Stone, Middle Tennessee State University
Dr. Alice Pawley, Purdue University at West Lafayette

Description, Assessment, and Outcomes of Three Initial Interventions Within a National Science Foundation Research Traineeship (NRT): Onboarding Event,
**Career Exploration Symposium, and Multidisciplinary Introductory Course**

Dr. Eduardo Santillan-Jimenez, University of Kentucky
Julia E. Parker, University of Kentucky
Keren Mabisi, University of Cincinnati
Dr. Carissa B. Schutzman, University of Cincinnati
Prof. Mark Crocker, University of Kentucky

**Education and Evaluation for the NRT: Accounting for Numerous Requirements, Multiple Disciplines, and Small Cohorts**

Dr. Nathalie Duval-Couetil, Purdue University at West Lafayette
Dr. Soohyun Yi, Texas Tech University

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**M530 - Computing and Information Technology Division Technical Session 2**

3:00 P.M. - 4:30 P.M.

**Sponsor: Computing and Information Technology Division**

Moderators: Afsaneh Minaie, Utah Valley University; Mudasser Wyne, National University; Reza Sanati-Mehrizy, Utah Valley University; David Dampier, Marshall University

This session presents papers on a variety of topics pertaining to computing and information technology.

**Web-based Cryptomining Detection**

Dr. Vijay Anand, University of Missouri, St. Louis
Mr. Dmytro Kudriashov, EPAM Systems

**Self-assessment of Knowledge Levels in the Subjects of Cyber Attacks and Defense in a Cybersecurity Awareness Education Workshop**

Dr. Te-Shun Chou, East Carolina University
Dr. Tijjani Mohammed, East Carolina University

**Integrating Cybersecurity Concepts Across Undergraduate Computer Science and Information Systems Curriculum**

Dr. Uma Kannan
Dr. Rajendran Swamidurai, Alabama State University

**Curricular Improvement Through Course Mapping: An Application of the NICE Framework**

Dr. Ida B. Ngambeki, Purdue University, West Lafayette
Dr. Marcus Rogers, Purdue University, West Lafayette
Miss Sienna Jasmine Bates, Purdue University, West Lafayette
Megan Celeste Piper

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**Development of a HyFlex Defensive Security Course**

Dr. Jeremy Straub, North Dakota State University

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**M533 - Pre-College Engineering Education Division Technical Session 3**

3:00 P.M. - 4:30 P.M.

**Sponsor: Pre-College Engineering Education Division**

Moderators: Greg Strimel, Purdue University at West Lafayette; Katelyn Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University

University and High School Partnerships, Career Prep
A University-High School Partnership for Introduction to Engineering: Building Community with Underrepresented Students (Evaluation)

Dr. Shazib Z. Vijlee, University of Portland
Jamie Merritt, University of Portland

**Mentoring Correlates to Characteristics of University K12 Outreach Programs: Survey Findings (Fundamental)**

Miss Sabina A. Schill, University of Colorado Boulder
Dr. Angela R. Bielefeldt, University of Colorado Boulder

**Evaluation of Virtual Young Scholar Program with a Focus on Hands-on Engineering Design Projects in a Virtual Setting (Evaluation)**

Dr. Elena Nicolescu Veety, North Carolina State University at Raleigh
Mr. James Edward Lamberth III, Enloe High School
Mrs. Evelyn L. Baldwin, Wake STEM Early College High School

**Cross-Sectional Assessment of CEM Curriculum Offerings at the Pre-college level in North Carolina (Evaluation)**

Ms. Cayla Lenore Anderson, Clemson University
Dr. Dhaval Gajjar, Clemson University

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**M533B - Pre-College Engineering Education Division Technical Session 4**

3:00 P.M. - 4:30 P.M.

**Sponsor: Pre-College Engineering Education Division**

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Teacher Observational Instruments

Training Teachers on the Internet of Things (Evaluation)
- Dr. Melissa A. Dagley, University of Central Florida
- Dr. Damla Turgut, University of Central Florida
- Prof. Hyoung Jin Cho, University of Central Florida
- Dr. Eleazar Vasquez

Biologically Inspired Design For Engineering Education: Online Teacher Professional Learning (Evaluation)
- Dr. Meltem Alemdar, Georgia Institute of Technology
- Dr. Hoda Ehsan, Georgia Institute of Technology
- Mr. Christopher Cappelli, Georgia Institute of Technology
- Dr. Euisun Kim, CEISMC
- Dr. Roxanne Moore, Georgia Institute of Technology
- Dr. Michael Helms, Georgia Institute of Technology
- Mr. Jeffrey H. Rosen, Georgia Institute of Technology
- Dr. Marc Weissburg, Georgia Institute of Technology

Studying In-service Teacher Professional Development on Purposeful Integration of Engineering into K-12 STEM Teaching (Research to Practice)
- Dr. Amanda M. Gunning, Mercy College
- Dr. Meghan E. Marrero, Mercy College
- Dr. Kristen V. Larson, Mercy College

Teachers Navigating Educational Systems: Reflections on the Value of Funds of Knowledge (Fundamental)
- Dr. Joel Alejandro Mejia, University of San Diego
- Mr. Luis Ricardo Betancourt, San Diego State University
- Dr. Alberto Esquinca, San Diego State University
- Dr. Vitaliy Popov, University of Michigan

M534 - Professional Formation and Career Experiences

3:00 P.M. - 4:30 P.M.
Sponsor: Liberal Education/Engineering & Society Division

Moderators: Megan Kenny Feister, CSUCI; Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University

Penalized for Excellence: The Invisible Hand of Career-Track Stratification
- Dr. Cindy Rottmann, University of Toronto
- Dr. Emily Moore P.Eng., University of Toronto
- Dr. Doug Reeve P.Eng., University of Toronto
- Dr. Andrea Chan, University of Toronto
- Mr. Milan Maljkovic, University of Toronto
- Ms. Dimpho Radebe, University of Toronto

The Hidden Curriculum and the Professional Formation of Responsible Engineers: A Review of Relevant Literature in ASEE Conference Proceedings
- Dr. Stephen Campbell Rea, Colorado School of Mines
- Kylee Shiekh, Colorado School of Mines
- Dr. Qin Zhu, Colorado School of Mines
- Dr. Dean Nieusma, Colorado School of Mines

Using a Values Lens to Examine Engineers’ Workplace Experiences
- Dr. Samantha Ruth Brunhaver, Arizona State University
- Dr. Benjamin David Lutz, California Polytechnic State University, San Luis Obispo
- Dr. Nathan E. Canney, Taylor Devices, Inc.

Alumni Reflect on Their Education About Ethical and Societal Issues
- Dr. Angela R. Bielefeldt, University of Colorado Boulder
- Jake Walker Lewis
- Dr. Madeline Polmear, University of Florida
- Dr. Daniel Knight, University of Colorado Boulder
- Dr. Chris Swan, Tufts University

M534B - Ethics, Mindfulness, and Reform During the COVID-19 Pandemic

3:00 P.M. - 4:30 P.M.
Sponsor: Liberal Education/Engineering & Society Division

Moderators: Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University; Sean Ferguson, University of Virginia

Teaching Ethical Theory and Practice to Engineering Students: Pre-Pandemic and Post-Pandemic Approaches
- Ms. Alexis Powe Nordin, Mississippi State University
- Ms. Amy K. Barton, Mississippi State University

Engineering Students Coping With COVID-19: Yoga, Meditation, and Mental Health
- Dr. Kacey Beddoes, San Jose State University
- Dr. Andrew Danowitz, California Polytechnic State University,
2021 ASEE Virtual Conference

Monday, July 26th Sessions

San Luis Obispo

Work in Progress: Post-Pandemic Opportunities to Re-Engineer Engineering Education: A Pragmatic-Futurist Framework

- Dr. Shahrima Maharubin, Texas Tech University
- Mr. Shamsul Arefeen, Texas Tech University
- Dr. Ryan C. Campbell, Texas Tech University
- Dr. Roman Taraban, Texas Tech University

Situation Engineering Education in a World Impacted by COVID-19

- Dr. Thomas A. De Pree, University of New Mexico
- Sarah Appelhans, University at Albany-SUNY
- Dr. Alan Cheville, Bucknell University
- Dr. Atsushi Akera, Rensselaer Polytechnic Institute
- Melissa Shuey, Rensselaer Polytechnic Institute

M538 - Design Related

3:00 P.M. - 4:30 P.M.

Sponsor: Mechanical Engineering Division

Moderators: David Mikesell, Ohio Northern University; Rungun Nathan, Pennsylvania State University, Berks Campus; Thomas DeNucci, United States Coast Guard Academy

Papers related to design are presented in this session.

A General Structured Procedure to Solve Machine Design Problems

- Dr. Joseph J. Reincis P.E., California State Polytechnic University-Pomona
- Hartley T. Grandin Jr., Worcester Polytechnic Institute (WPI)

Are You Sure About That? Introducing Uncertainty in Undergraduate Engineering

- Sophia V. Yates, Smith College
- Dr. Christopher H. Conley, Smith College
- Dr. Aaron J. Rubin, Smith College

Collaborative Learning in an Online-only Design for Manufacturability Course

- Miss Taylor Tucker, University of Illinois at Urbana - Champaign
- Mr. Nattasit Dancholvichit, University of Illinois at Urbana - Champaign
- Dr. Leon Liebenberg, University of Illinois at Urbana - Champaign

Design Across the Curriculum: An Evaluation of Design Instruction in a New Mechanical Engineering Program

- Dr. Sean Stephen Tolman, Utah Valley University
- Dr. Matthew J. Jensen, Utah Valley University

Transforming an Engineering Design Course into an Engaging Learning Experience Using a Series of Self-Directed Mini-Projects and ePortfolios: Face-to-Face Versus Online-only Instruction

- Miss Taylor Tucker, University of Illinois at Urbana - Champaign
- Dr. Ava R. Wolf, University of Illinois at Urbana-Champaign
- Mr. Nattasit Dancholvichit, University of Illinois at Urbana - Champaign
- Dr. Leon Liebenberg, University of Illinois at Urbana - Champaign

M539 - Engaging the Online Classroom

3:00 P.M. - 4:30 P.M.

Sponsor: Mechanics Division

Moderators: Jennifer Holte, University of St. Thomas; Mohammad Shafinul Haque, Angelo State University; Julian Davis, University of Southern Indiana; Masoud Rais-Rohani, University of Maine

In this session you will find papers discussing methods and activities that have been used to engage students in the online learning environment.

Interactive Videos and “In-Class” Activities in a Flipped Remote Dynamics Class

- Dr. Phillip Cornell, United States Air Force Academy

Work-in-Progress: Computer Simulations to Deliver Inquiry-Based Laboratory Activities in Mechanics

- Mr. Jacob Matthew Cook, Oregon State University
- Mr. Thomas W. Ektstedt, Oregon State University
- Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo
- Dr. Milo Koretsky, Tufts University

Development of an Interactive TopHat Textbook for Engaged Learning

- Dr. Matthew M. Barry, University of Pittsburgh
- Miss Samantha E. Wismer
- Dr. Tony Lee Kerzmann, University of Pittsburgh
- Mr. Lee Allen Dosse, University of Pittsburgh

Activating and Engaging Students in Online Asynchronous Classes

- Dr. Nicolas Ali Libre, Missouri University of Science and Technology
M543 - ASEE 101, Financial Town Hall & General Body Meeting

3:00 P.M. - 4:30 P.M.
Sponsor: ASEE Board of Directors
Moderator: Nathan Kahl, American Society for Engineering Education
Speakers: Dr. Sheryl A. Sorby, University of Cincinnati; Dr. Adrienne Minerick, Michigan Technological University; Dr. Stephanie G. Adams, University of Texas at Dallas; Dr. Doug Tougaw P.E., Valparaiso University; Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo; Mr. Joseph E. Dillon, American Society for Engineering Education

Open to all attendees

M547 - Writing Your Diversity Statement for Academic Job Searches

3:00 P.M. - 4:30 P.M.
Sponsor: Student Division
Moderators: Ms. Mi Thant Mon Soe, Drexel University; Susan Sajadi, Arizona State University; Adrianne Wheeler, Project SYNCRE; Cassandra Woodcock, University of Michigan
Speaker: Ms. Mi Thant Mon Soe, Drexel University

During this interactive session, learn the elements of a diversity statement, write your own diversity statement outline, and share with others for feedback.

M548 - Systems Engineering Division Technical Session 2

3:00 P.M. - 4:30 P.M.
Sponsor: Systems Engineering Division
Moderators: Bryan Mesmer, University of Alabama in Huntsville; Alejandro Salado, Virginia Polytechnic Institute and State University; Marsha Lovett; Karim Muci-Kuchler, South Dakota School of Mines and Technology

Building and Revising an Assessment to Measure Students’ Self-Efficacy in Systems Thinking

Dr. Marsha Lovett, Carnegie Mellon University
Dr. Mark David Bedillion, Carnegie Mellon University
Dr. Cassandra M. Birrenkott, South Dakota School of Mines and Technology
Dr. Karim Heinz Muci-Kuchler, South Dakota School of Mines and Technology
Dr. Laura Ochs Pottmeyer, Carnegie Mellon University

Systems Thinking Assessments: Approaches That Examine
Engagement in Systems Thinking
Ms. Kelley E. Dugan, University of Michigan
Dr. Erika A. Mosyjowski, University of Michigan
Dr. Shanna R. Daly, University of Michigan
Dr. Lisa R. Lattuca, University of Michigan

Work in Progress: Cognitive Competencies Within Systems Thinking in the Design of Biological Systems
Mr. Ruben D. Lopez-Parra, Purdue University at West Lafayette
Prof. Tamara J. Moore, Purdue University at West Lafayette

Evaluation of Targeted Systems Thinking and Systems Engineering Assessments in a Freshmen-Level Mechanical Engineering Course
Dr. Cassandra M. Birrenkott, South Dakota School of Mines and Technology
Dr. Karim Heinz Muci-Kuchler, South Dakota School of Mines and Technology
Dr. Mark David Bedillion, Carnegie Mellon University
Dr. Marsha Lovett, Carnegie Mellon University
Dr. Laura Ochs Pottmeyer, Carnegie Mellon University

WIP: Knowing Engineering Through the Arts: The Impact of the Film Hidden Figures on Perceptions of Engineering Using Arts-Based Research Methods
Katherine Robert, University of Denver

The Growth of Interdisciplinarity in Engineering Education in the 21st Century
Dr. Mousumi Roy P.E., University of Connecticut

Engineering in Videogames: A Case Study of Iconoclasts Narrative and Interactive Portrayal of Engineers
Dr. Corey T. Schimpf, University at Buffalo, the State University of New York

M549 - TELPhE Division Technical Session 2: The Broadening Face of Engineering Education
3:00 P.M. - 4:30 P.M.
Sponsor: Technological and Engineering Literacy/Philosophy of Engineering Division
Moderators: Chandra Asthana, Elizabeth City State University; Michael Williamson, Indiana State University; Olgha QAqish, North Carolina State University at Raleigh; John Reisel, University of Wisconsin - Milwaukee; Katherine Goodman, University of Colorado Denver

This session contains several papers that consider updated visions of engineering education and the forces shaping these changes.

Kindness in Engineering Education
Dr. Angela R. Bielefeldt, University of Colorado Boulder

A Human-Centric Engineering Education Model Inspired from Modern Manufacturing Processes
Dr. Y. Curtis Wang, California State University, Los Angeles
Prof. Jim Kuo, California State University, Los Angeles
Dr. He Shen, California State University, Los Angeles
Dr. David E. Raymond, California State University, Los Angeles
Mr. Mathias J. Brieu, California State University, Los Angeles

Undergraduate Women in Science and Engineering Mentoring Program to Enhance Gender Diversity Demonstrates Success During the COVID Pandemic
Lauren Drankoff, University of Dayton
Dr. Sandra L. Furterer, University of Dayton
Ms. Elizabeth Hart, University of Dayton

Engaging Women Engineering Undergraduates as Peer Facilitators in Participatory Action Research Focus Groups
Dr. Susan Thomson Tripathy, University of Massachusetts Lowell
Prof. Kavitha Chandra, University of Massachusetts Lowell
Dr. Hsien-Yuan Hsu, University of Massachusetts Lowell
Dr. Yanfen Li, University of Massachusetts Lowell
Diane Reichlen, University of Massachusetts Lowell

M557 - Faculty Development
Lightning Talk Session 1: COVID-19 Focus

3:00 P.M. - 4:30 P.M.
Sponsor: Faculty Development Division
Moderators: Natascha Buswell, University of California, Irvine; Kaatlin Mallouk, Rowan University; Karen High, Clemson University

This session is lightning talks discussing faculty development in the COVID-19 era. Each presenter will give a five-minute presentation followed by two minutes of clarifying questions. The final 20 minutes will be for the group to synthesize major items learned, feedback for presenters, and future directions for faculty development. The audience will be engaged through polls, chats, and other features to make the session enjoyable for all.

Lessons Learned: Making Shifts: Faculty Development Shifts in a University Makerspace During the COVID-19 Pandemic
Dr. Audrey Boklage, University of Texas at Austin
Ms. Roxana Maria Carbonell, University of Texas at Austin
Dr. Maura Borrego, University of Texas at Austin

Establishing Virtual Communities of Practice to Support Chemical Engineering Faculty Development During the COVID-19 Pandemic
Prof. Matthew W. Liberatore, University of Toledo
Dr. Daniel Lepek, Cooper Union for the Advancement of Science and Art

Lessons Learned: How Our Agile Department Survived the COVID-19 Pivot
Dr. Diana A. Chen, University of San Diego
Dr. Laura Ann Gelles, University of Texas at Dallas
Dr. Susan M. Lord, University of San Diego
Prof. Gordon D. Hoople, University of San Diego
Dr. Joel Alejandro Mejia, University of San Diego
Prof. Mark A. Chapman, University of San Diego

Lessons Learned: Adapting to Aid Faculty for Teaching in a Pandemic
Dr. Stephanie Cutler, Pennsylvania State University
Dr. Sarah E. Zappe, Pennsylvania State University
Dr. Thomas A. Litzinger, Pennsylvania State University
Ms. Cathy J. Holsing, Pennsylvania State University
Mrs. Christa Watschke, Saint Louis University

Lessons Learned: Making the “New Reality” More Real: Adjusting a Hands-on Curriculum for Remote Learning
Dr. Yen-Lin Han, Seattle University
Prof. Joshua M. Hamel, Seattle University
Dr. Claire Strebinger, Seattle University
Dr. Gregory Mason, Seattle University
Dr. Kathleen E. Cook, Seattle University
Dr. Jennifer A. Turns, University of Washington
Dr. Teodora Rutar Shuman, Seattle University

Engineering Instructors’ Self-reported Activities to Support Emergency Remote Teaching During the COVID-19 Pandemic
Dr. Abeer P. Rehmat, University of Nebraska, Lincoln
Prof. Heidi A. Diefes-Dux, University of Nebraska, Lincoln
Grace Panther, University of Nebraska, Lincoln

Faculty Experiences with Undergraduate Engineering Student Mental Health
Dr. Sarah A. Wilson, University of Kentucky
Dr. Joseph H. Hammer, University of Kentucky
Dr. Ellen L. Usher, University of Kentucky

A Rapid and Formative Response by the Engineering Education Faculty to Support the Engineering Faculty and Students Throughout the Extreme Classroom Changes Resulting from the COVID-19 Pandemic
Mr. Lance Leon Allen White, Texas A&M University
Ms. Donna Jaison, Texas A&M University
Samantha Ray, Texas A&M University
Dr. Kelly Brumbelow, Texas A&M University
Dr. Shereece Fields, Texas A&M University
Dr. Luciana R. Barroso, Texas A&M University
Dr. Karan Watson P.E., Texas A&M University
Dr. Tracy Anne Hammond, Texas A&M University

Give Them Grace: An Autoethnographic Study on Instructors’ Adaptation to Online Technology in Education as a Result of COVID-19
Jazmin Jurkiewicz, Virginia Polytechnic Institute and State University
Dr. Byron Hempel, University of Arizona
Ms. Malori Redman, San Francisco State University
Dr. Homero Murzi, Virginia Polytechnic Institute and State University
Christopher Dominguez
M559 - Changing How We Pursue Change

3:00 P.M. - 4:30 P.M.

Sponsor: Equity, Culture & Social Justice in Education Division

Moderator: James Holly, Jr., Wayne State University

Liberatory Potential of Labor Organizing in Engineering Education
Joseph Valle, University of Michigan, Ann Arbor
Dr. Corin L. Bowen, California State University, Los Angeles
Dr. Donna M. Riley, Purdue University, West Lafayette

Examining the STEM Institution and Imagining the Beginnings of a Revolutionary Praxis Through the Queer Perspective
Madeleine Jennings, Arizona State University

Burning Bridges: Considerations From a Structure-agency Perspective for Developing Inclusive Precollege Engineering Programming
Jacqueline Handley, University of Michigan

Antiracist Institutional Transformation Matters: How Can Community Cultural Wealth and Counter-space Processes Illuminate Areas for Change?
Dr. Emily Knaphus-Soran, University of Washington
Daiki Hiramori, University of Washington
Dr. Elizabeth Litzler, University of Washington

The Engineering Exchange for Social Justice (ExSJ): Advancing Justice Through Sociotechnical Engineering and Equitable Partnership Exchanges
Dr. Marissa H. Forbes, University of San Diego
Dr. Odesma Onika Dalrymple, University of San Diego
Dr. Susan M. Lord, University of San Diego
Dr. Caroline Baillie, University of San Diego
Prof. Gordon D. Hoople, University of San Diego
Dr. Joel Alejandro Mejia, University of San Diego

M559B - Working Against Unjust Social Forces

3:00 P.M. - 4:30 P.M.

Sponsor: Equity, Culture & Social Justice in Education Division

Moderator: James Holly, Jr., Wayne State University

Implementing Social Justice Projects in Thermal System and Mechanical Design Courses
Dr. Lauren Anne Cooper, California Polytechnic State University, San Luis Obispo
Dr. Jennifer Mott, California Polytechnic State University, San Luis Obispo

Teaching Environmental Justice Principles to Chemical Engineering Seniors: An Antiracist, Collaborative Approach
Ms. Anna Marie LaChance, University of Connecticut
Dr. Jennifer Pascal, University of Connecticut
Ms. Danielle Gan, University of Connecticut
Mr. Justyn James Paquette Welsh, University of Connecticut
Mr. Thomas James Pauly, University of Connecticut
Patrick Paul, University of Connecticut

Critical Perspectives on Teaching Design in First-year Engineering
Dr. Desen Sevi Ozkan, Tufts University
Dr. Avneet Hira, Boston College

Development of a Social-justice Mindset Through Discovery Learning From the Conflict Between Safety and Welfare in Engineering Ethics
Dr. Matthew Sleep, University of Kentucky
Dr. Yasha Rohwer, Oregon Institute of Technology

Redressing Inequities Within Our Margin of Maneuverability: A Narrative Inquiry Study
Dr. Kristen Moore, University of Buffalo
Prof. Rebecca Walton, Utah State University
Prof. Natasha N. Jones, Michigan State University
2021 ASEE VIRTUAL CONFERENCE
MONDAY, JULY 26th SESSIONS

M578 - UEC Business Meeting
3:00 P.M. - 4:30 P.M.
Sponsor: Undergraduate Experience Committee
Moderators: Mary Besterfield-Sacre, University of Pittsburgh; Jerome Lavelle, North Carolina State University at Raleigh

M599 - SPONSORED SESSION: Utilizing FPGAs for Teaching in the Classroom or Virtualized Lab - Presented by Intel
3:50 P.M. - 4:30 P.M.
Sponsor: Sponsored Sessions

M599B - Department Chair Focus Group
3:00 P.M. - 4:30 P.M.
Sponsor: Sponsored Sessions
Moderator: Donald Visco, University of Akron

M679 - ABET SESSION: Preparing for My Virtual ABET Accreditation Review in 2021 – 2022 ... Am I Ready?
4:15 P.M. - 6:15 P.M.
Sponsor: ABET Sponsored Sessions
Moderator: Christine Kalambary, American Society for Engineering Education
Speakers: Dr. Winston F. Erevelles, St. Mary’s University; Dr. Patricia Brackin P.E., Rose-Hulman Institute of Technology

Going through ABET accreditation for the first time and it’s virtual? You will gain a firm understanding of the foundational processes and procedures of the ABET accreditation process, what is needed to prepare for the initial accreditation of a program, and where to turn for further information. We will go over the entire process of ABET accreditation — from how to apply to the purpose of the Self-Study Report and what to expect during the on-site visit. You will also understand what a due process response entails and when to expect the final decision.
T143 - TUESDAY PLENARY
Sponsored by Autodesk

8:00 A.M. - 8:45 A.M.
Sponsor: ASEE Board of Directors
Moderators: Sheryl Sorby, University of Cincinnati; Dora Smith, Siemens Digital Industries Software
Speakers: Dr. Gary R. Bertoline, Purdue University at West Lafayette; Kelly J. Cross, University of Nevada, Reno; Alex Mejia, University of San Diego; and Karan Watson, Texas A&M University

In June 2020, ASEE President Sheryl Sorby challenged members to review the current state of engineering and engineering technology education in preparing engineers and identify ways to fundamentally improve access, diversity, and student success. Chair Gary Bertoline and members of the steering committee appointed by President Sorby will provide details into the proposed efforts and will seek input from ASEE members in attendance.

T199B - KEYNOTE SESSION:
Grand Challenges Demand Fearless Ideas—Presented by University of Maryland

8:55 A.M. - 9:40 A.M.
Sponsor: Sponsored Sessions
Moderator: Nathan Kahl, American Society for Engineering Education
Speaker: Dr. Darryll J. Pines, President, University of Maryland College Park

The world needs engineers and, in many ways, this is our moment. Climate change. Social injustice and inequality. Improving the nation’s infrastructure. Preparing for the next pandemic. Engineers should lead the way in addressing these global challenges, setting the national priorities for research and transforming engineering education. University of Maryland President Darryll J. Pines will share a vision for the role of engineering in driving positive change in our society.

T201 - Aerospace Division Technical Session 3

9:45 A.M. - 11:15 A.M.
Sponsor: Aerospace Division
Moderators: Michael Hatfield, University of Alaska Fairbanks; Tracy Yother, Purdue University at West Lafayette; Nadir Yilmaz, Howard University; Pradip Sagdeo

Teaching methodology and assessment 1
Redefining Assessment Formats to Replicate Real-world Aerospace Engineering Applications
Dr. Amelia Greig, University of Texas at El Paso
Student Achievement Goals with Alternative and Traditional Exam Formats
Connor Ott, University of Colorado Boulder
Dr. Kathryn Anne Wingate, University of Colorado Boulder
Dr. Aaron W. Johnson, University of Colorado Boulder
Fair Senior Capstone Project Teaming Based on Skills, Preferences, and Friend Groups
Prof. Zachary Nolan Sunberg, University of Colorado Boulder
Dr. Kathryn Anne Wingate, University of Colorado Boulder
Lara Buri, University of Colorado, Boulder
An Assessment of an Online Flipped-style Classroom Instruction for Mechanical and Aerospace Engineering Students
Dr. Sharanabasaweshwara Asundi, Old Dominion University
Dr. Miltos Kotinis

T204 - Supporting Biomedical Engineering Students in Holistic Development

9:45 A.M. - 11:15 A.M.
Sponsor: Biomedical Engineering Division
Moderators: Yareni Lara-Rodriguez, University of Puerto Rico, Mayaguez; Richard Goldberg, University of North Carolina at Chapel Hill; Aileen Huang-Saad, Northeastern University; Renata Ramos, Rice University

Biomedical engineering is an interdisciplinary discipline that requires the thoughtful intersection of discipline specific content and more holistic student development. This session addresses different ways to support students
in the development of ethics, an entrepreneurial mindset, and social justice. Authors will also discuss frameworks for holistic assessment of BME student learning and methods for analyzing BME resumes for use in career pathway alignment.

**Applying the Framework of Fink’s Taxonomy to the Design of a Holistic Culminating Assessment of Student Learning in Biomedical Engineering**
- Dr. Emily Dosmar, Rose-Hulman Institute of Technology
- Dr. B. Audrey Nguyen, University of Akron

**BME Career Exploration: Examining Students’ Career Perspectives**
- Cassandra Sue Ellen Woodcock, University of Michigan
- Annie AnMeng Wang, University of Michigan
- Dr. Aileen Huang-Saad, Northeastern University
- Dr. Shanna R. Daly, University of Michigan
- Dr. Lisa R. Lattuca, University of Michigan

**Development of Quantitative Methodologies for Analyzing Biomedical Engineering Resumes and Their Use in Career Pathway Alignment**
- Mr. Tristan McCarty, University of Florida
- Dr. Sarah Corinne Rowlinson Furtney, University of Florida

**Enhancing the Teaching of Research Ethics Through Emotional Priming with Encounters with Patients and Reflection**
- Dr. Ashley J. Earle, York College of Pennsylvania
- Nozomi Nishimura, Cornell University
- Prof. Isaac Smith, Brigham Young University
- Dr. David M. Small, Cornell University

**Impact of Entrepreneurial Mindset Module Connecting Societal Consideration, Medical Interventions, and Engineering Physiology**
- Allison Lukas, Western New England University
- Dr. Devina Jaiswal, Western New England University

**Teaching Social Justice to Engineering Students**
- Dr. Dianne Grayce Hendricks, University of Washington
- Miss Yuliana Flores, Human Centered Design & Engineering, University of Washington

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**T205 - Works in Progress in Chemical Engineering Education**

**9:45 A.M. - 11:15 A.M.**

**Sponsor: Chemical Engineering Division**

**Moderators:** VJ Tocco, University of Florida; Ashlee Ford Versypt, University at Buffalo, the State University of New York

**Work in Progress: Active Learning Techniques for Online Teaching of Chemical Engineering Courses**
- Dr. Erick S. Vasquez, University of Dayton
- Dr. Michael J. Elsass, University of Dayton

**Work in Progress: Wrappers vs. Experts**
- Prof. Carl F. Lund, University at Buffalo

**Work in Progress: Evaluation of a Remote Undergraduate Research Experience in Chemical Engineering**
- Dr. Sarah E. Zappe, Pennsylvania State University
- Dr. Enrique D. Gomez
- Prof. Scott T. Milner
- Ms. Yu Xia

**Work in Progress: Techniques for Including Chemical Process Safety and Environmental Compliance in a Chemical Engineering Capstone Design Course**
- Dr. Matthew Lucian Alexander P.E., Texas A&M University, Kingsville
- Dr. Joseph Amaya

**Work in Progress: Identifying Success Factors for Chemical Engineering Sophomores and Testing the Effects of an Intervention**
- Dr. Brad Cicciarelli, Louisiana Tech University
- Eric Sherer, Corteva Agriscience
- Dr. Marisa K. Orr, Clemson University
- Dr. Timothy Reeves, Louisiana Tech University

- Kitana Kaiphanliam, Washington State University
- Mrs. Olivia Reynolds, Washington State University
- Olufunso Oje, Washington State University
- Dr. Olusola Adesope, Washington State University
- Prof. Bernard J. Van Wie, Washington State University
T206 - Program Support Initiatives

9:45 A.M. - 11:15 A.M.

Sponsor: Civil Engineering Division

Moderators: Jieun Hur, Ohio State University; Norman Dennis, University of Arkansas; Matthew Lovell, Rose-Hulman Institute of Technology; Steven Burian, University of Utah

This session covers a variety of topics geared toward program development and improvement. Topics include the development of teaching models, program development, and assessment across the curriculum.

Civil Engineering Master’s Programs: Requirements and Outcomes

Dr. Angela R. Bielefeldt, University of Colorado Boulder
Ms. Leslie Nolen, American Society of Civil Engineers

Development of an Institutional Teaching Model

Dr. Charles Riley P.E., Oregon Institute of Technology
Dr. Jesse M. Kinder, Oregon Institute of Technology
Dr. Ben S. Bunting Jr, Oregon Institute of Technology

Does a Review Course Increase FE Exam Preparedness?

Dr. Matthew K. Twenty, Virginia Military Institute
Dr. Christopher R. Shearer, South Dakota School of Mines and Technology
Dr. Benjamin Z. Dymond, University of Minnesota Duluth
Dr. Wakeel Ishola Anthony Idewu, Virginia Military Institute

Leader Development Model (LDM) Through Self- and Peer-assessment Across the Curriculum

Dr. Alyson Grace Eggleston, The Citadel
Dr. Robert J. Rabb P.E., The Citadel

Using the SWIVL for Effective HyFlex Instruction: Best Practices, Challenges, and Opportunities

Dr. Ronald W. Welch, The Citadel
Dr. Robert J. Rabb P.E., The Citadel
Dr. Alyson Grace Eggleston, The Citadel

Construction education topics

Direct Assessment of Student Learning Outcomes

Dr. Yilmaz Hatipkarasulu, University of Texas at San Antonio
Dr. Guntulu S. Hatipkarasulu, Texas State University

Modifying the Syllabus on Construction Materials and Methods to Better Prepare Construction Students for Upper-level Courses, Co-ops, or Internships

Dr. George Okere, University of Cincinnati

The Perception of Sustainable Design and Construction: Case Study of Construction Students at Two Universities

Dr. Sanjeev Adhikari, Kennesaw State University
Dr. Caroline Murrie Clevenger P.E.
Rui Zhang, University of Colorado Denver

Community-engaged Learning in Construction Education: A Case Study

Dr. Saeed Rokooei, Mississippi State University
Mrs. Michelle Garraway, Mississippi State University
Mr. Ali Karji

Pedagogy to Teach BIM in Construction Management Curriculum

Dr. Sanjeev Adhikari, Kennesaw State University
Dr. Pavan Meadati, Kennesaw State University

T209 - Construction Engineering Division Technical Session 2

9:45 A.M. - 11:15 A.M.

Sponsor: Construction Engineering Division

Moderators: Rachel Mosier, Oklahoma State University; Nicholas Tymvios, Bucknell University; Norman Philipp, Pittsburg State University; Luciana de Cresce El Debs, Purdue University Programs

T213 - DEED Invited Speaker

9:45 A.M. - 11:15 A.M.

Sponsor: Design in Engineering Education Division

Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, Ohio State University

T214 - FIE Steering Committee: Open Session

9:45 A.M. - 11:15 A.M.

Sponsor: Educational Research and Methods Division

Moderators: P.K. Imbrie, University of Cincinnati; Cynthia Finelli, University of Michigan
T220 - Past, Present, and Future of the OEC (Online Ethics Center)

9:45 A.M. - 11:15 A.M.
Sponsor: Engineering Ethics Division
Moderator: Rosalyn Berne, University of Virginia
Speakers: Dr. Rosalyn W. Berne, University of Virginia; Dr. Karin Ellison, Arizona State University; Ms. Kelly Laas; Dr. Qin Zhu, Colorado School of Mines

The OEC owes its existence to the founding leadership of Professor Caroline Whitbeck, a pioneer of active learning methods. Students at the Massachusetts Institute of Technology (MIT), and at Case Western Reserve University (CWRU) from 1997 to 2007, were the primary creators of many of the OEC pages and made many invaluable contributions to its design, maintenance, and accessibility. Subsequent to being hosted by Case Western Reserve University, the OEC transferred to the National Academy of Engineering in 2007, and to the University of Virginia in 2020. Over the years the OEC has grown to become a digital repository containing nearly 1,000 ethics resources including cases, teaching notes, syllabi, articles, reviews, and an array of multimedia. The OEC is currently funded by the National Science Foundation.

In this special session, OEC PI Rosalyn (Ros) Berne (UVA) and Co-PIs Karin Ellison (ASU) and Kelly Laas (IIT), joined by OEC Advisory Group member Qin Zhu, will provide an overview of the history of OEC, discuss the recent transition to UVA, and share the vision and plans for its evolution from a digital repository to an active ethics “Collaboratory” for teaching and research in engineering, science, and social sciences. Audience Q&A will be included.

T221 - Getting Started With LaTeX and Overleaf

9:45 A.M. - 11:15 A.M.
Sponsor: Engineering Libraries Division
Moderators: Kari Kozak, University of Iowa; David Hubbard, Texas A&M University; Amanpreet Kaur, University of Pennsylvania
Speakers: Dr. Sarah Over, University of Maryland College Park; Mr. Eric J. Schares, Iowa State University of Science and Technology

This workshop is intended for engineering librarians who wish to learn more about the document markup and preparation language LaTeX. There appeared to be demand at the 2020 Annual Conference for additional depth in explaining how LaTeX works, its features and benefits, and how to get started learning the software in a structured setting. Both presenters have developed workshops at their own campuses, and participants will experience the session as students and see firsthand how they could adapt and deliver a similar workshop at their home institutions. Attendees will gain hands-on experience writing LaTeX code, debugging errors, and formatting sample equations and text. Topics covered will include math formatting, special characters, document structure, reference management, environments, packages, labeling, and auto-numbering. The workshop will conclude with a discussion of teaching tips, tools, and lesson plans for LaTeX instruction. The workshop will be conducted over Zoom, and each attendee must sign up for a free Overleaf account prior to the workshop. Overleaf is an online LaTeX editor and compiler that allows users to get LaTeX up and running quickly without requiring a local install on each individual’s machine.

T225 - EED Panel Session

9:45 A.M. - 11:15 A.M.
Sponsor: Environmental Engineering Division
Moderators: Fethiye Ozis, Northern Arizona University; Michelle Marincel Payne, Rose-Hulman Institute of Technology

T229 - Industrial Engineering Division Business Meeting

9:45 A.M. - 11:15 A.M.
Sponsor: Industrial Engineering Division
Moderators: Raymond Smith, East Carolina University; Ebisa Wollega, Colorado State University - Pueblo; Lisa Bosman, Purdue University at West Lafayette; McKenzie Landrum, University of Florida

Business meeting for the Industrial Engineering Division. Members and interested non-members are welcome to attend.
T232A - International Division Technical Session 5

9:45 A.M. - 11:15 A.M.
Sponsor: International Division

Moderators: Maria Alves, Texas A&M University; Johnny Woods, Jr., Virginia Polytechnic Institute and State University; Phillip Sanger, Purdue University at West Lafayette; Nick Safai, Salt Lake Community College

Global STEM Partnerships via Consortium Models for Resilience During a Pandemic
Sylvia Jons, Institute of International Education
Dr. Edward Randolph Collins Jr. P.E., Clemson University

Key Elements for Integrating a Semester-long Study Abroad Program into the Engineering Curriculum
Prof. Luca Quadrifoglio, Texas A&M University
Dr. Maria Claudia Alves, Texas A&M University
Ahmarlay Myint, Texas A&M University

Variations in Marketing and Depiction of Study Abroad Programs: A Content Analysis of Engineering Study Abroad Programs
Zuleka Woods, Virginia Polytechnic Institute and State University
Johnny C. Woods Jr., Virginia Polytechnic Institute and State University
Dr. Homero Murzi, Virginia Polytechnic Institute and State University

Work in Progress: Creating an Internet Platform for USA and Indian Students to Share Ethical Viewpoints
Dr. Sweta Saraff, Amity University Kolkata
Dr. Roman Taraban, Texas Tech University
Dr. William M. Marcy P.E., Texas Tech University
Dr. Ramakrishna Biswal, National Institute of Technology, Rourkela

T232B - Bridging the Gap in Engineering Education, Computational Thinking, and Artificial Intelligence for Education: International Perspectives in the Global Community

9:45 A.M. - 11:15 A.M.
Sponsor: International Division

Moderator: Ibrahim Yeter, Nanyang Technological University

Speakers: Dr. Ibrahim H. Yeter, Nanyang Technological University; Jeffrey D. Radloff, SUNY, Cortland; Prof. Maartje E. D. Van den Bogaard, Delft University of Technology

The speakers are members of the engineering education community who will expound upon their most recent exciting projects. The speakers are from the Netherlands, Singapore, and the United States. To start, each panelist will provide a brief introduction of engineering education trends in their respective countries and then share their projects. They will describe a mixture of research- and practice-based studies centered on the use of engineering design, computational thinking, and initial projects in artificial intelligence for education in K-16 education settings. While one of the main goals of this panel discussion is to provide an overview of the different projects from different countries, there will be plenty of opportunity for audience participation. The session chair will facilitate the discussion, and participants will have the opportunity to provide their own questions at any time during the Q&A session.

T233 - Pre-College Engineering Education Division Technical Session 14

9:45 A.M. - 11:15 A.M.
Sponsor: Pre-College Engineering Education Division

Moderators: Elena Veety, North Carolina State University at Raleigh; Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University

Secondary programs/apps

Discovery: Transition of an Inquiry-focused Learning Program to a Virtual Platform During the COVID-19 Pandemic (Evaluation)
Nicolas Ivanov, Institute of Biomedical Engineering, University of Toronto
Ms. Nhien Tran-Nguyen, University of Toronto
Neal Callaghan, University of Toronto
Theresa Frost, Toronto District School Board
Mr. Jose Luis Cadavid, University of Toronto
Mr. Huntley H. Chang, University of Toronto  
Ms. Ileana Louise Co.  
Mr. Patrick Diep, University of Toronto  
Guijin Li, University of Toronto  
Ms. Nancy T. Li, University of Toronto  
Mr. Joshua Yazbeck  
Locke Davenport Huyer, Johns Hopkins University  
Dr. Dawn M. Kilkenny, University of Toronto  

Virtual Femineer® Program: Engaging K-12 Students and Teachers in Remote STEM Instruction (Evaluation)  
Dr. Kristina Rigden, California State Polytechnic University-Pomona  

Improving Spatial-Visualization Skills of High School Students Through Sketch Training on a Touchscreen (Evaluation)  
Ms. J. Jill Rogers, University of Arizona  
Dr. Lelli Van Den Einde, University of California, San Diego  
Mrs. Melissa Wendell, Tempe Union High School District - Mountain Pointe High School  

How are Engineering Ethics Integrated into High School STEM Education in Colorado? (Fundamental)  
Jake Walker Lewis  
Dr. Angela R. Bielefeldt, University of Colorado Boulder  

T233B - Pre-College Engineering Education Division Technical Session 15  
9:45 A.M. - 11:15 A.M.  
Sponsor: Pre-College Engineering Education Division  
Moderators: Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University; Lynn Albers, Hofstra University  

Elementary kids’ engineering (about the students)  

Elementary Students Learn How To Engineer Online (RTP)  
Dr. Stacy S. Klein-Gardner, Vanderbilt University  

Art and Engineering in Kindergarten (RTP)  
Dr. Diane Elisa Golding, University of Texas at El Paso  
Dr. Heather Kaplan, University of Texas El Paso  

Student Communication of Engineering Design Solutions (Fundamental)  
Alexandria Muller, University of California, Santa Barbara  

Liliana Garcia, University of California, Santa Barbara  
Ron Kevin Skinner, MOXI, The Wolf Museum of Exploration + Innovation  
Dr. Danielle Harlow, University of California, Santa Barbara  

Assessing Elementary Students’ Engineering Design Thinking with an “Evaluate-and-Improve” Task (Fundamental)  
Nicole Alexandra Batrouny, Tufts University  
Dr. Kristen B. Wendell, Tufts University  
Dr. Chelsea Andrews, Tufts University  
Dr. Tejaswini S. Dalvi, University of Massachusetts, Boston  
Christine M. Kelly  

T234 - Socially Responsible Engineering I: Context, Innovation, and Reflection  
9:45 A.M. - 11:15 A.M.  
Sponsor: Liberal Education/Engineering & Society Division  
Moderators: Elizabeth Cady, National Academy of Engineering; Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University  

Contextualization as Virtue in Engineering Education  
Dr. Marie Stettler Kleine, Colorado School of Mines  
Dr. Kari Zacharias, Concordia University  
Dr. Desen Sevi Ozkan, Tufts University  

Exploring Values and Norms of Engineering Through Responsible Innovation and Critiques of Engineering Cultures  
Dr. Rider W. Foley, University of Virginia  
Rachel Sinclair, University of Virginia  
Araba Dennis, Purdue University  

Visual Thinking Strategies (VTS) for Promoting Reflection in Engineering Education: Graduate Student Perceptions  
Dr. Ryan C. Campbell, Texas Tech University  
Ms. Ngan T.T. Nguyen, Texas Tech University  
Dr. Jeong-Hee Kim, Texas Tech University  
Ms. Linda Ann Duke, Kansas State University, Marianna Kistler Beach Museum of Art  
Dr. Roman Taraban, Texas Tech University  
Dr. Danny D. Reible P.E., Texas Tech University  

Schedule subject to change. Please go to https://2021asee.pathable.co/ for up-to-date information.
T235 - Manufacturing Division Session - Virtual and Augmented Reality

9:45 A.M. - 11:15 A.M.
Sponsor: Manufacturing Division

Moderators: Tzu-Liang Tseng, University of Texas at El Paso; Irina Ciobanescu Husanu, Drexel University

Eye-Track Modeling of Problem-Solving in Virtual Manufacturing Environments
Rui Zhu, Complex System Monitoring, The Pennsylvania State University
Dr. Faisal Aqlan, Pennsylvania State University
Dr. Richard Zhao, University of Calgary
Prof. Hui Yang, Pennsylvania State University

MAKER: Design of a Virtual CNC Mill by Unity Software
Jose Diaz
Currell Trott
Mr. Fatahillah Iskandar
Prof. Ju Wang, Virginia State University
Dr. Zhenhua Wu, Virginia State University

Scaling Hands-on Learning Principles in Manufacturing Through Augmented Reality Disassembly and Inspection of a Consumer Product
Ms. Emily Welsh, Massachusetts Institute of Technology
Dan Li, Massachusetts Institute of Technology
Prof. A. John Hart, Massachusetts Institute of Technology
Dr. John Liu, Massachusetts Institute of Technology

Developing VR-Based Solar Cell Lab Module in Green Manufacturing Education
Dr. Richard Chiou, Drexel University
Mr. Hieu V. Nguyen, Drexel University
Dr. Irina Nicoleta Ciobanescu Husanu, Drexel University
Prof. Tzu-Liang Bill Tseng, University of Texas at El Paso

T236 - Materials Division Business Meeting

9:45 A.M. - 11:15 A.M.
Sponsor: Materials Division

Moderators: Lessa Grunenfelder, University of Southern California; Alison Polasik, Ohio State University

T237 - Math Division Business Meeting

9:45 A.M. - 11:15 A.M.
Sponsor: Mathematics Division

Moderators: Jeffrey Hieb, University of Louisville; Amitabha Ghosh, Rochester Institute of Technology

T238 - Computation Related

9:45 A.M. - 11:15 A.M.
Sponsor: Mechanical Engineering Division

Moderators: Rungun Nathan, Pennsylvania State University, Berks Campus; Thomas DeNucci, United States Coast Guard Academy; Prabhakar Venkateswaran, Milwaukee School of Engineering

Papers related to computation or software for computation are put together in this session.

A New Approach to Teaching Programming at Freshman Level in Mechanical Engineering
Dr. Pavan Karra, Minnesota State University, Mankato

Effective Learning Strategies: Design of Course Structure for Engineering Courses Aimed for Hybrid Classes
Dr. Muzammil Arshad, Texas A&M University
Dr. Rebecca R. Romatoski, St. Ambrose University

MATLAB Marina: The Primary Resource for MATLAB in a Freshmen Computing Applications for Mechanical Engineering Course
Dr. Priya T. Goeser, Georgia Southern University
Dr. Thomas Murphy, Georgia Southern University
Mr. Christopher Williams, Georgia Southern University
Dr. David Calamas, Georgia Southern University
Dr. Junghun Choi, Georgia Southern University

Sustainability Incorporation in Courses in Mechanical, Civil, and Environmental Engineering: Insights from AASHE STARS Data
Ms. Joan Kathryn Tisdale, University of Colorado Boulder
Dr. Angela R. Bielefeldt, University of Colorado Boulder

The Influence of Program Concentrations on Enrollment and Placement
Dr. David R. Mikesell, Ohio Northern University
Dr. John-David S. Yoder, Ohio Northern University
T239 - Using Technology to Support Learning in Mechanics

9:45 A.M. - 11:15 A.M.

Schedule subject to change. Please go to https://2021asee.pathable.co/ for up-to-date information.

T240 - Growing the Domestic Pool of Diverse Graduate Students in Engineering

9:45 A.M. - 11:15 A.M.

The need to increase the numbers of underrepresented graduate students in engineering that matriculate and graduate has been a topic of discussion for several years within the MIND division, as well as other divisions of ASEE.

2020 has been a challenging year for all, including those in engineering education. Do the constraints and reality of the COVID-19 pandemic and its potential impact on the the pool of international graduate students provide an unforeseen opportunity for organizations (institutions of higher education, engineering societies, and corporations) to reimagine what the engineering community can do to engage and support the domestic pool of students? We emphasize reaching underrepresented students who are considering graduate programs in engineering.

Are there proven practices or models that can be scaled and expanded? What role do professional engineering societies, including ASEE, play in recruiting a greater pool of diverse graduate students? Given that many of the mechanisms of outreach to potential graduate students (e.g., campus visits, national conferences) are not feasible during the pandemic, what are some viable means of outreach and engagement?

The panel will consist of representatives from engineering societies who have established records and proven practices in working with diverse student populations, as well as representatives of institutions of higher education with current programs and policies aimed at growing their pool of diverse graduate students. The panel will be facilitated by Catherine Jay Didion of The Didion Group and former senior program officer of the National Academy of Engineering (NAE).

Growing the Domestic Pool of Diverse Graduate Students in Engineering

Ms. Catherine "Kitty" Didion, The Didion Group
The Educational Research and Methods Division (ERM) has been working for more than 40 years to improve the quality of instruction in all branches and levels of engineering education. The primary objectives of the ERM division are:

- dissemination of knowledge on learning and teaching
- encouragement of efforts to improve instruction through development of innovative materials and techniques, sound instructional design, and improved evaluation methodology
- enhancement of the status of teaching in the university

Student Division members are encouraged and welcome to attend this session to learn more about ERM and how the division can support your current work and career interests.

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**T247B - Student Division Technical Session 5**

9:45 A.M. - 11:15 A.M.

**Sponsor: Student Division**

**Moderators: Adrianne Wheeler, Project SYNCERE; Michel Kornegay, Morgan State University; Anna Malakian, Clemson University**

**Examining the Changing Perceptions of Graduate Students’ Role as Teaching Assistant with Online and Hybrid Labs During COVID-19 (Instruction)**

Mrs. Jennifer Shaffer Brown, Clemson University

**Sudden Shift to Online Learning: COVID-19’s Impact on Engineering Student Experiences**

Ms. Nathalia De Souza, California Polytechnic State University, San Luis Obispo

Michaella Ochotorena, California Polytechnic State University, San Luis Obispo

Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo

Dr. Lauren Anne Cooper, California Polytechnic State University, San Luis Obispo

**Online Engagement and Outreach Activities in an ASEE Student Chapter During Turbulent Times**

Ms. Amanda N. Quay, Stanford University

Ms. Callan E. Monette, Stanford University

Ms. Stacey A. Huang, Stanford University

Ms. Alexa Wnorowski, Stanford University

Dr. Anjali Mulchandani, Stanford University

Ronnie Miller, Stanford University

**First-year Engineering Student Advice for Succeeding in Online Courses**

Miss Amanda Marie Singer, Michigan Technological University

Dr. Michelle E. Jarvie-Eggart, Michigan Technological University

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**T251 - Women in Engineering Division Technical Session 8**

9:45 A.M. - 11:15 A.M.

**Sponsor: Women in Engineering Division**

**Moderators: Sophia Santillian, Duke University; Lisa Abrams, Ohio State University**

**Exploring Young Women’s Interest in Fluid Power with Workshop Experiences**

Dr. Anne M. Lucietto, Purdue University

Dr. Jennifer D. Moss, Emporia State University

Dr. Jose M. Garcia, Purdue University

John H. Lumkes, Purdue University

**Women in Engineering: 3D Printing Interests, Habits, and Persistence**

Alexa Tannebaum, Duke University

Dr. Sophia T. Santillian, Duke University

Dr. Rebecca Simmons, Duke University

**A Book Club Model to Promote Personal and Professional Development Activities for Female Engineering and Computer Science Students**

Dr. Shelly Gulati, University of the Pacific

**The Benefits of an Engineering Field Trip for Women Students**

Dr. Kerry Meyers, University of Notre Dame

Dr. Victoria E. Goodrich, University of Notre Dame

Taylor Maida, University of Notre Dame

Simran Moolchandaney, University of Notre Dame

Gabrielle Tanjuatco, University of Notre Dame

Caroline Lubbe, University of Notre Dame

**Work in Progress: An Autoethnographic Account of a Female Engineering Intern**

Gretchen A. Dietz, University of Florida

Kayla Julianna Kummerlen
T252 - Community-Engaged Engineering Education Challenges and Opportunities in Light of COVID-19 Paper Presentations 2

9:45 A.M. - 11:15 A.M.

Sponsors: Community Engagement Division; Equity, Culture & Social Justice in Education Division; Liberal Education/Engineering & Society Division

Moderators: Kelly Bohrer, University of Dayton; Sarah Brownell, Rochester Institute of Technology; Joan Schuman, Missouri University of Science and Technology; Marybeth Lima, Louisiana State University and A&M College

This session is to follow the panel of invited speakers at the crossroads of ethics, community engagement, liberal education, and engineering and society. In this paper session, using new methods with ethical community engagement frameworks to retool and innovate the work of community-based engineering education for post-COVID times will be explored.

This session is designed to advance conversations, connections, and practices within the multifaceted field of inclusive and equitable community engagement in engineering education. After papers are presented, we will facilitate time for dialogue and critical reflection, essential practices in this field of engineering education. The session will end with collecting possible next-step action items proposed by attendees to continue this conversation through practice, pedagogy, and scholarship.

Engagement in Practice: Lessons From a Large

Engagement Program During a Pandemic

Dr. William "Bill" C. Oakes, Purdue University at West Lafayette
Paul A. Leidig P.E., Purdue University at West Lafayette
Nusaybah Abu-Mulaweh, Purdue University at West Lafayette
Mr. Andrew Pierce, Purdue University at West Lafayette

Collaboration Through Participation: Rethinking Scale

Conceptualization and Development in STEM Education Research

Dr. Cijy Elizabeth Sunny, Baylor University
Dr. Kathleen Koenig, University of Cincinnati

Engagement in Practice: Project-Based Community

Engagement Model Preliminary Case Studies

Paul A. Leidig P.E., Purdue University at West Lafayette
Dr. William "Bill" C. Oakes, Purdue University at West Lafayette

“The Road Less Travelled”: Engineering With Vulnerable Communities Through NGOs

Dr. Juan C. Lucena, Colorado School of Mines

A Tool for Informing Community-Engaged Projects

Camille Velarde, University of New Mexico
Dr. Vanessa Svhila, University of New Mexico
Mr. Matthew P. Fetrow
Mrs. Estike Kokovay Gutierrez

T257 - Exploring Anti-Racism and Social Justice in Engineering Curricula: Ideas, Reflections, and Challenges

9:45 A.M. - 11:15 A.M.

Sponsor: Faculty Development Division

Moderators: Wendi Kappers, Embry-Riddle Aeronautical University - Daytona Beach; Karen High, Clemson University

Speakers: Dr. Susan M. Lord, University of San Diego; Dr. Diana Chen, University of San Diego; Dr. Odesma Onika Dalrymple, University of San Diego; Dr. Joel Alejandro Mejia, University of San Diego; Ms. Rhonda Harley; Prof. Gordon D. Hoople, University of San Diego

In Summer 2020, the murders of Breonna Taylor and George Floyd fueled national discourse across the USA around ideas including systemic racism, social justice, and Black Lives Matter (BLM). (We acknowledge that there are countless Black individuals whose stories of injustice may never gain public status, yet contribute to a normalized narrative of sustained anti-Blackness and inequality in all aspects of life in the USA.) What do these ideas mean for engineering faculty in terms of our teaching? Many of our students and colleagues think engineering is and should stay apolitical and neutral. We argue instead that radical change is needed now in terms of how we teach and what we teach to better prepare our students to be both successful engineers and conscientious citizens. This work is not easy.

At the Shiley-Marcos School of Engineering at the University of San Diego (USD), we have been exploring...
the incorporation of these issues into our engineering curricula for several years, many of us driven by our experiences of marginalization within engineering and a desire to make things better for our students. We will share stories and examples of how we have begun to do this work, including our challenges, successful curricula from our engineering courses, and supporting students through career counseling and professional organizations. We will also provide a list of resources for more exploration of these topics.

Facilitators from the University of San Diego:

- Susan M. Lord, Professor of Integrated Engineering
- Diana A. Chen, Assistant Professor of Integrated Engineering
- Odesma Dalrymple, Associate Professor of Industrial and Systems Engineering
- J. Alex Mejia, Assistant Professor of Integrated Engineering
- Rhonda Harley, Assistant Director, Shiley-Marcos School of Engineering Career Development Center
- Gordon Hoople, Assistant Professor of Integrated Engineering

**T259A - Opening Hearts and Minds Through Contextual Listening: Moving Towards an Education That Dignifies All**

9:45 A.M. - 11:15 A.M.

**Sponsor: Equity, Culture & Social Justice in Education Division**

**Moderator:** James Holly, Jr., Wayne State University

**Speakers:** Tasha Zephirin, Purdue University at West Lafayette; Dr. Linda Vanasupa, Franklin W. Olin College of Engineering; Dr. Nadia N. Kellam, Arizona State University; Dr. Colleen Elizabeth Bronner, University of California, Davis; Dr. Bernadette Friedrich, Michigan State University

Like all education in this singular moment in time, engineering education must undergo a transformation if it is to fulfill the engineering discipline’s mandate to prioritize and serve society’s wellbeing above all other considerations. Using a transformative justice lens, we affirm that history matters, justice matters, race matters, language matters, and futures matter (Winn, 2018)—much of which is absent from traditional engineering education. The inaccurate belief that engineering is an objective and apolitical discipline has functioned to hide and sustain the existing oppression of those who lack systemic power (Friere, 1973). While this pedagogy of oppression may not be intentional, undoing its dynamics must be.

We invite colleagues to participate in a first step of cocreating transformative justice in engineering education: a listening session and dialogue. In service to ECSJ’s pillars of examining systems, theoretical perspectives, equitable practice, and action and activism, we desire to sit together to listen and share narratives of marginalization in engineering education. We invite this effort in the spirit of recognizing that a first step in restoring justice in our education is to understand the harms that engineering education has done. It is our hope that this experience will serve as the groundwork for those desiring to be transformative change agents toward just engineering education.

We ask that attendees cocreate a shared space to hear one another and engage as contextual listeners (Leydens and Lucena, 2009). Because this session is focused on contextual listening to each other, we plan to invite attendees from diverse roles in the university and diverse identities to be coparticipants. Instead of a traditional panel discussion where the stories of a few are showcased, this session will highlight the stories of all attendees, giving priority to attendees who are from marginalized communities (using the progressive stack method, Savonick, 2016). Prior to the session we will send individualized invitations to graduate students and early career faculty to serve as both active participants and summarize their contextual listening insights as aligned with one of the Transformative Justice Framework lenses.

Please attend this session if you desire to listen and learn or share; attend this session if you are open to hearing and seeing things in ways that may be unfamiliar or uncomfortable to you; attend this session if you are ready to open your heart and mind through contextual listening. This session will be facilitated by the CDEI Strategic Planning Group of ASEE.
T259B - Asset Sourcing for Remaking Engineering Learning

9:45 A.M. - 11:15 A.M.

Sponsor: Equity, Culture & Social Justice in Education Division

Moderator: James Holly, Jr., Wayne State University

Open Educational Resource Learning Impact on Students from Poverty
  Dr. Michael R. Williamson, Indiana State University
  Dr. Neslihan Alp P.E., Indiana State University

Unified Voice and Group Agency: Developing Teams to Transform Engineering Education
  Dr. Cara Margherio, University of Washington
  Anna Lee Swan, University of Washington
  Dr. Julia M. Williams, Rose-Hulman Institute of Technology
  Dr. Eva Andrijcic, Rose-Hulman Institute of Technology
  Dr. Sriram Mohan, Rose-Hulman Institute of Technology
  Dr. Elizabeth Litzler, University of Washington

Institutional Data as Motivation for Course-level Change in Engineering
  Dr. Molly McVey, University of Kansas
  Dr. Caroline R. Bennett P.E., University of Kansas

Sense of Belonging in Large Online Engineering Classes: A Scoping Review
  Dr. Chelsea Haines Lyles, Virginia Polytechnic Institute and State University
  Dr. Lisa D. McNair, Virginia Polytechnic Institute and State University
  Dr. David Reeping, University of Michigan

The racialization project that started as an expansionist effort from the United States’ self-proclaimed Manifest Destiny has led to the dispossession of the land, language, and education of many Latinxs in the U.S. It was this racialization project that created a set of legally granted privileges and protections to Whites at the expense of people of color. This is not a problem of the past. There are still sociopolitical forces that serve as the backdrop for what we are experiencing today. The Border as we know it is not just a physical location, but also a symbolic manifestation of White supremacy. Borders have created hegemonic structures that are visible to all of us but also limit the full humanization of those that call the Borderlands their home. The Borderlands also illuminate the ways in which the political, personal, and educational spheres are interconnected in many ways. As engineers, we contribute to the existing oppression of those who inhabit the Borderlands. If we want to engage in decolonial thinking, promote culturally responsive education, and challenge dominant narratives in engineering, then it is important that we begin the conversation of not turning a blind eye to what happened with the change of plans for this year’s ASEE Annual Conference and continue with business as usual.

T259C - Special Session

9:45 A.M. - 11:15 A.M.

Sponsors: Equity, Culture & Social Justice in Education Division; Educational Research and Methods Division; Minorities in Engineering Division; Liberal Education/Engineering & Society Division

Moderator: James Holly, Jr., Wayne State University

T260A - Accreditation of General Engineering Programs: History, Philosophy, and Current Trends

9:45 A.M. - 11:15 A.M.

Sponsor: ASEE Headquarters

Moderators: Teri Reed, University of Cincinnati; Chell Roberts, University of San Diego

T266 - Agility in the Classroom - Lighthouse Industry-Academic Collaborations

9:45 A.M. - 11:15 A.M.

Sponsor: Corporate Member Council

Moderators: P.J. Boardman, MathWorks; Dora Smith, Siemens Digital Industries Software

Speakers: Mr. Michael Richey, The Boeing Company; Mrs. Dora Smith, Siemens Digital Industries Software; Douglas Jussaume; Mr. Paul Gilbert, Quanser Consulting, Inc.; Prof. Andre Knoesern, University of California, Davis; Dr. Akos Ledeczi, Vanderbilt University; Sam Michalka; Dr. David P. Schmidt, University of Massachusetts Amherst; Dr. David R. Ely, Ivy Tech Community College - Indianapolis
This session will be an inspiring lightning round to promote agility in the classroom. Academic and industry representatives will share innovations implemented over the past year to include virtual labs, integrated technologies like augmented/virtual reality, digital twins, cutting-edge research, and new recruiting methods.

**T277A - Best DEI Paper Award Finalists**

9:45 A.M. - 11:15 A.M.

**Sponsor:** ASEE Committee on Diversity, Equity & Inclusion  
**Moderator:** Susan Walden, University of Oklahoma  
**Speaker:** Dr. Elizabeth Litzler, University of Washington

Now in its sixth year, the ASEE Best Diversity, Equity, and Inclusion Paper Award seeks to identify highly impactful research or programs published at an ASEE conference that help address inequities in engineering and influence the inclusive, diverse future of engineering. Diversity dimensions addressed can include (but are not limited to) age, belief system, disability status, ethnicity, gender, gender identity, gender expression, national origin, race, sexual orientation, socioeconomic status, and any other visible or invisible differences.

Nominated DEI papers and presentations are assessed for a) the extent of inclusivity and focus on diversity, equity, and/or inclusion; b) novelty of approaches/ideas/interventions; c) depth and extent of connection with existing literature and/or theory; d) demonstrated or potential impact; and e) communication effectiveness. The ASEE Best Diversity, Equity, and Inclusion Paper rubric is used by an ASEE CDEI Paper Selection Committee to assess these scholarly attributes of the nominated manuscripts and to identify up to five finalists.

The finalists present their work in this session (in addition to their original Annual, Section, or Zone conference) for additional evaluation by the Committee. The award recipient is selected based on the sum of the two evaluations.

**T279 - ABET SESSION: ABET Academic Advisory Council Listening Session: Ask Us Anything!**

9:45 A.M. - 11:15 A.M.

**Sponsor:** ABET Sponsored Sessions  
**Moderator:** Christine Kalambary, American Society for Engineering Education  
**Speakers:** Dr. Jeffrey L. Ray, Western Carolina University; Dr. Joseph L. Sussman, ABET

Attendees are invited to ask any and all accreditation-related questions, and our experts—ABET Academic Advisory Council Chair Jeff Ray and ABET Chief Accreditation Officer Joe Sussman—will be there to answer your questions.

**T299 - SPONSORED SESSION: What Is Generative Design and How to Integrate It Into Your Curriculum - Presented by Autodesk**

9:45 A.M. - 10:20 A.M.

**Sponsor:** Sponsored Sessions  
**Speaker:** Kevin Lee, Autodesk, Inc.

Generative design harnesses the power of machine learning to propose hundreds of solutions to a design or engineering challenge. In this session, you will get an overview of generative design and identify the best resources to help you incorporate it in the classroom. You will see how generative design can help students connect the knowledge they learned in materials science and statics courses into real-life solutions throughout their academic careers and beyond.
Two-stage collaborative quizzes are an exam preparation activity with an opportunity for immediate feedback. Students attempt a quiz independently, and then work in groups of 3-4 students to reattempt the same quiz. This process allows students to check their understanding with peers. This presentation will address the implementation and benefits of two-stage collaborative quizzes.

Dr. Titley-Peloquin obtained his Ph.D. from McGill University’s School of Computer Science in 2010. He then spent one year as a post-doctoral fellow at the University of Oxford and three years at the European Center for Research and Advanced Training in Scientific Computing (CERFACS) in Toulouse, France. Since January 2015 he has been a Faculty Lecturer at McGill University. He teaches introductory physics courses in the Macdonald Campus Freshman Program and applied mathematics courses in the Department of Bioresource Engineering.
Using Existing University Resources: Integration of the University Writing Center into a Senior-level Laboratory Series for Improved Learning Outcomes
- Prof. Stephanie G. Wettstein, Montana State University - Bozeman
- Dr. Jennifer R. Brown, Montana State University - Bozeman

Kidney and Lung Demonstrations to Introduce Engineering Concepts to Middle School Students and Their Grandparents
- Dr. Ashlee N. Ford Versypt, University at Buffalo
- Samantha Lyn Carpenter, Oklahoma State University
- Mr. Troy Lamarr Adkins II, Oklahoma State University
- Mr. Ted Anderson Sperry, Oklahoma State University
- Dr. Yu Feng, Oklahoma State University

T306 - Supporting the Capstone Experience
11:30 A.M. - 1:00 P.M.
Sponsor: Civil Engineering Division
Moderators: Timothy Wood, The Citadel; Kristen Sanford, Lafayette College; Matthew Lovell, Rose-Hulman Institute of Technology; Steven Burian, University of Utah

Authors summarize initiatives that can help cultivate successful capstone experiences, including team training, technical writing, and the assessment of sustainability components.

Assessing the Sustainability Components of Engineering Capstone Projects
- Dr. Leslie R. Brunell, Stevens Institute of Technology
- Mr. Alex Dubro, Stevens Institute of Technology
- Mr. Viraj Vasudev Rokade, Stevens Institute of Technology

Engineers as Effective Team Players: Evaluating Teamwork Skills in a Flipped Project Management for Civil Engineers Course
- Nathan Miner, Iowa State University of Science and Technology
- Dr. Aliye Karabulut Ilgu, Iowa State University of Science and Technology
- Jennifer S. Shane, Iowa State University of Science and Technology
- Dr. Katherine Madson, Iowa State University of Science and Technology

Improving Technical Writing for Civil Engineering Students Through Short Written Assignments
- Dr. Kun Zhang P.E., California State University-Chico
- Dr. Pablo K. Cornejo, California State University-Chico
- Dr. Chris Fosen, California State University-Chico

Software Strategies for Team Functionality Support in Capstone Courses
- Dr. Ryan Solnosky P.E., Pennsylvania State University
- Prof. M. Kevin Parfitt, Pennsylvania State University

T308 - Computers in Education 4 - Online and Distributed Learning 1
11:30 A.M. - 1:00 P.M.
Sponsor: Computers in Education Division
Moderators: James Lewis, University of Louisville; Steven Barrett, University of Wyoming; Afrin Naz, West Virginia University Institute of Technology

This session will be one of two sessions dealing with papers related to online and distributed learning.

Online COVERAGE (Completion of VEX Educational Robotics to Advance Girls’ Education)
- Dr. Afrin Naz, West Virginia University Institute of Technology
- Dr. Mingyu Lu, West Virginia University Institute of Technology
- Ryan E. Utzman

A Comparative Analysis of Student Performance and Face-to-Face Engineering Courses
- Dr. Sunay Palsole, Texas A&M University
- Dr. Jeff Chernosky, Texas A&M University
- Dr. Randy McDonald, Texas A&M University

Online Testing with Blackboard: Lessons Learned (Perspectives from Three Engineering Faculty)
- Dr. Julian Ly Davis, University of Southern Indiana
- Mr. Thomas McDonald, University of Southern Indiana
- Mr. Bradley Lane Kicklighter, University of Southern Indiana

Assessing the Influence of an Online Video Tutorial Library on Undergraduate Mechanical Engineering Students
- Prof. Juliana Lynn Fuqua, California State Polytechnic University, Pomona
- Dr. Faye Linda Wachs, California State Polytechnic University, Pomona
- Dr. Paul Morrow Nissenson, California State Polytechnic University, Pomona
- Ms. Deanna Miranda Barrios
- Ms. Cecilia Nguyen
- Ms. Cecilia Nguyen, California State Polytechnic University,
T310 - CPDD Networking session
11:30 A.M. - 1:00 P.M.
Sponsor: Continuing Professional Development Division
Moderator: Keith Plemmons,
Networking session for CPDD members

T311 - Cooperative and Experiential Education Division Technical Session 1
11:30 A.M. - 1:00 P.M.
Sponsor: Cooperative and Experiential Education Division
Moderators: Katherine McConnell, University of Colorado Boulder; Robin Hammond, Arizona State University

The papers in this session focus on the process of transitioning internships, research experiences, and engineering competitions to an online structure during COVID-19. Following the paper presentations, participants will have an opportunity to both ask questions and join the presenters in breakout rooms to discuss their work.

Entering Research Online: Developing a Virtual Course to Support Experiential Education for Undergraduate Research Assistants
Ms. Candyce Hill, Michigan State University
Dr. Katy Luchini-Colbry, Michigan State University

How COVID-19 Led to Improvements and Adaptations to Experiential Learning Opportunities for an Increasingly Remote Environment
Ms. Jessica Britt, Energy Systems Division, Argonne National Laboratory
Mr. Lucas W. Shoults, Energy Systems Division, Argonne National Laboratory

Development of an Online Course in Research for Undergraduate Students
Dr. Diane L. Peters P.E., Kettering University
Prof. Ronald E. Kumon, Kettering University
Gabrielle Feeny

Virtual Internships: Accelerating Opportunity Through Disruption
Ms. Lynn Merritt Ekstedt, Oregon State University
Dr. Nikki James, Northeastern University
Dr. Kemi Jona, Northeastern University
Erich White
Dr. Scott Paja, Oregon State University
Josefine Fleetwood, Oregon State University

T313 - Design Methodologies 2
11:30 A.M. - 1:00 P.M.
Sponsor: Design in Engineering Education Division
Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, Ohio State University

DEED technical session

Quality Function Deployment (QFD) in Late Stages of Capstone Design
Dr. James Righter, The Citadel
Dr. David S. Greenburg, The Citadel
Dr. Robert J. Rabb P.E., The Citadel
Dr. Nathan John Washuta P.E., The Citadel

Investigating the Effects of CERA on Design Requirement Detail
Dr. Malena Agyemang, Clemson University
Dr. Cameron J. Turner, Clemson University

Asset-based Approaches to Engineering Design Education: A Scoping Review of Theory and Practice
Dr. Hannah D. Budinoff, University of Arizona
Dr. Vignesh Subbian, University of Arizona

Leadership and Communication Network Identification and Analysis with Dependency Structure Matrices in Senior Design Teams
Dr. James Righter, The Citadel
Prof. Joshua D. Summers, Clemson University

Towards Development of an Engineering Design Value-expectancy Scale (EDVES)
Dr. J. Blake Hylton, Ohio Northern University
Dr. Patrick James Herak, Ohio State University
Dr. Todd France, Ohio Northern University
Mr. Bruce Wellman, Olathe Northwest High School
Sherri Youssef, Ohio State University

**T313B - Impact of COVID-19 on Design Education 2**

**11:30 A.M. - 1:00 P.M.**

**Sponsor: Design in Engineering Education Division**

**Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, Ohio State University**

DEED technical session

**The Effects of COVID-19 on Mechanical Engineering Senior Capstone Design Student Self-efficacy and Projects**

Dr. Joanna Tsenn, Texas A&M University

**Work in Progress: Senior Design Day During a Pandemic: Virtually the Same as In-person?**

Dr. C. Richard Compeau Jr, Texas State University
Dr. Austin Talley P.E., Texas State University

**Optimized Cohort Creation for Hybrid Online Design-learning During COVID-19**

Ms. Sheng Lun (Christine) Cao, University of Calgary
Prof. Laleh Behjat P.Eng., University of Calgary

**Delivering Meaningful Design-and-Build Experiences to M.E. Underclass Students in the Age of COVID-19 and Beyond**

Dr. Kevin Schmaltz, Western Kentucky University
Prof. H. Joel Lenoir, Western Kentucky University

**Achieving Capstone Design Objectives During Necessitated COVID-19 Online Teaching**

Dr. Mohamed E. El-Sayed, Eastern Michigan University
Dr. Jacqueline A. El-Sayed, American Society for Engineering Education

**T314 - FIE Steering Committee: Executive Session**

**11:30 A.M. - 1:00 P.M.**

**Sponsor: Educational Research and Methods Division**

**Moderators: P.K. Imbrie, University of Cincinnati; Cindy Finelli**

T314B - Studies of Shifting In-person Courses to Online and Students' Online Behavior

**11:30 A.M. - 1:00 P.M.**

**Sponsor: Educational Research and Methods Division**

**Moderators: Natascha Buswell, University of California, Irvine; Kerrie Douglas, Purdue University at West Lafayette**

**Transformation of an On-campus Course to an On-demand Course and Assessment**

Dr. Chiu Choi, University of North Florida

**What Should Teachers Do? Visibility of Faculty and TA Support Across Remote and Traditional Learning**

Morgan Elizabeth Anderson, University of Washington
Dr. Denise Wilson, University of Washington
Ziyan Bai, University of Washington
Neha Kardam, University of Washington
Ms. Shruti Misra, University of Washington

**Survey Design for Evaluating Student Interaction in Face-to-Face and Online Learning Environment**

Mr. Jaskirat Singh Batra, Texas A&M University
Dr. Sunay Palsole, Texas A&M University

**Institutional Supports for Student Experiential Learning in Hybrid/Remote Learning Contexts**

Beata Johnson, Purdue University, West Lafayette
Andrew Whitehead, Purdue University, West Lafayette
Dr. Joyce B. Main, Purdue University, West Lafayette

**Student Perceptions of the Complete Online Transition of Two CS Courses in Response to the COVID-19 Pandemic**

Dr. Mohammed F. Farghally, Virginia Polytechnic Institute and State University
Mostafa Kamel Osman Mohammed, Virginia Polytechnic Institute and State University; Assiut University
Dr. Hamdy F. F. Mahmoud, Virginia Polytechnic Institute and State University
How Students Search Video Captions to Learn: An Analysis of Search Terms and Behavioral Timing Data

Mr. Zhilin Zhang, University of Illinois at Urbana-Champaign
Ms. Bhavya Bhavya, University of Illinois at Urbana-Champaign
Prof. Lawrence Angrave, University of Illinois at Urbana-Champaign
Mr. Ruihua Sui, University of Illinois at Urbana-Champaign
Mr. Rob Kooper, University of Illinois at Urbana-Champaign
Mr. Chirantan Mahipal, University of Illinois at Urbana-Champaign
Prof. Yun Huang, University of Illinois at Urbana-Champaign

It’s About Time: An Analysis of Student Activities Under Remote Learning

Bradley J. Sottile, Pennsylvania State University
Laura E. Cruz, Pennsylvania State University
Dr. Yi-An Lo Burleson, Pennsylvania State University
Kris McLain, Pennsylvania State University

T315 - Electrical and Computer Engineering Division Technical Session 4

11:30 A.M. - 1:00 P.M.

Sponsor: Electrical and Computer Engineering Division

Moderators: Salih Sarp, Old Dominion University; Huihui Wang, St. Bonaventure University; Nader Rafia, Boise State University; Saharnaz Baghdadi, University of California, San Diego

Implement Your DSP Algorithm on Android Tablet: Real-time DSP Laboratory Course

Prof. Thomas Moon, University of Illinois at Champaign Urbana
Prof. Minh N. Do, University of Illinois at Champaign Urbana

Development of a Laboratory Platform for UAV Cybersecurity Education

Mr. Yushan Jiang, Embry-Riddle Aeronautical University
Jiawei Yuan, University of Massachusetts Dartmouth
Dr. Lulu Sun, Embry-Riddle Aeronautical University
Prof. Houbing Song, Embry-Riddle Aeronautical University

μSAFABOT: A Robotics Learning Platform for a Hands-on, Laboratory-based Approach in an Introductory ECE Course

Mr. Steven M. Beyer, United States Air Force Academy
Col. Brian James Neff, United States Air Force Academy

Teaching System Design in Experiential Learning: Building a Fitness Wearable at Home

Dr. Ramsin Khoshabeh, University of California, San Diego
Vikash Gilja

T316 - Energy Conversion and Conservation Division Technical Session 2: Solar Track

11:30 A.M. - 1:00 P.M.

Sponsor: Energy Conversion and Conservation Division

Moderators: Ted Song, John Brown University; Robert Kerestes, University of Pittsburgh

This technical session covers educational and research papers focused on solar power technologies.

A Model Passive Solar Home Student Design Project

Dr. Matt Aldeman, Illinois State University
Dr. Jin Ho Jo, Illinois State University

Design and Implementation of Solar PV Charging Stations for City of Huntsville Aquatic Center

Dr. Reg Pecen, Sam Houston State University
Dr. Keith L. Coogler, Sam Houston State University
Dr. Faruk Yildiz, Sam Houston State University
Dr. Ulan Dakeev, Sam Houston State University
Mr. Lance David Sebesta

ETHR-ENRG Smart Solar Project Kits

Ms. Danielle S. Washington, North Carolina Agricultural and Technical State University
Mr. Tony D. Martin Jr.
Dr. Evelyn Sowells-Boone, North Carolina Agricultural and Technical State University

Simulation and Validation of Battery Management System

Mr. Edmund Huminski, United States Coast Guard Academy
Salena Marie Bantz
T318 - Engineering Design Graphics Division Technical Session 1: Spatial Visualization
11:30 A.M. - 1:00 P.M.

Sponsor: Engineering Design Graphics Division

Moderators: Matthew Wettergreen, Rice University; Tracy Hammond, Texas A&M University

This session focuses on spatial visualization and how to use technology tools to enhance students' spatial visualization skills.

Implementation of a Nontraditional Spatial Skills Training Program
Dr. Maxine Fontaine, Stevens Institute of Technology
Dr. Alexander John De Rosa, Stevens Institute of Technology

Teaching Spatial Skills Online During a Global Pandemic
Dr. Melissa C. Richards, Clarkson University
Ms. Norma L. Veurink, Michigan Technological University
Dr. Sheryl A. Sorby, University of Cincinnati

Work in Progress: Suitability of Spatial Visualization Training for Remote Learning
Dr. Lelli Van Den Einde, University of California, San Diego
Prof. Nathan Delson, University of California at San Diego
Elizabeth Rose Cowan, eGrove Education

T319 - Engineering Economy Division Business Meeting
11:30 A.M. - 1:00 P.M.

Sponsor: Engineering Economy Division

Moderators: Ona Egbue, University of South Carolina, Upstate; James Burns, Western Michigan University

T320 - Engineering Ethics Division Business Meeting
11:30 A.M. - 1:00 P.M.

Sponsor: Engineering Ethics Division

Moderators: Qin Zhu, Colorado School of Mines; Xiaofeng Tang, Tsinghua University

T321 - Librarian’s Role in the Accreditation Process
11:30 A.M. - 1:00 P.M.

Sponsor: Engineering Libraries Division

Moderators: Zachary Painter, Stanford University; Kari Kozak, University of Iowa; David Hubbard, Texas A&M University; Mindy Thuna, University of Toronto

Speakers: Ms. Susan Wainscott, University of Nevada - Las Vegas; Mr. Tom C. Volkening, Michigan State University; Mr. Buenaventura Basco, University of Central Florida; Dr. Frederick C. Berry, Purdue University at West Lafayette

Engineering librarians often have questions about the level of involvement libraries are expected to have in the accreditation process. Even for those who have experience with accreditation documentation and site visits, the process has changed in the time of COVID. Panelists will discuss their recent accreditation visits and highlight key takeaways related to the librarian’s role.
T325 - Environmental Engineering Division Technical Session 2: Innovative Approaches for Teaching Environmental Engineering

11:30 A.M. - 1:00 P.M.
Sponsor: Environmental Engineering Division
Moderators: Alexa Rihana Abdallah, University of Detroit Mercy; Michelle Marincel Payne, Rose-Hulman Institute of Technology; Fethiye Ozis, Northern Arizona University

Work in Progress: Incorporating a Circular Economy and an Interdisciplinary Framework Within Engineering Education
Ms. Tomeka Carroll, University of Virginia

Improving Climate Change Educational Outcomes for First-year Students Through Multidisciplinary Instruction
Dr. Joe Dallas Moore, Carnegie Mellon University
Turner Cotterman, Carnegie Mellon University
Dr. James Wynn, Carnegie Mellon University

Mask Effectiveness: A Project to Connect Air Pollution and Materials Science
Prof. Jean M. Andino, Arizona State University
Cameron N. Morgan, Arizona State University
Dr. Lizandra C. Godwin, University of New Mexico

Development of a Crayfish Behavior Case Study for a New First-semester General Engineering Course Using a High-frequency Environmental Monitoring System
Sara Freix, Virginia Polytechnic Institute and State University
Mr. Yousef Jalali, Virginia Polytechnic Institute and State University
Dr. Daniel S. Brogan, Virginia Western Community College
Mr. Akshat Kotheyari, Virginia Polytechnic Institute and State University
Dr. Vinod K. Lohani, Virginia Polytechnic Institute and State University

T326 - Remote Physical Laboratories: Experimentation and Laboratory-oriented Studies

11:30 A.M. - 1:00 P.M.
Sponsor: Experimentation and Laboratory-Oriented Studies Division
Moderators: Jacob Bishop, Southern Utah University; Sally Pardue, Tennessee Technological University

Presenters in this session will discuss remote physical laboratories, and the use of hands-on, home-based laboratory kits.

Anytime-anywhere Engineering Experimentation
Prof. John M. Sullivan Jr, Worcester Polytechnic Institute
Prof. Ahmet Can Sabuncu, Worcester Polytechnic Institute
Ms. Valerie B. Smedile Rifkin, Worcester Polytechnic Institute
Dr. Kimberly LeChasseur, Worcester Polytechnic Institute
Ms. Caitlin A. Keller, Worcester Polytechnic Institute

Best Practices for the Implementation of Home-based, Hands-on Lab Activities to Effectively Engage STEM Students During a Pandemic
Dr. Oludare Adegbola Owolabi P.E., Morgan State University
Dr. Jumoke ’Kemi’ Ladeji-Osias, Morgan State University
Mr. Oludayo Samuel Alamu, Morgan State University
Dr. Seong W. Lee, Morgan State University
Dr. Gbekeloluwa B. Oguntimein P.E., Morgan State University
Dr. Adedayo Aripibi, Morgan State University
Ms. Hye Jeong Lee, Morgan State University
Dr. Krishna Bista, Morgan State University
Dr. Mulugeta T. Dugda, Morgan State University
Ms. Sotonye Ikiriko, Morgan State University
Dr. Celeste Chavis P.E., Morgan State University

Designing At-home Laboratory Experiments Using Smart Phones and Basic Test Equipment for Senior Mechanical Engineering Students
Prof. John Whitefoot, University of Pittsburgh
Dr. Jeffrey S. Vipperman, University of Pittsburgh

Development, Implementation and Assessment of Thermodynamics Lab Kits for Remote Lab Instruction
Lamyaa El-Gabry, Princeton University

Work in Progress: Combining At-home and On-campus
Students in a Measurements and Analysis Lab Course
Dr. Bridget M. Smyser, Northeastern University

T327 - The Best of First-year Programs Division
11:30 A.M. - 1:00 P.M.
Sponsor: First-Year Programs Division
Moderators: Kaitlin Mallouk, Rowan University; Kerry Meyers, University of Notre Dame; Timothy Hinds, Michigan State University

Implementing an Engineering Math Curriculum Sequence: Preliminary Results and Lessons Learned
Prof. John Charles Minor, Clemson University
Dr. Elizabeth Anne Stephan, Clemson University
Ms. Abigail T. Stephan, Clemson University
Dr. Andrew I. Neptune, Clemson University

Acknowledging Unique Needs: Empowering Student Choice in the Creation of Their Pathway Through a First-year Experience Course
Frank J. Marsik, University of Michigan
Dr. Claudia G. Cameratti-Baeza, University of Michigan
Elizabeth Mann Levesque, University of Michigan
Stacie Edington, University of Michigan

Collaborative Parsons Problems in a Remote-learning First-year Engineering Classroom
Brooke Morin, Ohio State University
Dr. Krista M. Kecskemety, Ohio State University

Novel Hands-on Product-design Module for Online, Large-enrollment FYE Courses
Prof. Jenni Buckley, University of Delaware
Dr. Haritha Malladi, University of Delaware
Dr. Amy Trauth, University of Delaware
Dr. Marcia Gail Headley, University of Delaware

Hybrid Learning: For Better or Worse? The Effect of Hybrid Learning on Grades and Attitudes of First-year Engineers in Chemistry
Ms. Sydney Anne Morris, Northeastern University
Ms. Hannah Boyce, Northeastern University
Ms. Caroline Ghio, Northeastern University
Ms. Amanda Dee, Northeastern University
Ms. Alexis Pathwick-Paszyc, Northeastern University
Dr. Paul DiMilla, Northeastern University

Ms. Rachelle Reisberg, Northeastern University

T328 - Graduate Studies Division Technical Session 3
11:30 A.M. - 1:00 P.M.
Sponsor: Graduate Studies Division
Moderators: Diane Peters, Kettering University; Jeffrey Fergus, Auburn University

Electronic Mentoring During the COVID-19 Pandemic: Effects on Engineering Graduate Students’ Academic, Career, and Mental Health Outcomes
Dr. Chi-Ning Chang, University of Kansas
Dr. Guan Kung Saw, Claremont Graduate University
Uriel Lomeli-Carrillo, University of Texas at San Antonio
Dr. Mingxia Zhi, Northside Independent School District
Dr. Kahlí Romano, Claremont Graduate University
Mr. Ryan Culbertson, University of Texas at San Antonio

Work in Progress: Using Photovoice to Examine the Mental Health Experiences of Engineering Graduate Students During COVID-19
Ms. Sarah Jane Bork, University of Michigan
Dr. Joi-Lynn Mondisa, University of Michigan

Why We Failed: Barriers to Participation, Management, and Sustainability of an Immersive Faculty Experience Supporting Graduate Student Professional Development
Dr. Ella L. Ingram, Rose-Hulman Institute of Technology
Dr. Rachel McCord Ellestad, University of Tennessee at Knoxville
Dr. Cory Hixson, Colorado Christian University
Dr. Julia M. Williams, Rose-Hulman Institute of Technology

Work in Progress: A Holistic Ph.D. Admissions Rubric—Design & Implementation
Dr. Shannon Barker, University of Virginia
Dr. Amy Clobes, University of Virginia

Graduate Student Experiences as Told Through Instagram Posts
Ms. Liesl Krause, Purdue University at West Lafayette
Dr. Greg J. Strimel, Purdue University at West Lafayette
T330 - Computing and Information Technology Division Technical Session 3

11:30 A.M. - 1:00 P.M.

Sponsor: Computing and Information Technology Division

Moderators: Afsaneh Minaie, Utah Valley University; Mudasser Wyne, National University; Iftekhar Basith, Sam Houston State University; Reza Sanati-Mehrizy, Utah Valley University

This session presents papers on a variety of topics pertaining to computing and information technology.

**Evaluating Publications' Keywords in Computer Science Education Research: A Bibliometric NLP Approach**

Jia Zhu, Florida International University
Leila Zahedi, Florida International University
Dr. Monique S. Ross, Florida International University

**Experience in Moving Information and Computer Technology Courses Online**

Dr. Peng Li, East Carolina University

**Exploring the Effect of Quiz and Homework Submission Times on Students’ Performance in an Introductory Programming Course in a Flipped Classroom Environment**

Leslie Harvey III, University of Florida
Ashish Aggarwal, University of Florida

**From UML Design to Implementation of a Reliable Student Information System**

Briana Marie Bailey
Dr. Yujian Fu P.E., Alabama A&M University

**Impact of Flipped Classroom Model on High-workload and Low-income Students in Upper-division Computer Science**

Dr. Alberto Cureg Cruz, California State University, Bakersfield
Mr. Antonio-Angel L. Medel, California State University Bakersfield
Dr. Anthony Chistoper Bianchi, California State University, Bakersfield
Dr. Vincent Wong On, California State University, Bakersfield
Dr. Melissa Danforth, California State University, Bakersfield

T332 - International Division Business Meeting

11:30 A.M. - 1:00 P.M.

Sponsor: International Division

Moderators: Phillip Sanger, Purdue University at West Lafayette; Nick Safai, Salt Lake Community College

T333 - Pre-College Engineering Education Division Technical Session 9

11:30 A.M. - 1:00 P.M.

Sponsor: Pre-College Engineering Education Division

Moderators: Michael Johnson, Texas A&M University; Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University

High school kids and college kids/courses

**High School Student Outcome Expectations on Postsecondary Pathways in Two Regions of Virginia (Fundamental)**

Kai Jun Chew, Virginia Polytechnic Institute and State University
Dr. Holly M. Matusovich, Virginia Polytechnic Institute and State University
Dr. Cheryl Carrico P.E., E4S, LLC

**The Role of All-Female STEM Spaces in Encouraging High School Girls to Pursue STEM (Fundamental, Diversity)**

Dr. Mariel Kolker, Morris School District

**An Evaluation of a University-Level, High School Course Taught to Foster Interest in Civil Engineering (Evaluation)**

Ms. Morgan R. Broberg, Purdue University
Susan Khalifah P.E., S.E., Purdue University
Mr. Abhinav Gupta, Purdue University
Mr. Abdullah J. Nafakh, Purdue University

**Long Term Impact of New Jersey National Summer Transportation Institute Hosted at Rowan University on Career Choices of Cohorts (Evaluation)**

Ms. Kristine Rivera, Center for Research and Education in Advanced Transportation Engineering Systems
Dr. Ayman Ali
Dr. Yusuf Mehta P.E., Rowan University
Miss Shivani D. Patel, New Jersey Department of Transportation
T333B - Pre-College Engineering Education Division Technical Session 13

11:30 A.M. - 1:00 P.M.
Sponsor: Pre-College Engineering Education Division

Moderators: Susan Letourneau, New York Hall of Science; Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University

At-home engineering

STEM Moments in the Family Context Throughout Engineering Design Challenge Activities (Fundamental)
Dr. Jungsun Kim, Indiana University Bloomington
Dr. Amber Simpson, Binghamham University

Caregivers’ Multiple Roles in Supporting Their Child Through an Engineering Design Project (Fundamental)
Dr. Amber Simpson, State University of New York at Binghamton
Dr. Jing Yang, Indiana University Bloomington
Peter N. Knox, Binghamham University
Dr. Adam V. Maltese, Indiana University-Bloomington

#LaHoraSTEAM (The STEAM Hour) – An Initiative to Promote STEM-STEAM Learning in Quarantine Times (Work in Progress)
Mr. Marcelo Caplan, Columbia College

Motives, Conflicts, and Mediation in Home Engineering Design Challenges as Family Pedagogical Practices (Fundamental)
Dr. Jungsun Kim, Indiana University Bloomington
Dr. Soo Hyeon Kim, Indiana University-Purdue University Indianapolis

T334A - Teamwork: Priming, Empathy, and Metacognition

11:30 A.M. - 1:00 P.M.
Sponsor: Liberal Education/Engineering & Society Division

Moderators: Deborah Tihanyi, University of Toronto; Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University

Exploring How Empathy Manifests with/for Teammates in a Junior-Level Biomedical Engineering Course
Dr. Justin L. Hess, Purdue University at West Lafayette
Mr. Aristides Carrillo-Fernandez, Purdue University at West Lafayette
Dr. Nicholas D. Fila, Iowa State University of Science and Technology
Dr. Corey T. Schimpf, University at Buffalo, the State University of New York

The Critic as Designer: How Metacognition Makes Transdisciplinarity Possible
Andrea L. Schuman, Virginia Polytechnic Institute and State University
Dr. Lisa D. McNair, Virginia Polytechnic Institute and State University
Dr. David Gray, Virginia Polytechnic Institute and State University
Desen Sevi Ozkan, Tufts University

T334B - Alternative Pathways for Engineering Education Predicated on Dismantling Hierarchies and Examining the Politics of Care Practices

12:00 P.M. - 1:30 P.M.
Sponsor: Liberal Education/Engineering & Society Division

Moderator: Ellen Foster, Purdue University at West Lafayette

Speakers: Dr. Alan Cheville, Bucknell University; Dr. Ellen Foster, Purdue University at West Lafayette; Andrea Haverkamp, Oregon State University; Dr. Yanna Lambrinidou, Virginia Polytechnic Institute and State University; Mr. Justin Charles Major, Purdue University at West Lafayette; Dr. Donna M. Riley, Purdue University at West Lafayette

As the COVID-19 pandemic progresses, this moment has brought increased attention to the structural issues of academic capitalism, academic racism, and inequities that have long been reproducing within higher education in the
United States. While this is new to some who may have been able to comfortably ignore these dynamics previously, many in higher education have faced unreasonable expectations, vulnerability, and precarity tied to labor issues for quite some time, and recognized that these are entangled with inequities tied to gender, race, disability, and other categories of identity and status. This moment highlights how the current toxic, productivity-oriented framing of academia under late capitalism leaves us in a scrappy survival mode, trying to exist day-by-day, week-by-week with a negligible amount of energy to plan or have foresight as to how the world could be otherwise, and what the alternatives might be. Responsibility has been designated as an individual endeavor (rooted in the American individualist hero narrative) that discounts the importance of group care and accountability, something which we acknowledge nascent care groups in engineering education research are working to disrupt, and to which we would like to contribute. Many of us feel so close to walking away, and thus visioning alternative narratives and diverse formats for engineering education seems important in this moment toward creating a sustainable and more equitable future.

This panel of invited speakers seeks to unpack what it would mean to create a different path that troubles current structures and practices of the institution of higher education to which we have fraught relationships. What would it look like to center on collective care, strategic resource dissemination, or dismantling hierarchies of power? Are we ready to abandon these institutions of higher education? What could it mean to exist in an anti-racist (non-racist), non-capitalist frame? Precarity seems to make it impossible to move toward an alternative or new narrative; how could we counter precarity to make such shifts viable?

We intend to examine these questions and establish modes of visioning for how the world could be otherwise through a discussion and conversational mode with others in attendance of this panel which asks: How do we get where we want to go?

T335 - Remote Education in Manufacturing Engineering

11:30 A.M. - 1:00 P.M.
Sponsor: Manufacturing Division
Moderators: Irina Ciobanescu Husanu, Drexel University; Yalcin Ertekin, Drexel University; Tzu-Liang Tseng, University of Texas at El Paso

This session will feature a panel of speakers discussing the challenges and opportunities generated by remote education in manufacturing engineering. It will focus on laboratory activities in a remote and virtual format.

T336 - Advances in Materials Education

11:30 A.M. - 1:00 P.M.
Sponsor: Materials Division
Moderators: Lessa Grunenfelder, University of Southern California; Alison Polasik, Ohio State University
Speaker: Dr. Steven Yalisove, University of Michigan

Creating a Minor in Materials for Engineering Technology Students
Dr. Barry Dupen, Purdue University Fort Wayne

Integrating Materials and Manufacturing Education
Dr. Claes Fredriksson, ANSYS - Education Division and University West, Sweden

Personalized Learning: Building a Model
Dr. Anuja Kamat, Wentworth Institute of Technology
Hadi Kazemiroodsari, Wentworth Institute of Technology

T337 - Mathematics Division Technical Session 1

11:30 A.M. - 1:00 P.M.
Sponsor: Mathematics Division
Moderators: Jeffrey Hieb, University of Louisville; James Lewis, University of Louisville; Amitabha Ghosh, Rochester Institute of Technology

Best of Math Division
Exploring the Relationship Between Math Anxiety, Working Memory, and Experiences
T338 - Thermal Fluid Related

11:30 A.M. - 1:00 P.M.

Sponsor: Mechanical Engineering Division

Moderators: Rungun Nathan, Pennsylvania State University, Berks Campus; Thomas DeNucci, United States Coast Guard Academy; Pradip Sagdeo

These papers are in the thermal fluid area generally—or the paper worked and used thermal or fluid classes.

A New Approach to Equip Students to Solve 21st-Century Global Challenges: Integrated Problem-Based Mechanical Engineering Laboratory

Dr. Siu Ling Leung, Pennsylvania State University
Dr. Eric Marsh, Pennsylvania State University
Dr. Stephen Lynch, Pennsylvania State University
Dr. H. J. Sommer III, Pennsylvania State University
Dr. Sean N. Brennan, Pennsylvania State University
Prof. Tak-Sing Wong, The Pennsylvania State University
Prof. Brian M. Foley, Pennsylvania State University

Dr. Jean-Michel Mongeau, Pennsylvania State University
Dr. Daniel H. Cortes, Pennsylvania State University
Prof. Karen A. Thole, Pennsylvania State University

Development and Use of Open Educational Resources in an Undergraduate Heat and Mass Transfer Course

Dr. Julie Mendez, Indiana University-Purdue University Columbus

How to Think About Fluids In and Out of Classrooms: Developing Interactive Strategies for Learning Fluid Mechanics Online

Dr. Soheil Fatehiboroujeni, Cornell University
Dr. Matthew J. Ford, Cornell University
Dr. Hadas Ritz, Cornell University
Prof. Brian J. Kirby, Cornell University
Prof. Elizabeth Mills Fisher, Cornell University

On Moving a Face-to-Face Flipped Classroom to a Remote Setting.

Prof. Autar Kaw, University of South Florida

ThermoVR: A Virtual Laboratory to Enhance Learning in Undergraduate Thermodynamics

Prof. John M. Pfotenhauer, University of Wisconsin - Madison
Mr. David J. Gagnon, University of Wisconsin - Madison

T339 - Building Success in the Online Classroom

11:30 A.M. - 1:00 P.M.

Sponsor: Mechanics Division

Moderators: Sarah Wodin-Schwartz, Worcester Polytechnic Institute; Eric Davishahl, Whatcom Community College; Julian Davis, University of Southern Indiana; Masoud Rais-Rohani, University of Maine

In this session you will find papers discussing methods and activities that have been used to transition to the online learning environment.

A Blend Flex Engineering Mechanics Course

Dr. Jiehong Liao, Florida Gulf Coast University
Dr. Galen I. Papkov, Florida Gulf Coast University
Dr. Ashraf Badir P.E., Florida Gulf Coast University
Dr. Robert O’Neill P.E., Florida Gulf Coast University

Effects of Different Team Formation Strategies on Performance in an Undergraduate Introductory Mechanical Engineering Course
2021 ASEE VIRTUAL CONFERENCE
TUESDAY, JULY 27th SESSIONS

Capt. Hayden K. Richards, United States Air Force Academy
Dr. Phillip Cornwell, United States Air Force Academy

Successes, Expectations, and Challenges Associated with In-person to Online Remote Transition of an Engineering Statics Course
Dr. Anu Osta, Rowan University
Dr. Jennifer Kadlowec, Baldwin Wallace University
Ms. Melanie Amadoro, Rowan University

The Transition from In-Person to Online Classes
Dr. Reihaneh Jamshidi, University of Hartford
Dr. Eoin A. King, NUI Galway

T340 - Minorities in Engineering Division Technical Session 2
11:30 A.M. - 1:00 P.M.
Sponsor: Minorities in Engineering Division
Moderators: Peter Golding, University of Texas at El Paso; Kristin Imhoff, Saint Joseph's University; Trina Fletcher, Florida International University; Fatima Alleyne, University of California, Berkeley

Black in Engineering: How the Social Justice Efforts of Black Academics Affect Change
Dr. Carlotta A. Berry, Rose-Hulman Institute of Technology
Dr. Audrey Bowden, Vanderbilt University
Dr. Monica Farmer Cox, Ohio State University
Prof. Tahira N. Reid, Purdue University at West Lafayette
Dr. Leroy L. Long III, Embry-Riddle Aeronautical University - Daytona Beach

Reflecting on 10 Years of Centralized Engineering Student Diversity Initiatives (Experience)
Ms. Lisa Trahan, University of California, San Diego
Ms. Gennie Miranda, University of California San Diego
Prof. Olivia A. Graeve, University of California, San Diego

Continuous Improvement for Equity in Engineering—Addressing Departmental Change with Theory-Informed Case Study Research (EBR)
Dr. Sarah Hug, Colorado Evaluation & Research Consulting
Christina Convertino
Dr. Heather Thiry

Effects of Uncertainty Avoidance and Country Culture on Perceptions of Power Distance in the Learning Process
Johnny C. Woods Jr., Virginia Tech

Dr. Homero Murzi, Virginia Tech
Andrea L. Schuman, Virginia Tech

Institutional Racism in Scholarship Renewal (Research)
Dr. Alan S. Hoback, University of Detroit Mercy

T341 - Multidisciplinary Curriculum and Course Development
11:30 A.M. - 1:00 P.M.
Sponsor: Multidisciplinary Engineering Division
Moderators: Cynthia Barnicki, Milwaukee School of Engineering; AJ Hamlin, Michigan Technological University; Luis Rodriguez, Milwaukee School of Engineering; James Olson, Rensselaer Polytechnic Institute

2020 ETI Annual Summer School: Data Science and Engineering
Prof. Steven R. Biegalski, Georgia Institute of Technology
Dr. Pavel V. Tsvetkov, Texas A&M University
Prof. Vladimir Sobes, University of Tennessee at Knoxville
Dr. Karl Pazdernik, Pacific Northwest National Laboratory
Dr. Simon Labov, Lawrence Livermore National Laboratory
Prof. Alfred Olivier Hero, University of Michigan

Exploration Elective: Students from All Disciplines Explore Engineering and Sciences
Dr. Karl D. Schubert, University of Arkansas
Dr. Manuel D. Rossetti P.E., University of Arkansas

Investigating Construction Courses within the U.S. Civil Engineering Curricula—A Resource for Designing the Course
Dr. Kleio Avrithi P.E., Mercer University
Mr. Samuel Alan Fong, Mercer University

Work in Progress: Engineering for Sustainable Development: An Undergraduate Course Inspiring New
Mentalities in Engineering Students of All Majors

Dr. Jorge R. Lara, Texas A&M University
Dr. Sunay Palsole, Texas A&M University
Dr. Mark H. Weichold, Texas A&M University
Prof. Patrick Linke, Texas A&M University at Qatar

T344 - Microsoft Teams, Deep Learning, and Classroom Flipping

11:30 A.M. - 1:00 P.M.
Sponsor: Ocean and Marine Division
Moderators: Lynn Albers, Hofstra University; Vukica Jovanovic, Old Dominion University

Come listen to our authors as they present their success using Microsoft Teams, deep learning, and classroom flipping to continue providing students with an excellent education during the pandemic.

Microsoft Teams Utilization for Group Function in Maritime-Focused Mechanical Design Capstone
Dr. Robert Kidd, State University of New York Maritime College

Deep Learning at a Distance: Remotely Working to Survive Sharks
Grace Nolan, California Polytechnic State University, San Luis Obispo
Prof. Franz J. Kurfess, California Polytechnic State University, San Luis Obispo
Mr. Kathirvel A. Gounder
Damon Tan
Mr. Casey Daly, California Polytechnic State University, San Luis Obispo
Caroline Skae, California Polytechnic State University, San Luis Obispo

How Classroom Flipping Affects Coast Guard License Students in Engineering
Dr. Paul M. Kump, SUNY Maritime College

An Undergraduate Course on Renewable Energy Systems with Enhanced Marine Energy Content
Dr. Radian G. Belu, Southern University and Agricultural & Mechanical College
Prof. Lucian Ionel Cioca, Lucian Blaga University of Sibiu
Dr. Alexandru Belu

T345 - STEAM Education—Powering the Next Generation

11:30 A.M. - 1:00 P.M.
Sponsor: Engineering Physics and Physics Division
Moderators: Bala Maheswaran, Northeastern University; Robert Ross, University of Detroit Mercy
Speakers: Dr. Stacy S. Klein-Gardner, Vanderbilt University; Marie Bukowski; Dr. Teresa L. Larkin, American University; Prof. Angeles Dominguez, Tecnologico de Monterrey and Universidad Andres Bello; Ms. Rachelle Reisberg, Northeastern University

This session provides P–12 Science, Technology, Engineering, Arts, and Math (STEAM) education and covers the following:

• Current state of STEAM education
• Experiential learning activities for P–12 STEAM
• Increase talent pool by improving P–12 STEAM experiential education
• Experiential learning and professional development
• STEAM education for underrepresented communities
• The future of STEAM in our new world

T346 - Software Engineering Division Technical Session 1

11:30 A.M. - 1:00 P.M.
Sponsor: Software Engineering Division
Moderators: Robert Hasker, Milwaukee School of Engineering; Afsaneh Minaie, Utah Valley University

WIP: Engaging Software Engineering Students in Synchronous and Asynchronous Online Course
Dr. Bruce R. Maxim, University of Michigan - Dearborn
Thomas Limbaugh, University of Michigan - Dearborn

Using Agile and Active Learning in Software Development Curriculum
Prof. Ben Tribelhorn, University of Portland
Dr. Andrew M. Nuxoll, University of Portland

Evaluating a Software Project Management Course Collaboration Framework at a Second Institution
Dr. Stefan Christov, Quinnipiac University
Dr. James Walker, Michigan Technological University
Dr. Mark Hoffman, Quinnipiac University

T347 - Student Chapter Panel: Getting Started and Staying Active
11:30 A.M. - 1:00 P.M.
Sponsor: Student Division
Moderators: Adurangba Oje, University of Georgia; Adrienne Wheeler, Project SYNCERE; Cassandra Woodcock, University of Michigan
Speaker: Mr. Adurangba Victor Oje, University of Georgia

Whether you're looking to start a chapter or are currently a chapter leader, this is the session for you. Come and meet other student chapter leaders and discuss student chapter best practices, particularly in the wake of COVID-19.

T347B - Student Division Technical Session 6
11:30 A.M. - 1:00 P.M.
Sponsor: Student Division
Moderators: Adrienne Wheeler, Project SYNCERE; Anna Malakian, Clemson University; Michel Kornegay, Morgan State University

Minimizing Communication Challenges Faced by Virtual Project Teams
Mr. Nathaniel Blalock, University of Tennessee at Knoxville
Miss Alexis Rae Walsh, University of Tennessee at Knoxville
Mr. Daniel Patrick Mountain, University of Tennessee at Knoxville
Ms. Sarah Emily Norris
Dr. Courtney June Faber, University of Tennessee at Knoxville

Proof of Concept: An Algorithm for Consideration of Students’ Personalities in Team Formation
Mr. Jeong Hin Chin, University of Michigan
Herbert Li, University of Michigan
Dr. Robin Fowler, University of Michigan

Exploring Student Academic Motivation and Perceptions of Teamwork and Communication
Mr. Hamidreza Taimoori, Virginia Tech
Dr. David B. Knight, Virginia Tech

Mr. Kazuki Hori, Virginia Tech

Exploring the Team Dynamics of Undergraduate Engineering Virtual Teams During the Rapid Transition Online Due to COVID-19
Miss Alexis Rae Walsh, University of Tennessee at Knoxville
Ms. Sarah E. Norris, University of Tennessee, Knoxville
Mr. Nathaniel Blalock, Enlite Research Group, University of Tennessee at Knoxville
Mr. Daniel Patrick Mountain, University of Tennessee at Knoxville
Dr. Courtney June Faber, University of Tennessee at Knoxville

T349 - Technological and Engineering Literacy-Philosophy of Engineering (TELPhe) Division Technical Session 3/Perspectives on Advances in Promoting Technological Literacy
11:30 A.M. - 1:00 P.M.
Sponsor: Technological and Engineering Literacy/Philosophy of Engineering Division
Moderators: Robert Leland, Oral Roberts University; Steve Efe, Morgan State University; Fatma Zamil; John Reisel, University of Wisconsin - Milwaukee; Katherine Goodman, University of Colorado Denver

This session contains a variety of papers that consider broadening and deepening technological and engineering literacy.

A Critical Thinking Paradigm for Materials and Manufacturing Education
Prof. Sayyad Zahid Qamar, Sultan Qaboos University
Dr. Ramanathan Arunachalam, Sultan Qaboos University
Mr. Sayyad Basim Qamar, Texas A&M University

Mastery Learning for Undergraduates in Engineering
Dr. Jayanta Kumar Banerjee, University of Puerto Rico, Mayaguez Campus

Identifying Core Engineering Virtues: Relating Competency and Virtue to Professional Codes of Ethics
Dr. Stephen T. Frezza, Gannon University
Dr. Justin Michael Greenly, Franciscan University of Steubenville

Rachel Shannon, Iowa State University of Science and Technology
Dr. Mani Mina, Iowa State University of Science and Technology

**T351 - Women in Engineering Division Technical Session 9**

**11:30 A.M. - 1:00 P.M.**

**Sponsor: Women in Engineering Division**

**Moderators: Anastasia Rynearson, Campbell University; Fabiola Clayton, Autodesk, Inc.**

**Exploring the Relationships Between Acculturation Attitudes and Demographic Characteristics in Engineering Workplaces**

Rohini Abhyankar, Arizona State University
Dr. Samantha Ruth Brunhaver, Arizona State University

**Empowering Engineering Students as Allies Through Dedicated Classroom Instruction**

Dr. Lisa Abrams, Ohio State University
Dr. Adithya Jayakumar, Ohio State University
Ms. Lucille Sheppard, Ohio State University
Amy Kramer P.E., Ohio State University
Dr. Toni M. Calbert, Ohio State University

**How and Why Women Leave Engineering Careers: Toward an Integrated Framework of Counseling and Organizational Psychology Career Theories**

Ms. Christina A. Pantoja, Purdue University at West Lafayette

**Why is Retaining Women in STEM Careers so Challenging? A Closer Look at Women’s Insights and Experiences in STEM Fields**

Dr. Megan O. Conrad, University of Detroit Mercy
Dr. Alexa Rihana Abdallah, University of Detroit Mercy
Lauren Ross, University of Detroit Mercy

**Women in Construction Engineering: Improving the Student Experience Throughout Their Careers**

Ing. Marcela Alejandra Silva, Universidad Andres Bello, Santiago, Chile
Prof. Angeles Dominguez, Tecnologico de Monterrey and Universidad Andres Bello

**T352 - At the Crossroads of Community Engagement, Ethics, Liberal Education, and Social Responsibility: Community-Engaged Engineering Education Challenges and Opportunities in Light of COVID-19**

**11:30 A.M. - 1:00 P.M.**

**Sponsors: Community Engagement Division; Equity, Culture & Social Justice in Education Division; Liberal Education/Engineering & Society Division**

**Moderators: Joan Schuman, Missouri University of Science and Technology; Marybeth Lima, Louisiana State University and A&M College; Lynn Rollins, Case Western Reserve University; Kelly Bohrer, University of Dayton**

**Speakers: Kelly Bohrer, University of Dayton; Lynn Rollins, Case Western Reserve University; Nora Reynolds; Dr. Juan C. Lucena, Colorado School of Mines; Dr. William "Bill" C. Oakes, Purdue University at West Lafayette; Sarah Aileen Brownell, Rochester Institute of Technology; Waleska Crowe, Guatemala Office for EWB USA; Kat Nilov, University of Massachusetts Amherst; Sanjana Manghnani, University of Massachusetts Amherst; Tunya Griffin, Rochester Institute of Technology (RIT)**

This special session includes a roundtable panel discussion with several leaders and stakeholders in the areas of service learning, sociotechnical engineering, engineering education, community/university partnerships, engineering and social justice, and ethical community-based global learning. Panelists' reflections and sharing of aspirations will include an opportunity to examine past practices that have caused harm (truth telling), ways to build and sustain ethical and reciprocal community partnerships (healing), consider ways to advance the multifaceted field of community engagement in engineering education (transformation), and consider new ways of inclusive community-engaged learning in light of the pandemic. We hope this special session will address the issues of 1) adapting engineering design projects serving vulnerable community partners in light of the pandemic, and 2) using new methods with ethical community engagement frameworks to retool and innovate the work of community-based engineering education for post-COVID times.
T355 - Designing and Evaluating Engineering Leadership Programs

11:30 A.M. - 1:00 P.M.
Sponsor: Engineering Leadership Development Division

Moderators: Meagan Kendall, University of Texas at El Paso; Cindy Rottmann, University of Toronto; David Nino, Massachusetts Institute of Technology

Development of Leadership and Communication Skills in an Experiential Learning Project Management Course
Ms. Angie Moussa, University of Massachusetts Lowell
Dr. Yanfen Li, University of Massachusetts Lowell

Evaluating the Effectiveness of an Undergraduate Engineering Leadership Development Minor on Graduates
John D. Stevens, Pennsylvania State University
Dr. Dena Lang, Pennsylvania State University
Dr. Meg Handley, Pennsylvania State University
Dr. John Jongho Park
Mr. Paul Mittan, Pennsylvania State University

A Leadership-Development Ecosystem for Engineering Graduate Students
Teresa J. Didiano, University of Toronto
Ms. Annie Elisabeth Simpson, Troost Institute for Leadership Education in Engineering, University of Toronto
Dr. Doug Reeve P.Eng., University of Toronto

A Study of Alumni of the 'Leveraging Leadership for a Lifetime' Leadership Development Course
Dr. Ronald J. Bennett, University of St. Thomas
Dr. Eugene Joseph Audette, University of St. Thomas
Dr. Elaine R. Millam, WorkWise Coaching & Consulting
Alanna K. Moravetz, Alanna Consulting LLC
Dr. Sheryl Niebuhr, University of St. Thomas and Sheryl Niebuhr Consulting LLC

An Overview of the Hornet Leadership Program in the College of Engineering & Computer Science at California State University, Sacramento
Dr. Harindra Rajiyah, California State University, Sacramento
Dr. Lorenzo M. Smith, California State University, Sacramento
Prof. Susan L. Holl, College of Engineering & Computer Science, California State University, Sacramento

Development Program for Graduate Teaching Assistants
Ms. Hyun Hannah Choi, University of Illinois at Urbana - Champaign
Mr. Selim Havan, University of Illinois at Urbana - Champaign
Ms. Charlotte Hathaway
Dr. Blake Everett Johnson, University of Illinois at Urbana - Champaign
Dr. Mattox Alan Beckman, University of Illinois at Urbana - Champaign
Prof. Yuting W. Chen, University of Illinois at Urbana - Champaign
Mr. Lucas Anderson, University of Illinois at Urbana - Champaign

T357 - Faculty Development 2: COVID-19 Impact on Faculty

11:30 A.M. - 1:00 P.M.
Sponsor: Faculty Development Division

Moderators: Amy Nave, Colorado School of Mines; Karen High, Clemson University

This session focuses on the impact of COVID-19 on faculty. Traditional 12-minute presentations will be given, followed by three minutes of clarifying questions. The final 15-30 minutes will be for the group to synthesize major lessons learned, feedback for presenters, and future directions for faculty development. The audience will be engaged through polls, chats, and other features to make the session enjoyable for all.

Learning from the Voices of Faculty: An Analysis of the Impact of Shelter-in-Place on Faculty at San Jose State University in Spring 2020
Dr. Maria Chierichetti, San Jose State University
Dr. Patricia R. Backer, San Jose State University
Dr. Laura E. Sullivan-Green, San Jose State University
Prof. Liat Rosenfeld, San Jose State University

A Review of the Teaching Modalities Chosen by Faculty During the Global Pandemic
Prof. Dani Fadda P.E., University of Texas at Dallas
Dr. Oziel Rios, University of Texas at Dallas
Roopa Vinay, University of Texas at Dallas

Assessment of Online Professional Development on Faculty Teaching Virtually
Dr. Jamie R. Gurganus, University of Maryland Baltimore County
Anita H. Komlodi  
Dr. Neha B. Raikar, University of Maryland Baltimore County  
Dr. Maria C. Sanchez, University of Maryland Baltimore County  
Dr. Charles D. Eggleton, University of Maryland Baltimore County  
Dr. Mariahose Castellanos, University of Maryland Baltimore County  
Prof. Mark Berczynski, University of Maryland Baltimore County  
Olivia M. Bailey, University of Maryland Baltimore County  

Dr. Susannah C. Davis, University of New Mexico  
Dr. Yan Chen, University of New Mexico  
Dr. Vanessa Svihla, University of New Mexico  
Ms. Madalyn Wilson-Fetrow, University of New Mexico  
Dr. Pil Kang, University of New Mexico  
Dr. Abhaya K. Datye, University of New Mexico  
Prof. Eva Chi, University of New Mexico  
Prof. Sang M. Han, University of New Mexico  

Pandemic Pivots Show Sustained Faculty Change

T359 - For Students to Know and Grow

11:30 A.M. - 1:00 P.M.

Sponsor: Equity, Culture & Social Justice in Education Division

Moderator: James Holly, Jr., Wayne State University

Studying the Impact of Humanitarian Engineering Projects on Student Professional Formation and Views of Diversity, Equity, and Inclusion

Dr. Kirsten Heikkinen Dodson, Lipscomb University  
Courtney Deckard, Lipscomb University  
Hannah Duke, Lipscomb University  
Makenzie Cohn  
Natalie Shaffer, Lipscomb University  
Dr. Elizabeth Buchanan, Marshfield Clinic Research Institute

Implementation of a Module to Increase Engineering Students’ Awareness of Unconscious Bias

Emily Lauber, Microsoft  
Dr. Benjamin Emery Mertz, Rose-Hulman Institute of Technology

Supporting Equitable Team Experiences Using Tandem, an Online Assessment and Learning Tool

Dr. Robin Fowler, University of Michigan  
Dr. Laura K. Alford, University of Michigan  
Dr. Stephanie Sheffield, University of Michigan  
Molly Maher, University of Michigan  
Dr. Caitlin Hayward, University of Michigan  
Trevion S. Henderson, University of Michigan  
Dr. Rebecca L. Matz, University of Michigan

Exploring the Role of Project-based Learning in Building Self-efficacy in First-year African Engineering Students

Dr. Heather R. Beem, Ashesi University

Exploring Undergraduate Civil Engineering Students’ Perceptions of Infrastructure Inequities: A Pilot Study

Mrs. Candice W. Bolding, Clemson University  
Dr. Jennifer Harper Ogle, Clemson University  
Dr. Luke J. Rapa, Clemson University

T359B - Special Topics: Conscious Considerations

11:30 A.M. - 1:00 P.M.

Sponsor: Equity, Culture & Social Justice in Education Division

Moderator: James Holly, Jr., Wayne State University

Women in Science and Engineering: A Tale of Two Countries

Dr. Behrooz Parhami, University of California, Santa Barbara

Featuring Silenced Perspectives in STEM: Supporting Multicultural and Diversity Leadership Through the STEM Foundry Heritage Fellows Program

Dr. Andrea Arce-Trigatti, Tennessee Technological University  
Dr. Stephanie Jorgensen, Tennessee Technological University  
Dr. Robby Sanders, Tennessee Technological University  
Dr. Pedro E. Arce, Tennessee Technological University

Seeing the Invisible: The Year This White Woman Spent Learning at an HSI

Dr. Lizabeth L. Thompson, California Polytechnic State University, San Luis Obispo

Equity, Engineering, and Excellence: Pathways to Student Success

Dr. Doris J. Espiritu, Wilbur Wright College  
Bridget Eileen O’Connell, Wilbur Wright College  
David Potash, Wilbur Wright College

Identifying Engineering Students’ Beliefs About Seeking
Help for Mental Health Concerns
Ms. Courtney Janaye Wright, University of Kentucky
Lucy Elizabeth Hargis, University of Kentucky
Dr. Ellen L. Usher, University of Kentucky
Dr. Joseph H. Hammer, University of Kentucky
Dr. Sarah A. Wilson, University of Kentucky
Melanie E. Miller, University of Kentucky

T368 - EDC Executive Board Meeting
11:30 A.M. - 1:00 P.M.
Sponsor: Engineering Deans Council
Moderators: Virona Mehta, American Society for Engineering Education; Nathan Kahl, American Society for Engineering Education

This is the meeting of the Engineering Deans Council Executive Board.

T377 - Understanding and Interrogating Racialized Power and Privilege in the STEM Classroom: An Anti-Racist Pedagogical Approach
11:30 A.M. - 1:00 P.M.
Sponsor: ASEE Committee on Diversity, Equity & Inclusion
Moderators: Elizabeth Cady, National Academy of Engineering; Rachelle Reisberg, Northeastern University
Speakers: Dr. Kelly J. Cross, University of Nevada, Reno; Dr. Elizabeth Litzler, University of Washington; Emily Affolter, University of Washington; Dr. Christian Matheis

This workshop will explore U.S. cultural norms that create an inequitable status quo, privileging White people and the concept of Whiteness, while disenfranchising people of color and offering undue privilege to other dominant identities. The workshop presenters will facilitate discussions and individual self-reflection and provide tools to interrupt and dismantle White privilege and other forms of systemic dominance that STEM faculty and staff may not otherwise have access or exposure to explore.

T399 - SPONSORED SESSION: Growing the Domestic Pool of Diverse Graduate Students in Engineering - Presented by EngineeringCAS
12:20 P.M. - 1:00 P.M.
Sponsor: Sponsored Sessions
Speaker: Ms. Catherine "Kitty" Didion, Liaison International

The need to increase the numbers of underrepresented graduate students in engineering that matriculate and graduate has been a topic of discussion for several years within the MIND division, as well as other divisions of ASEE.

2020 has been a challenging year for all, including those in engineering education. Do the constraints and reality of the COVID-19 pandemic and its potential impact on the the pool of international graduate students provide an unforeseen opportunity for organizations (institutions of higher education, engineering societies, and corporations) to reimagine what the engineering community can do to engage and support the domestic pool of students? We emphasize reaching underrepresented students who are considering graduate programs in engineering.

Are there proven practices or models that can be scaled and expanded? What role do professional engineering societies, including ASEE, play in recruiting a greater pool of diverse graduate students? Given that many of the mechanisms of outreach to potential graduate students (e.g., campus visits, national conferences) are not feasible during the pandemic, what are some viable means of outreach and engagement?

The panel will consist of representatives from engineering societies who have established records and proven practices in working with diverse student populations, as well as representatives of institutions of higher education with current programs and policies aimed at growing their pool of diverse graduate students.
T199 - ASCE Formal Engineering Education
1:00 P.M. - 7:00 P.M.
Sponsor: Sponsored Sessions

T360 - NETWORKING SESSION: ASEE Is Me
1:00 P.M. - 1:45 P.M.
Sponsor: ASEE Headquarters
Moderator: Nathan Kahl, American Society for Engineering Education
Learn about some of the products and programs ASEE has to offer.

T401 - Aerospace Education in a Fiscally Constrained Environment
1:45 P.M. - 3:15 P.M.
Sponsor: Aerospace Division
Moderators: Tracy Yother, Purdue University at West Lafayette; Michael Hatfield, University of Alaska Fairbanks; Sharan Asundi, Old Dominion University; Nadir Yilmaz, Howard University
Speakers: Dr. Denise Thorsen, University of Alaska Fairbanks; Wilhelm Friess, University of Maine; Dr. Tobias Rossmann, Lafayette College
This panel is to discuss various methods for providing valuable aerospace engineering opportunities and systems engineering experience to students when program constraints may not allow for a full aerospace program.

T403 - Biological and Agricultural Engineering Division Technical Session 1
1:45 P.M. - 3:15 P.M.
Sponsor: Biological and Agricultural Engineering Division
Moderators: Heidi Diefes-Dux, University of Nebraska - Lincoln; Janie Moore, Texas A&M University

Papers emphasize instruction during COVID-19
Lessons Learned From a COVID-impacted Capstone
Dr. Alicia A. Modenbach P.E., University of Kentucky
Prof. Michael "Mick" Peterson, University of Kentucky

Investigating Impact of Disruption to Biological and Agricultural Engineering Senior Design Capstone Courses Due to COVID-19
Dr. Lucie Guertault, North Carolina State University
Dr. Tamecia R. Jones, North Carolina State University
Mr. Eric Steven Hall, North Carolina State University
Dr. Praveen Kolar, North Carolina State University

Student Opinion on Teaching Thermodynamics Through Synchronous and Asynchronous Distance Learning
Ms. Tara Gupte Wilson, Wright State University
Ms. Ashley Nicole Venturini, Ohio State University
Dr. Ann D. Christy P.E., Ohio State University

T404 - Biomedical Engineering Postcard Session (Best of Works in Progress)
1:45 P.M. - 3:15 P.M.
Sponsor: Biomedical Engineering Division
Moderators: Vignesh Subbian, University of Arizona; Rachel Childers, Ohio State University; Aileen Huang-Saad, Northeastern University; Renata Ramos, Rice University; Tanya Nocera, Ohio State University

In this interactive session, six authors will each pitch their work in progress as a five-minute, two-slide “postcard” overview. Attendees will then have the opportunity to enter and exit breakout rooms with any author(s) they wish, to engage in dynamic, small-group discussion. Works in progress were chosen for this session based on reviewers’ evaluations for novelty, technical merit, outcomes, and relevance to BME education.

Work in Progress: Creative Biomechanics Project Using an Interactive Digital Experience as an Alternative Laboratory (IDEAL) – Phase 2
Dr. Elizabeth Mays, Michigan State University
Dr. Valerie A. Troutman, Milwaukee School of Engineering
Geoffrey William John Grimm
Elizabeth Rose Pollack, Michigan State University
Dr. Michele J. Grimm, Michigan State University
Work in Progress: Development of a Training Program to Prepare Students for an Immersive Bioinformatics Summer Research Experience
Prof. Mark A. Chapman, University of San Diego

Work in Progress: Development of a Virtual Introduction to Machining and Manufacturing for BME Applications
Emily Moreno, University of California, Davis
Dr. Jennifer H. Choi, University of California, Davis
Prof. Anthony G. Passerini, University of California, Davis

Work in Progress: Novel Initiatives for Senior Design Collaborative Projects With Healthcare Workers and Undergraduate Students—a COVID-19 Response Nursing Hackathon
Prof. Christine E. King, University of California, Irvine
Dr. George Tolomiczenko, Caltech
Ms. Nadine B. Afari, CHOC Children’s Health Orange County

Work in Progress: Promoting Equitable Team Dynamics in an Introductory Biomedical Engineering Course
Dr. Jennifer H. Choi, University of California, Davis

Work in Progress: Exploring the Relationships Between BME Student Perception of the Field and Career Plans
Dr. Nicole L. Ramo, Shantou University
Dr. Aileen Huang-Saad, Northeastern University

Matthew Lovell, Rose-Hulman Institute of Technology;
Steven Burian, University of Utah

This session includes a broad discussion on ways programs can address diversity issues in classrooms, departments, and curricula.

Diversity and Inclusion Lessons that Support the Traditional Civil Engineering Curriculum
Dr. Pamela K. Judge, Roger Williams University

Diversity, Equity, and Inclusion in Civil and Environmental Engineering Education: Social Justice in a Changing Climate
Dr. Daniel Erian Armanios
Dr. Sarah Jane Christian P.E., Carnegie Mellon University
Ms. Andrea Francioni Rooney, Carnegie Mellon University
Dr. Millard L. McElwee, Exponent
Joe Dallas Moore, Carnegie Mellon University
Dr. D esteemie Nock, Carnegie Mellon University
Prof. Constantine Samaras, Carnegie Mellon University
Prof. Gerald J. Wang, Carnegie Mellon University

Efficacy of Curricular Enhancements to Address Social and Environmental Injustice in Civil Engineering
Dr. Rebekah Oulton P.E., California Polytechnic State University, San Luis Obispo
Ms. Tessa Gail Gallagher, California Polytechnic State University, San Luis Obispo
Ms. Claire Katherine Anovick, California Polytechnic State University, San Luis Obispo

Redesign of a Large Statics Course for Neurodiverse Students in the Distance Learning Environment
Prof. Shinae Jang P.E., University of Connecticut

T405 - Chemical Engineering Division Business Meeting
1:45 P.M. - 3:15 P.M.
Sponsor: Chemical Engineering Division
Moderators: VJ Tocco, University of Florida; Ashlee Ford Versypt, University at Buffalo, the State University of New York

Business meeting for the Chemical Engineering Division, including an annual update from all officers and the election of new officers.

T406 - Development Around Diversity
1:45 P.M. - 3:15 P.M.
Sponsor: Civil Engineering Division
Moderators: Anuja Kamat, Wentworth Institute of Technology; Tonya Nilsson, Santa Clara University;

Academic and Industry Collaboration: A Literature Review
Dr. Anne M. Lucietto, Purdue University, West Lafayette
Dr. Diane L. Peters, Kettering University
TUESDAY, JULY 27th SESSIONS

Inclusivity in Engineering Curriculum in the Age of Industry 4.0: The Role of Internet of Things
Dr. Shuvra Das, University of Detroit Mercy
Dr. David Pistrui, University of Detroit Mercy
Dr. Darrell K. Kleinke P.E., University of Detroit Mercy
Dr. Eric T. Gehrig, Target Training International, Ltd.
Dr. Ron Bonnstetter

Industry-University Capstone Design: How Did Students Adapt to the COVID-19 Pandemic?
Ms. Shruti Misra, University of Washington
Dr. Denise Wilson, University of Washington

Exploring a New Mentorship Model: From One-on-One to Flash Mentoring
Dr. Marissa H. Forbes, University of San Diego
Dr. Chell A. Roberts, University of San Diego

T408 - Computers in Education 5 - Online and Distributed Learning 2

Investigation of Technology-based Student Interaction for Social Learning in Online Courses
Dr. Sunay Palsole, Texas A&M University
Mr. Jaskirat Singh Batra, Texas A&M University
Xi Zhao, Texas A&M University

Work in Progress: Remote Instruction of Circuitry in a Multidisciplinary Introduction to Engineering First-year Course
Dr. James E. Lewis, University of Louisville
Dr. Nicholas Hawkins, University of Louisville
Dr. Brian Scott Robinson, University of Louisville

IoT to Enable Remote Collaboration in Robotics Class of Mechanical Engineering Technology
Dr. Zhou Zhang, New York City College of Technology

Ashmum Express: A Mobile-based Study Application for STEM Students
Dr. Tiffanie R. Smith, Lincoln University
Dr. Susan Ellen Safford, Lincoln University
Chidera Iguwe
Mofoluwaso Akinlade

Solar-powered, Digital Classroom-in-Box: A Digital System to Mitigate the Digital Divide of Post-pandemic Education
Mr. Shamsul Arefeen, Texas Tech University
Dr. Tim Dallas P.E., Texas Tech University
Dr. Heather Greenhalgh-Spencer, Texas Tech University

T408B - Computers in Education 6: Best of CoED

Engage AI: Leveraging Video Analytics for Instructor-class Awareness in Virtual Classroom Settings
Mr. Jeremy Stairs, University of Toronto
Mr. Raman Mangla, University of Toronto
Mr. Manik Chaudhery, University of Toronto
Mr. Janpreet Singh Chandhok, University of Toronto
Dr. Hamid S. Timorabadi, University of Toronto

Modeling COVID-19 Disruptions via Network Mapping of the Common Core Mathematics Standards
Ms. Luwen Huang, Massachusetts Institute of Technology
Dr. Kayla M. Bicol
Prof. Karen E. Willcox, University of Texas at Austin

Factors Associated with Collaboration Networks in ASEE Conference Papers
Dr. Sherif Abdelhamid, Virginia Military Institute
Mr. Yousef Jalali, Virginia Polytechnic Institute and State University

ASEE online session locator can be found at www.asee.org/osl.
T410 - The Changing Face of Our Workforce

1:45 P.M. - 3:15 P.M.
Sponsor: Continuing Professional Development Division

Moderator: Keith Plemmons

Engineering educators need to be aware of the changes happening within our workforce. These changes are being driven by existential forces beyond our control. We will examine these changes from a variety of perspectives and discuss the implications for our futures.

T411 - Engineering at Scale: The Role of Experiential Learning at the Modern-day Public Engineering Institution

1:45 P.M. - 3:15 P.M.
Sponsor: Cooperative and Experiential Education Division

Moderators: Katherine McConnell, University of Colorado Boulder; Robin Hammond, Arizona State University

Speaker: Albert Pisano, University of California San Diego

The panel speakers will discuss the role of experiential learning, including co-op and internship programs, and other industry collaboration opportunities created at the public engineering institution, as well as how to leverage the industry connection to successfully create experiential learning opportunities for a large student body at public institutions.

T413A - Design Across Curriculum 1

1:45 P.M. - 3:15 P.M.
Sponsor: Design in Engineering Education Division

Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, Ohio State University

DEED technical session

Assessing the Impact of Transitioning Introductory Design
2021 ASEE VIRTUAL CONFERENCE
TUESDAY, JULY 27th SESSIONS

Instruction to an Online Environment
Mr. Christopher Rennick, University of Waterloo
Dr. Carol Hulls P.Eng., University of Waterloo
Dr. Andrew Gryguc, University of Waterloo

Work in Progress: Inclusion of an Engineering Design Experience in Freshman Introductory Engineering Courses at a Hispanic-serving Institution
Dr. Matthew Lucian Alexander P.E., Texas A&M University - Kingsville
Mr. Rajashekar Reddy Mogiligidda, Texas A&M University - Kingsville
Dr. David Hicks, Texas A&M University - Kingsville

Decades of Alumni: What Can We Learn from Designing a Survey to Examine the Impact of Project-based Courses Across Generations?
Dr. Sheri Sheppard, Stanford University
Dr. Helen L. Chen, Stanford University
Prof. George Toye, Stanford University
Mr. Felix Kempf, King’s College London
Nada Elfiki, Stanford University

Designing for Diversity, Equity, and Inclusion in Systems Engineering Education
Courtney C. Rogers, University of Virginia
Dr. Rupa S. Valdez, University of Virginia

Adding a “Design Thread” to Electrical and Computer Engineering Degree Programs: Motivation, Implementation, and Evaluation
Dr. Alan Cheville, Bucknell University
Dr. Michael S. Thompson, Bucknell University
Matthew Lamparter, Bucknell University
Dr. Stewart Thomas, Bucknell University

Student Skills Growth in a Prototyping and Fabrication Course: Increase in Operation and Technique-based Knowledge as a Result of an Apprenticeship Model
Dr. Matthew Wettergreen, Rice University
Joshua Brandel
Mr. Adulfo Amador

Beyond Making: Application of Constructionist Learning Principles in Engineering Prototyping Centers
Dr. Kate Youmans, Colorado School of Mines
Idalis Villanueva, University of Florida
Dr. Jana Bouwma-Gearhart, Oregon State University
Dr. Louis S. Nadelson, University of Central Arkansas

Student Perceptions of an Iterative or Parallel Prototyping Strategy During a Design Competition
Alexander R. Murphy, Georgia Institute of Technology
Danielle M. Saracino, Georgia Institute of Technology
Dr. Robert L. Nagel, James Madison University
Dr. Julie S. Linsey, Georgia Institute of Technology

The Smart Campus as a Testing Ground for Smart Cities
Dr. Amir Hajrasouliha, California Polytechnic State University, San Luis Obispo
Mr. Joseph P. Cleary, California Polytechnic State University, San Luis Obispo
Dr. Jeong H. Woo, California Polytechnic State University, San Luis Obispo

T413B - Making in Design Education

1:45 P.M. - 3:15 P.M.
Sponsor: Design in Engineering Education Division
Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, Ohio State University

Comparison of Student Learning in Two Makerspace Communities
Danielle M. Saracino, Georgia Institute of Technology

T413C - Design Pedagogy 2

1:45 P.M. - 3:15 P.M.
Sponsor: Design in Engineering Education Division
Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, Ohio State University

Design the Future Activities (DFA): A Pedagogical Content Knowledge Framework in Engineering Design Education
Hadi Ali, Arizona State University, Polytechnic campus
Prof. Andrew David Maynard, Arizona State University

Investigating How Mechanical Engineering Students
Design and Make the Now and the Future
Mr. Jarod White, South Dakota School of Mines and Technology
Dr. Micah Lande, South Dakota School of Mines and Technology

A Context-centered Visual Tool for the Design of Engineering Education Solutions
Ms. Imane Aboutajedyne, Sidi Mohamed Ben Abdellah University, Fez (Morocco)
Dr. Yassine Salih Alj, Al Akhawayn University
Prof. Ahmed Aboutajeddine, Sidi Mohamed Ben Abdellah University, Fez (Morocco).

Discussing the Impact on Student Learning Experiences in a Renovated Technical Drawing (AutoCAD) Course Using an Online Delivery Format
Dr. Sarah Rajkumari Jayasekaran, University of Florida

Augmenting Activities in Engineering Courses with Tools, Technology, and Kits for Remote Experiential Learning
Dr. Sonia Traviglini, Stanford University
Dr. Sheri Sheppard, Stanford University
Dr. Helen L. Chen, Stanford University
Dr. Swetha Nittala, Stanford University

Predicting Interest in Engineering Majors: The Role of Critical Agency and Career Goals
Heather Perkins, Purdue University, West Lafayette
Ms. Brianna Shani Benedict, Purdue University, West Lafayette
Mr. Herman Ronald Clements III, Purdue University, West Lafayette
Dr. Allison Godwin, Purdue University, West Lafayette

Exploring Student Responses to Utility-value Interventions in Engineering Statics
Mr. Lorenzo Laxamana Ruiz, California Polytechnic University, San Luis Obispo
Dominick Trageser, California Polytechnic State University, San Luis Obispo
Dr. Benjamin David Lutz, California Polytechnic State University, San Luis Obispo
Isabella Grace Sorensen

T414 - FIE Planning Committee Meeting
1:45 P.M. - 3:15 P.M.
Sponsor: Educational Research and Methods Division
Moderators: Cynthia Finelli, University of Michigan; P.K. Imbrie, University of Cincinnati

T414B - Motivation, Goal Orientation, Identity, and Career Aspirations
1:45 P.M. - 3:15 P.M.
Sponsor: Educational Research and Methods Division
Moderators: Diana de la Rosa-Pohl, University of Houston; Allison Godwin, Purdue University at West Lafayette

Relationship Between Goal Orientation, Agency, and Motivation in Undergraduate Civil Engineering Students
Mr. Robert M. O’Hara, Clemson University
Dr. Lisa Benson, Clemson University
Dr. Jennifer Harper Ogle, Clemson University

Mrs. Candice W. Bolding, Clemson University

Using Motivational Theory to Implement S-STEM Activities Supporting Student Success
Dr. Tris Utschig, Kennesaw State University
Dr. Valmiki Sooklal, Kennesaw State University
Dr. Margaret L. Lowder, Kennesaw State University
Dr. Chan Ham, Kennesaw State University
Dr. Renee Butler, Kennesaw State University

Characterizing Identity Profiles for Engineering Students Attending Small Colleges and Universities
Ellen Zerbe, Pennsylvania State University
Catherine G.P. Berdanier, Pennsylvania State University
Mr. Kyeonghun Jwa, Pennsylvania State University
T415 - ECE Panel

1:45 P.M. - 3:15 P.M.

Sponsor: Electrical and Computer Engineering Division

Moderators: Huihui Wang, St. Bonaventure University; Nader Rafia, Boise State University

Tony Maciejewski, Colorado State University
Nick Fila, Mani Mina, and Diane Rover, Iowa State University
Tom Martin, Virginia Tech
Tim Wilson, Embry-Riddle Aeronautical University
Alan Cheville and Stu Thompson, Bucknell University
Chris Ferekides, Ismail Uysal, and Gokhan Mumcu, University of South Florida

T415B - Electrical and Computer Engineering Division Technical Session 5

1:45 P.M. - 3:15 P.M.

Sponsor: Electrical and Computer Engineering Division

Moderators: Huihui Wang, St. Bonaventure University; Nader Rafia, Boise State University; Yushan Jiang, ; Caroline Crockett, University of Michigan

It’s All About Engagement: Infusing the Mobile Studio Approach Throughout the Electrical Engineering Curriculum

Dr. Steven S. Holland, Milwaukee School of Engineering
Dr. Jennifer L. Bonniwell, Milwaukee School of Engineering
Dr. Joshua D. Carl, Milwaukee School of Engineering
Dr. Brian E. Faulkner, Milwaukee School of Engineering
Dr. Richard W. Kelnhofer, Milwaukee School of Engineering
Dr. Cory J. Prust, Milwaukee School of Engineering
Dr. Luke Gerard Weber P.E., Milwaukee School of Engineering

Development of a Smart Grid Course in an Electrical Engineering Technology Program

Dr. Murat Kuzlu, Old Dominion University
Dr. Otilia Popescu, Old Dominion University
Dr. Vukica M. Jovanovic, Old Dominion University

Implementation and Design of a Novel Student Developed Modular HTOL/HTRB System Using Thermoelectric Control

Mr. Nathaniel J. O’Neal, Naval Postgraduate School
Matthew A. Porter, Naval Postgraduate School
Cmdr. Christopher Adrian Martino, United States Naval Academy

Applying Complexity Theory and Project-based Learning onto Project Designs of Complex Computing Systems

Victor E. Lugo Vélez, University of Puerto Rico, Mayagüez Campus
Dr. Nayda G. Santiago, University of Puerto Rico, Mayagüez Campus
Jose Fernando Vega-Riveros, University of Puerto Rico, Mayagüez Campus
Dr. Carmen M. Bellido, University of Puerto Rico, Mayagüez Campus

T416 - Energy Conversion and Conservation Division Technical Session 3: Education Track

1:45 P.M. - 3:15 P.M.

Sponsor: Energy Conversion and Conservation Division

Moderators: Matt Aldeman, Illinois State University; Sandip Das, Kennesaw State University

Food to Energy: A K12/University Partnership to Develop a Resource Recovery Program

Dr. Jan DeWaters P.E., Clarkson University
Prof. Stefan J. Grimberg, Clarkson University

Project-based Learning Approach in Teaching Power and Energy Engineering Courses

Dr. Radian G. Belu, Southern University
Dr. Alexandru Belu
Dr. Zhengmao Ye, Southern University

Teaching Power Electronics to Electrical Engineering Undergraduates in an Interactive Two-semester Integrated Sequence

Dr. Herbert L. Hess, University of Idaho

Teaching STEM Early-college Students: A New Methodology to Teach Energy Complex Systems

Dr. Ahmed Cherif Megri, North Carolina Agricultural and Technical State University
Dr. Sameer Hamoush, North Carolina Agricultural and Technical State University
Dr. Taher M. Abu-Lebdeh P.E., North Carolina Agricultural and Technical State University
Teaching Maximum Power Point Tracking (MPPT) Algorithms of Photovoltaic (PV) Systems Using MATLAB
Dr. Lihong Heidi Jiao, Grand Valley State University

T417 - Engineering and Public Policy Division Technical Session 1

1:45 P.M. - 3:15 P.M.
Sponsor: Engineering and Public Policy Division
Moderators: Deanna Matthews, Carnegie Mellon University; Daniel Oerther, Missouri University of Science and Technology

An assortment of papers covering topics such as teaching science diplomacy, copyright during a pandemic, issues for state university faculty, incorporating policy in the classroom, and diffusion of innovation issues.

Workshop Result: Teaching Science Diplomacy to Environmental Engineering Researchers
Dr. Daniel B. Oerther, Missouri University of Science and Technology

Impacts of Governmental Policy Actions on University Faculty and Students in Wisconsin
Dr. John R. Reisel P.E., University of Wisconsin, Milwaukee

Copyright: Infringement, Remedies, and Defenses in a Pandemic Environment
Dr. Salvatore Marsico, Pennsylvania State University, Wilkes-Barre Campus

Incorporating Contemporary Policy Issues in Science and Engineering Curricula
Dr. Amro El Badawy, California Polytechnic State University, San Luis Obispo
Prof. Marie Yeung, California Polytechnic State University, San Luis Obispo
Dr. James L. Hanson, California Polytechnic State University, San Luis Obispo
Dr. Nazli Yesiller, California Polytechnic State University, San Luis Obispo

Research on the Diffusion of Innovation Within Higher Education: Case of Double First-rate Initiative in the Chinese Mainland
Dr. Ming Li, Beijing Foreign Studies University

T418 - Engineering Design Graphics Division Business Meeting

1:45 P.M. - 3:15 P.M.
Sponsor: Engineering Design Graphics Division
Moderator: Holly Ault, Worcester Polytechnic Institute

This is the EDGD business meeting, moderated by the chair, Holly Ault. All who are interested in engineering design graphics are welcome to join our meeting on Tuesday, July 27th.

T420 - Innovative, Engaging Pedagogies for Engineering Ethics Education

1:45 P.M. - 3:15 P.M.
Sponsor: Engineering Ethics Division
Moderators: Andrea Gregg, Pennsylvania State University; Tracy Hammond, Texas A&M University

Let’s Play! Gamifying Engineering Ethics Education Through the Development of Competitive and Collaborative Activities
Prof. Michael F. Young, University of Connecticut
Landon Bassett, University of Connecticut
Dr. Daniel D. Burkey, University of Connecticut
Dr. Scott Streiner, Rowan University
Joshua Bourne Reed

Piloting an Ethics Choose-Your-Own Adventure Activity in Early Engineering Education
Prof. Jennifer Fiegel, University of Iowa
Dr. Beth Rundlett, University of Iowa
Dr. A. Allen Bradley Jr., University of Iowa
Katelyn Rose Murhammer, University of Iowa

Using the Boeing Max Air Disaster as A Roleplay Scenario for Teaching Ethical Thinking
Ashish Hingle, George Mason University
Dr. Aditya Johri, George Mason University
Huzefa Rangwala
Dr. Alexander Monea, George Mason University

Examining Faculty Barriers and Challenges in Adopting Ethical Pedagogies in Online Environments
T421 - Engineering Libraries Division Technical Session 1: Diversity
1:45 P.M. - 3:15 P.M.
Sponsor: Engineering Libraries Division
Moderators: Kari Kozak, University of Iowa; David Hubbard, Texas A&M University; Kate Mercer, University of Waterloo; Chelsea Leachman, Washington State University

Engineering Libraries and Student Organizations: Working Together to Enhance Outreach to Underrepresented Groups
Mr. Paul McMonigle, Pennsylvania State University
Linda M. N. Struble, Pennsylvania State University

Raising Algorithm Bias Awareness Among Computer Science Students Through Library and Computer Science Instruction
Shalini Ramachandran, Boise State University
Dr. Steven Matthew Cutchin, Boise State University
Sheree Fu, California State University, Los Angeles

Raising Awareness of Diversity and Inclusion in One-shot Information Literacy Classes
Dr. Anamika Megwalu, San Jose State University

T425 - Environmental Engineering Division Technical Session 3: Teaching Environmental Engineering in the COVID-19 Era
1:45 P.M. - 3:15 P.M.
Sponsor: Environmental Engineering Division
Moderators: Jean Andino; Veera Gnaneswar Gude, Mississippi State University; Fethiye Ozis, Northern Arizona University; Michelle Marincel Payne, Rose-Hulman Institute of Technology

Student Perceptions and Performance with Online Instruction of Sustainability During COVID-19 Response
Dr. Shannon L. Isovitsch Parks P.E., University of Pittsburgh

Applying Resilience Theory to ‘Bounce Forward’ from COVID-19 for Environmental Engineering Programs
Lt. Col. Andrew Ross Pfluger, United States Military Academy
Dr. Michael A. Butkus, United States Military Academy
Dr. Benjamin Michael Wallen P.E., United States Military Academy
Col. Mark Robert Read, United States Military Academy

Assessing the Effectiveness of a Flex Model for a Sustainability Course in the COVID-19 Learning Environment
Dr. David V.P. Sanchez, University of Pittsburgh
Dr. Tony Lee Kerzmann, University of Pittsburgh
Claire P. Chouinard, University of Pittsburgh
Dr. Gregg P. Kotchey, University of Pittsburgh
T426 - Developing Teamwork, Student Attitudes, and Hardware Solutions for Laboratory Courses: Experimentation and Laboratory-oriented Studies Division

1:45 P.M. - 3:15 P.M.
Sponsor: Experimentation and Laboratory-Oriented Studies Division
Moderators: Jacob Bishop, Southern Utah University; Sally Pardue, Tennessee Technological University

Authors in this session will present on a variety of topics, including the use of daily laboratory activities, development of open-source hardware, and teamwork in hybrid laboratory courses.

Lab Every Day!! Lab Every Day?? *&%#ing Lab Every Day!? Examining Student Attitudes in a Core Engineering Course Using Hands-on Learning Every Day of Class
Dr. Erin A. Henslee, Wake Forest University
Kyle Luthy
William N. Crowe
Lindsey J. Gray, Wake Forest University

Low-cost Open-architecture Experimental Platform for Dynamic Systems and Feedback Control
Mr. Sergio Arturo Esteban, California State Polytechnic University, Pomona
Mr. Hector Damian Lopez Jr, California State Polytechnic University, Pomona
Dr. Nolan Tsuchiya P.E., California State Polytechnic University, Pomona
Mr. Patrick Mannion, California State Polytechnic University, Pomona

Teamwork Development and Evaluation for Hybrid Thermal Fluids Laboratory Course
Dr. Natasha Smith P.E., University of Virginia

Development of an Additive Manufacturing Laboratory Course with the Ability to Accommodate Asynchronous Students
Prof. Jill Johnson P.E., Pennsylvania State University
Mr. Brian Lani, Pennsylvania State University

T427 - First-year Programs: Virtual Instruction in the First Year 1

1:45 P.M. - 3:15 P.M.
Sponsor: First-Year Programs Division
Moderators: Lisa Abrams, Ohio State University; Gloria Ma, Wentworth Institute of Technology; Kaitlin Mallouk, Rowan University; Timothy Hinds, Michigan State University

Transforming a Large-lecture FYE Course Structure into Virtual Collaborative Learning
Dr. Haritha Malladi, University of Delaware
Dr. Amy Trauth, University of Delaware
Prof. Joshua A. Enszer, University of Delaware
Dr. Marcia Gail Headley, University of Delaware
Prof. Jenni Buckley, University of Delaware

Transitioning an In-person Team Engineering Design Project to a Virtual Setting
Dr. Christopher Dalton, University of Oklahoma
Dr. Allison Quiroga P.E., University of Oklahoma
Mr. Bobby Reed, University of Oklahoma Libraries

Transforming the Hands-on Learning Experience in a First-year Engineering Design Class to a Remote-learning Environment
Dr. Huihui Qi, University of California, San Diego
Dr. Carolyn L. Sandoval, University of California, San Diego
Mr. He Liu
Mr. Matthew Robin Kohanfars, University of California, San Diego
Mr. Edward I. Lan, University of California, San Diego
Mr. Cristian H. Tharin
Tania K. Morimoto, University of California, San Diego

T427B - First-year Programs: Focus on Student Success 2

1:45 P.M. - 3:15 P.M.
Sponsor: First-Year Programs Division
Moderators: Ashton Greer, Oregon Institute of Technology; Natalie Van Tyne, Virginia Polytechnic Institute and State University; Kaitlin Mallouk, Rowan University; Timothy Hinds, Michigan State University
**Student Success-focused Engineering College Preparatory Courses**
Randy Hugh Brooks, Texas A&M University

**Engineering and Science Modeling Course: Students Explore Engineering and Sciences**
Prof. Genaro Zavala, Tecnologico de Monterrey; Universidad Andres Bello
Dr. Esmeralda Campos, Tecnologico de Monterrey
Prof. Carlos Eduardo Martinez-Torteya, Tecnologico de Monterrey

**Using the Learning and Study Strategies Inventory (LASSI) to Track Students’ Growth and Evaluate the Effectiveness of a Learning Strategies Course**
Ms. Abigail T. Stephan, Clemson University
Dr. Jon Harcum, Clemson University
Laurel Whisler, Bristol Community College
Dr. Elizabeth Anne Stephan, Clemson University

**Exploring Engineering: Peer-sharing Presentations in First-year Engineering Curriculum**
Dr. Elizabeth Anne Stephan, Clemson University
Ms. Abigail T. Stephan, Clemson University
Baker A. Martin, Clemson University
Matthew K. Miller, Clemson University

**T432 - International Division Technical Session 1**

1:45 P.M. - 3:15 P.M.

**Sponsor: International Division**

**Moderators: Courtney Pfluger, Northeastern University; Phillip Sanger, Purdue University at West Lafayette; Nick Safai, Salt Lake Community College**

**Collaboration Between ESPOL and Villanova University on the Development and Delivery of a Digital Literacy Program for Youth on the Galapagos Islands**
Dr. Pritpal “Pali” Singh, Villanova University

**Learning About Solar Power in South Sudan: An International Collaboration**
Dr. Susan M. Lord, University of San Diego
Mr. Mou Deng Riiny, SunGate Solar

**Lessons Learned Developing and Running a Virtual, Faculty-Led, International Program on Sustainable Energy in Brazil**

**T433 - Pre-College Engineering Education Division Technical Session 10**

1:45 P.M. - 3:15 P.M.

**Sponsor: Pre-College Engineering Education Division**

**Moderators: Stacy Klein-Gardner, Vanderbilt University; Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University**
efusa (Engineering 4 US All)

**Professional Development Program for High School Counselors on the Engineering Design Process (Evaluation)**
Dr. Lydia Ross, Arizona State University
Dr. Medha Dalal, Arizona State University
Dr. Adam R. Carberry, Arizona State University
Jacob Roarty

**Exploring the Validity of the Engineering Design Self-Efficacy Scale for Secondary School Students (Research To Practice)**
Dr. Eunsil Lee, Florida International University
Dr. Adam R. Carberry, Arizona State University
Dr. Medha Dalal, Arizona State University
Matthew J. Miller, Loyola University Chicago

**Enabling Factors and Barriers for Adopting Engineering Curricula in High Schools: School, District, and State Administrator Perspectives (Fundamental)**
Dr. Medha Dalal, Arizona State University
Dr. Adam R. Carberry, Arizona State University

**High School Students’ Perspective of Active Learning in a Remote Classroom (Fundamental)**
Dr. Olushola V. Emiola-Owolabi, Morgan State University
Dr. Medha Dalal, Arizona State University
Dr. Adam R. Carberry, Arizona State University
Dr. Jumoke ‘Kemi’ Ladeji-Osias, Morgan State University
T433B - Pre-College Engineering Education Division Technical Session 11

1:45 P.M. - 3:15 P.M.

Sponsor: Pre-College Engineering Education Division

Moderators: Ahmad Fayed, Southeastern Louisiana University; Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University

Virtual camps/design competitions

Introducing Engineering Principles in a Diverse Interdisciplinary Virtual Summer Camp for Underrepresented 9th - 12th Graders in Rural Louisiana (Evaluation, Diversity)

Dr. Mehmet Emre Bahadir, Southeastern Louisiana University
Dr. Ahmad Fayed, Southeastern Louisiana University
Dr. Deborah Athas Dardis, Southeastern Louisiana University
Dr. Bonnie Achee, Southeastern Louisiana University
Dr. Troy Williams, Southeastern Louisiana University
Dr. Wendy J. Conarro, Southeastern Louisiana University
Tireka Cobb Ph.D., Louisiana Office of Student Financial Assistance
Dr. Mohammad Saadeh, Southeastern Louisiana University

Evaluation on a New Virtual Program Format: How Does an Engineering Summer Program Evolve and Adapt to Meet the Needs of an Increasingly Diverse Student Population During a Pandemic? (Evaluation, Diversity)

Mrs. Maria Manzano, California Polytechnic State University, San Luis Obispo
Emma Della
Gerome Cacho
Mr. Drew Miller
Dr. Dennis Derickson, California Polytechnic State University, San Luis Obispo

Engineering Virtual Design Competition – A Solution for High School Summer Outreach During the Pandemic and Beyond

Ms. J. Jill Rogers, University of Arizona
Dr. Tirupalavanam G. Ganesh, Arizona State University
Jennifer Velez M.Ed., Ira A. Fulton Schools of Engineering, Arizona State University

Analysis of Online Robotics Challenge Submissions

Ms. Sara Willner-Giwerc, Tufts University

T434 - Breaking Out of 'Engineering Nice': Why Engineering Education Must Make Space for Conflict

1:45 P.M. - 3:15 P.M.

Sponsor: Liberal Education/Engineering & Society Division

Moderator: Amy Slaton, Drexel University

Speakers: Prof. Amy Slaton, Drexel University; Dr. Yanna Lambrinidou, Virginia Polytechnic Institute and State University; Dr. Ayush Gupta, Homi Bhabha Center for Science Education, Tata Institute of Fundamental Research; Dr. Donna M. Riley, Purdue University at West Lafayette; Dr. Alice Pawley, Purdue University at West Lafayette; Mr. Michael Lachney, Michigan State University; Mitch Cieminski, Rensselaer Polytechnic Institute; Dr. James Holly, Jr., Wayne State University

This panel takes a critical look at U.S. engineering education's growing commitment to embracing historically marginalized people and perspectives through diversity, inclusion, and public engagement initiatives. Examining discourses, programs, and cases associated with such initiatives, it highlights the tendency of prevailing approaches to democratizing projects to promote an ameliorative stance of collectivity and positivity—what we might call a disposition of "engineering nice"—while prohibiting almost entirely the possibility for constructive conflict. We propose that the disposition to elide conflict—even in the rare cases when such elisions might be genuinely intended to discourage violence—precludes recognition of the possibility that serious harm occurs amid good intentions. It also anticipates a smooth path to democratization, with win-win outcomes for all in the absence of negotiation. In this context, the engagement of modern engineering with conditions of economic inequity, environmental injustice, and political domination can often be masked as discomfort, dissatisfaction, disagreement, and anger that are rendered disruptive to "real" technological research, learning, and progress. Familiar conciliatory sensibilities (such as perfunctory nods to "tolerance," "empathy," and "listening") also impart a possibility of innocence or redemption for engineering disciplines, possibilities that scholars and activists engaged
in decolonializing projects help us question.

Central questions to this panel are: What values and interests are being served by the systemic exclusion of possibilities for open expression of conflict in the face of oppression or violence, both in and beyond engineering institutions from engineering education? Who wins, who loses, and who is empowered to act and react in democratizing projects that fail to provide authentic opportunities for negotiation among actors of differential prestige and power? Are prevailing approaches to diversity, inclusion, and public engagement "thin" if they prohibit conflict between parties who have been traditionally included and excluded from engineering education? Can such approaches function as a new form of "permission" for coloniality that is hidden behind the allure of "engineering nice"? Finally, if spaces for conflict were to be created, what might they look like? What democratic values might they support, and how can engineering educators best challenge the current near-impossibility of constructive confrontations with power in engineering?

The panel's goal is threefold: To elevate the raised/razed voices of marginalized students, faculty, staff, and diverse communities engaged in such pressing global problems as climate change and social injustice while trying to address the ways in which engineering schools and organizations delegitimize or silence them; to support democratizing projects that grant shared authority to the empowered "embracers" and marginalized "embraced"; and, ultimately, to help foster engineering solutions that affected and disenfranchised publics deem effective, sustainable, and just. Ultimately, such a critique can support the case that engineering education ought to make space for conflict as a desirable and even necessary process for ensuring that engineers' "embrace" of historically marginalized ways of being, thinking, and knowing does not in fact erase, coopt, subjugate, or ultimately reproduce the very structural injustices it seeks to redress.

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**T435 - Manufacturing Division Technical Session - Robotics and Manufacturing**

1:45 P.M. - 3:15 P.M.

Sponsor: Manufacturing Division

Moderators: Irina Ciobanescu Husanu, Drexel University; Richard Chiou, Drexel University

- **Design and Evaluation of Collaborative Lab for Robot Programming**
  - Dr. Sheng-Jen "Tony" Hsieh, Texas A&M University

- **Developing and Teaching Modular Robots**
  - Dr. Arif Sirinterlikci, Robert Morris University

- **Lessons Learned from Hosting Workshops on Remote Control of Automated Systems**
  - Dr. Sheng-Jen "Tony" Hsieh, Texas A&M University

- **Multiple Setups Analysis of Industrial Robotic Operation**
  - Dr. Hayder Zghair P.E., Lawrence Technological University

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**T437 - Mathematics Division Technical Session 2**

1:45 P.M. - 3:15 P.M.

Sponsor: Mathematics Division

Moderators: Jeffrey Hieb, University of Louisville; Amitabha Ghosh, Rochester Institute of Technology

- **Analysis of STEM Students’ Ability to Respond to Algebra, Derivative, and Limit Questions for Graphing a Function**
  - Dr. Emre Tokgoz, Quinnipiac University
  - Samantha Eddi Scarpinella, Quinnipiac University
  - Mr. Michael Giannone, Quinnipiac University

- **Impacts of Mentoring on Math and Leadership Self-Efficacy Among Civil Engineering Students**
  - Dr. Mary Katherine Watson, The Citadel
  - Dr. Simon Thomas Ghanat P.E., The Citadel
  - Dr. Tara Hornor, The Citadel
  - Dr. William J. Davis P.E., The Citadel

- **Math in Engineering: Beyond the Equations**
  - Dr. Blair J. McDonald P.E., Western Illinois University
  - Dr. Susan C. Brooks, Western Illinois University - Quad Cities

- **Using Science Concepts in a Mathematics Professional**

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ASEE online session locator can be found at www.asee.org/osl.
Development Program To Improve Students' Standardized Test Scores
Mr. Allen J. Antoine Jr, Rice University Office of STEM Engagement
Dr. Carrie A. Obenland, Rice University
Mr. Roger Ramirez, Rice University
Dr. Christopher Barr, Office of Research, Rice University
Mr. Matthew Cushing, Rice University
Dr. Carolyn Aitken Nichol, Rice University

T438 - Thermal Fluid Experiment Related
1:45 P.M. - 3:15 P.M.
Sponsor: Mechanical Engineering Division
Moderators: Rungun Nathan, Pennsylvania State University, Berks Campus; Thomas DeNucci, United States Coast Guard Academy; Alexander De Rosa, Stevens Institute of Technology

Papers in this session are from the thermal fluid area and have an experiment.

Implementation of a Low-cost, Mobile Instructional Particle Image Velocimetry (mi-PIV) Learning Tool for Increasing Undergraduate and Secondary Learners' Fluid Mechanics Intuition and Interest
Mr. Jack Elliott, Utah State University
Dr. Angela Minichiello P.E., Utah State University
Lori Caldwell, Utah State University

A Thermodynamics Design Project that Applies Theory, Explores Renewable Energy Topics, and Considers the Economic and Social Impacts of the Designs
Prof. Melissa M. Gibbons, University of San Diego

A Low-cost Materials Laboratory Sequence for Remote Instruction that Supports Student Agency
Dr. Matthew J. Ford, Cornell University
Dr. Soheil Fatehboroujeni, Cornell University
Prof. Elizabeth Mills Fisher, Cornell University
Dr. Hadas Ritz, Cornell University

Improving Student Motivation Using a 3D Printed Heat Exchanger Project
Dr. James "Jamie" Canino, Trine University
Dr. Jon Koch, Trine University

Remote Versus In-class Active Learning Exercises for an Undergraduate Course in Fluid Mechanics
Mr. John Michael Cotter, University of South Florida
Prof. Rasim Guldiken, University of South Florida

T439 - Hands-On in the Online Classroom
1:45 P.M. - 3:15 P.M.
Sponsor: Mechanics Division
Moderators: Christopher Papadopoulos, University of Puerto Rico, Mayaguez Campus; Liza Boyle, Humboldt State University; Julian Davis, University of Southern Indiana; Masoud Rais-Rohani, University of Maine

Want to see the creativity of what folks did to get students to still be able to interact with the course material while still in an online setting? Meet us here!

Hands On Learning in a Remote Introduction to Statics Classroom Environment
Prof. Sarah Wodin-Schwartz P.E., Worcester Polytechnic Institute
Dr. Kimberly LeChasseur, Worcester Polytechnic Institute
Ms. Caitlin A Keller, Worcester Polytechnic Institute

WIP: Hands-On Statics in the Online “Classroom”
Eric Davishahl, Whatcom Community College
Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo
Matthew Parsons Fuentes, Everett Community College

Development of a Low-Cost, Compact, and Portable Experimental Kit for Online Engineering Statics Course
Dr. Md Rashedul Hasan Sarker, University of Indianapolis
Dr. Najmus Saqib, University of Indianapolis
Dr. George D. Rico, University of Indianapolis
Dr. Megan Hammond, University of Indianapolis
Mr. Alexander Quinn Ruble, University of Indianapolis
Mr. Bill Faton, University of Indianapolis
Mr. James T. Emery II, University of Indianapolis
Dr. Kenneth Reid, University of Indianapolis

Work in Progress: Hands-on Engineering Dynamics using Physical Models in Laboratory Sessions
Dr. Mohammad Shafinul Haque, Angelo State University
2021 ASEE VIRTUAL CONFERENCE
TUESDAY, JULY 27th SESSIONS

T440 - Minorities in Engineering Division Technical Session 3
1:45 P.M. - 3:15 P.M.
Sponsor: Minorities in Engineering Division
Moderators: Catherine Didion, Liaison International; Kristin Imhoff, Saint Joseph's University; Michel Kornegay, Morgan State University; Tina Fletcher

Pandemic! Influencing Girls' Fear of Failure in a STEM + Computational Thinking Program (Work in Progress)
Dr. Henriette D. Burns, Southern Illinois University Edwardsville

Transitioning to a Virtual Engineering Summer Bridge Program: Planning and Implementation (Experience)
Dr. Allison Quiroga P.E., University of Oklahoma
Dr. Christopher Dalton, University of Oklahoma
Ms. Lisa Morales, University of Oklahoma
Mr. Christopher Jeffries

Understanding Nontraditional Students in Engineering and Computing (Work in Progress)
Dr. Stephen Secules, Florida International University
Dr. Bruk T. Berhane, Florida International University
Dr. Haiying Long, University of Kansas
Ms. Anna Teresa Caringella
Ing. Andrea Pinto

What I Wish My Instructor Knew: Navigating COVID-19 as an Underrepresented Student - Evidence Based Research
Ms. Zaniyah Victoria Sealey, University of Georgia
Dr. Racheida S. Lewis, University of Georgia
Dr. Trina L. Fletcher, Florida International University

T441A - Multidisciplinary Engineering Division Social
1:00 P.M. - 1:45 P.M.
Sponsor: Multidisciplinary Engineering Division
Moderators: Cynthia Barnicki, Milwaukee School of Engineering; AJ Hamlin, Michigan Technological University

Join Multidisciplinary Engineering Division members and other individuals interested in multidisciplinary projects, courses, and programs. Stop by for some conversation, socializing, and sharing of ideas. All are welcome.

T441B - How Do 'Interdisciplinary' and 'General' Engineering Programs Find Their Niche? Exploring Curricular Decisions and Storytelling
1:45 P.M. - 3:15 P.M.
Sponsor: Multidisciplinary Engineering Division
Moderators: Elise Barrella, Wake Forest University; Cynthia Barnicki, Milwaukee School of Engineering; AJ Hamlin, Michigan Technological University
Speakers: Dr. Diana Chen, University of San Diego; Prof. Gordon D. Hoople, University of San Diego; Dr. Alexandra Coso Strong, Florida International University; Alison Wood, Franklin W. Olin College of Engineering

An interactive panel session at ASEE 2019 explored how general, non-discipline-specific, or interdisciplinary engineering programs are educating students to be adaptable in an uncertain future. These programs share a general approach to crossing disciplinary boundaries, but each program goes about it in a different way, serving a different student population. Curricular design decisions for newer programs or redesign for more well-established programs are driven by a wide range of factors—such as students’ self-reported goals, faculty perceptions of transdisciplinary engineering concepts, or local economic needs—rather than a prescribed disciplinary body of knowledge. This proposed panel session will facilitate activities and discussion among panelists and session participants that will explore the following questions:

1. How do programs shape their curricular and cocurricular activities to fill a niche, either regionally or nationally?
   a. What student characteristics lead to different curricular decisions?
   b. For what types of career paths are graduates prepared (or not prepared)?

2. How do niche programs tell their story to attract students and partners?

The session will begin with a brief panel discussion by faculty from different non-discipline-specific programs. Panelists will briefly introduce their programs, student
characteristics, and graduates’ career paths. They will highlight unique curricular or cocurricular features designed in response to (or anticipation of) students’ needs and career interests. Panelists will also compare and contrast their programs. Panelists will then lead a group break-out activity to dig deeper into how features of curricula are purposefully chosen to fill a niche and how the programs tell their stories to those outside of the program. Participants will then reconvene to report out key takeaways.

T442 - Delivering the Best Learning Experience—What Works and What Doesn’t: Reflections and Tips from New and Experienced Educators

1:45 P.M. - 3:15 P.M.

Sponsor: New Engineering Educators Division

Moderators: Derek Breid, Saint Vincent College; Kerry Widder, Milwaukee School of Engineering; Ashish Borgaonkar, New Jersey Institute of Technology; Vimal Viswanathan, San Jose State University

Speakers: Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo; Dr. Kaitlin Mallouk, Rowan University; Dr. Daniel W. Baker P.E., Colorado State University; Dr. Jaskirat Sodhi, New Jersey Institute of Technology; Dr. Kurt M. DeGoede, Elizabethtown College

The target of this panel is to provide some tips and advice to the new educators who enter academia with limited-to-no training on classroom instruction. For most new faculty, it is a trial-and-error process to arrive at an instructional practice that works specifically for them and their institution. Several institutions offer no mentorship in teaching and the new educators are left to experiment with various pedagogies. Oftentimes, they find it very hard to organize their classes in an effective way and to keep students engaged in the course materials. With the abundance of literature on the pros and cons of various educational pedagogies, one might feel overwhelmed. Aligning with the New Engineering Educators (NEE) Division’s vision to support new educators, this panel carries forward the discussions from the NEE panel at the 2020 Annual Conference to the next level. The 2021 version will feature new panelists from a variety of engineering disciplines sharing their experiences and visions on classroom instruction.

This panel is designed as a platform to share the experiences of new educators who have tried various pedagogies. The participants will hear from both new and experienced educators about what works for them and what does not. The participants will also be able to share their experiences. This discussion is not designed to answer all the questions, but instead to provide a good starting point reference for those who are beginning their career in academia. The participants will be able to ask open-ended questions and hear the perspectives of the panelists and the other participants in the room.

Who should attend?

Current or prospective faculty who wish to learn more about the educational practices that worked for their peers.

Format:

The session will be a live panel with 5-6 panelists. There will be 5-minute presentations by the panelists on how they teach their classes and any advice they could share with the audience, followed by an interactive discussion with the audience. The session will be moderated by the organizers.

Organizers: Vimal Viswanathan (San Jose State University) and Ashish Borgaonkar (New Jersey Institute of Technology)

T447 - Student Division Technical Session 7

1:45 P.M. - 3:15 P.M.

Sponsor: Student Division

Moderators: Adriannie Wheeler, Project SYNCERE; Lauren Singelmann, North Dakota State University; Arefeh Mohammadi, Virginia Tech Department of Engineering Education

Overcoming Perfectionism: My Journey with the Binary Mindset

Haleh Barmaki Brotherton, Clemson University

Dr. Marisa K. Orr, Clemson University

“Racing the Sun”: A Narrative Analysis of Engineering Graduate Students’ Journeys Navigating Public-Inspired Science Work
Ms. Taylor Lightner, Virginia Tech
Mr. Siddhartha Roy, Virginia Tech
Dr. Jeremi S. London, Virginia Tech
Dr. Marc Edwards, Virginia Tech

A Review of Personality Type Theory in STEM Education and Implications for First-Year Engineering Teaching Assistants
Andrew H. Phillips, Ohio State University
Dr. Krista M. Kecskemety, Ohio State University

Work in Progress: College Students with ADHD: A Framework for Studying the Role of the College Experience on Academic Success
Laura Jill Carroll, University of Michigan
Dr. Cynthia J. Finelli, University of Michigan

Work in Progress: Review of Working Memory, Spatial Ability, and Spatial Anxiety in Engineering Problem-Solving
Mrs. Catherine Hendricks Belk, Clemson University
Dr. Marisa K. Orr, Clemson University

T448 - Systems Engineering Division Business Meeting
1:45 P.M. - 3:15 P.M.
Sponsor: Systems Engineering Division
Moderators: Bryan Mesmer, University of Alabama in Huntsville; Alejandro Salado, Virginia Polytechnic Institute and State University

This is the business meeting of the Systems Engineering Division.

T449 - Importance of Technological Literacy - Where Do We Go From Here
1:45 P.M. - 3:15 P.M.
Sponsor: Technological and Engineering Literacy/Philosophy of Engineering Division
Moderators: Katherine Goodman, University of Colorado Denver; John Reisel, University of Wisconsin - Milwaukee

Members of the TELPhE Division have been working on a white paper to address the importance of technological literacy. The paper also discusses what should be done to promote technological literacy. Speakers in this session will give an overview of their work and there will be a discussion of the future of the paper.

T450 - The Challenges that Two-year College Students Face when Transferring to a Four-year College for Engineering and Engineering Technology Program
1:45 P.M. - 3:15 P.M.
Sponsor: Two-Year College Division
Moderators: Philip Regalbuto, Trident Technical College; Dimitrios Bolkas, Pennsylvania State University, Wilkes-Barre Campus

The challenges that students from two-year colleges encounter when transferring to an engineering and engineering technology four-year college and the solutions to these challenges.

ENGAGE: Cocurricular Engagement for Transfer Students
Montana Epps, California Polytechnic State University, San Luis Obispo
Jamie Bettencourt, Cuesta Community College
Dr. Daniel Almeida, California Polytechnic State University, San Luis Obispo
Dr. John Y. Oliver, California Polytechnic State University, San Luis Obispo
Dr. Lizabeth L. Thompson, California Polytechnic State University, San Luis Obispo
Dr. Chance Hoellwarth, California Polytechnic State University - San Luis Obispo
Dr. Jane L. Lehr, California Polytechnic State University, San Luis Obispo

Remote Undergraduate Research to Increase Participation and Engagement in Community College Engineering Classes: Bridging the Research Opportunity Gap Between Community College and University Students
Ms. Sophia Isabela Barber, Pasadena City College
Ms. Sophia Isabella Ibargüen, Pasadena City College
Ms. Chloe Sharp, Pasadena City College
Dr. Aaron Reedy, DataClassroom
Dr. Tanya Faltens, Purdue University, Main Campus
Dr. Yu-Chung Chang-Hou, Pasadena City College
Dr. Jared Ashcroft, Pasadena City College
Revolutionizing Transfer: A Novel and Holistic Programmatic Model that Eliminated the Visible and Invisible Barriers to Student Success
Dr. Doris J. Espiritu, Wilbur Wright College
Dr. Ruzica Todorovic, Wilbur Wright College
Dr. Natacha Depaola, Illinois Institute of Technology

T451 - Panel: Discussion of Intersectionality in Engineering Education
1:45 P.M. - 3:15 P.M.
Sponsor: Women in Engineering Division
Moderator: Idalis Villanueva, University of Florida

Intersectionality, defined as the interconnectedness of social categories of identities (such as ethnicity, race, gender, social class, age, national origin), creates experiences for individuals that produce both advantages and disadvantages. It provides a unique look at how interconnections between identities are oppressed by systemic structures designed to benefit majority groups. In the context of engineering education, intersectionality provides a unique lens to discuss how designs and structures in the discipline impede success and persistence of marginalized and minoritized groups. This panel offers discussion on ways that engineering academic environments can promote awareness of unique challenges affecting intersectional students and faculty. This panel will include experts and practitioners in the field of diversity, equity, and inclusion who will provide their personal and professional experiences of intersectionality in engineering education. Breakout sessions will allow participants to reflect upon their understanding of intersectionality and engage in meaningful conversations with panelists. Ideas generated from this activity will be shared with the larger engineering education community to inspire continuing discussions intended to level the playing field for all students and faculty in engineering.

T451B - Women in Engineering Division: Panel on Discussion of Intersectionality in Engineering Education

T452 - Community Engagement Division Technical Session 2
1:45 P.M. - 3:15 P.M.
Sponsor: Community Engagement Division
Moderators: Joan Schuman, Missouri University of Science and Technology; Marybeth Lima, Louisiana State University and A&M College; Greg Rulifson, Colorado School of Mines

"Community engagement" is an umbrella term for service learning in engineering, humanitarian engineering, learning through service, community-based research, civically engaged learners, technology-based social entrepreneurship, and more. Community organizations (either local or from abroad) partner with institutions of engineering education for the mutual benefit of communities and engineering students. Ideally, student teams and citizens work together via reciprocal partnerships on the shared purpose of completing community-identified projects aimed at increasing community assets.

Beyond the Social License to Operate: Training Socially Responsible Engineers to Contend with Corporate Frameworks for Community Engagement
Dr. Greg Rulifson P.E., USAID
Dr. Jessica Mary Smith, Colorado School of Mines

Insights Gathered from the National Survey of Student Engagement (NSSE) About Engineering/Computer Science Participation in High-impact Educational Practices at Two Western Land-grant Institutions
Mr. Ebenezer Rotimi Ewumi, Washington State University
Dr. Olusola Adesope, Washington State University
Dr. Candis S. Claiborn, Washington State University
Dr. Angela Miniciello P.E., Utah State University

Engagement in Practice: Accessing Engineering Stakeholder Perceptions at HBCUs During COVID-19 by Leveraging University Leaders and Partners
Miss Brittany Nicole Boyd, Morgan State University
Dr. Jay Phillip Jefferson, Florida International University
Dr. Trina L. Fletcher, Florida International University
Dr. Lesia L. Crumpton-Young, Morgan State University
Ashton Stepter

**Community Designers: A Pilot Virtual Community Codesign Symposium**

Ing. Pamela Cristina Silva Diaz, PamLab Design and Engineering
Ms. Maggie Favretti, Design Ed 4 Resilience
Nathalia Ospina Uribe
Dr. Christopher Papadopoulos, University of Puerto Rico, Mayaguez
Marcel Castro-Sitiriche, University of Puerto Rico, Mayaguez
Prof. Luisa Rosario Seijo-Maldonado
Nathalia Ospina Uribe
Dr. Christopher Papadopoulos, University of Puerto Rico, Mayaguez
Marcel Castro-Sitiriche, University of Puerto Rico, Mayaguez
Prof. Luisa Rosario Seijo-Maldonado
Marian Irizarry, University of Puerto Rico, Mayaguez
Javier Moscoso
Miss Gabriela Alexandra Otero-Andino
Mr. Kevin O’Neil Crespo Pagan
Ms. Laura Sofia Garcia Canto
Grace Amato, Connecticut College
Fernando Antonio Cuevas, University of Puerto Rico
Ms. Dulce M. del Río-Pineda, Mujeres de Islas Inc.
Mr. Reiner F. Simhauser-Arroyo, University of Puerto Rico, Mayaguez
Mrs. Darixa Roman

**Effectiveness of a Software-based Service-learning Project in First-year Seminar Course for Engineering Freshmen During the COVID-19 Pandemic**

Dr. Wookwon Lee P.E., Gannon University
Dr. Pezhman Hassanpour P.E., Gannon University
Dr. Saeed Tiari, Gannon University

**T455 - Innovative and Impactful Engineering Leadership Pedagogy**

1:45 P.M. - 3:15 P.M.

**Sponsor:** Engineering Leadership Development Division

**Moderators:** Cindy Rottmann, University of Toronto; Meagan Kendall, University of Texas at El Paso; David Nino, Massachusetts Institute of Technology

**Students’ Teamwork Assessment based on Reflection, Peer Evaluations, and Psychological Safety**

Dr. Seema C. Shah-Fairbank, California State Polytechnic University, Pomona
Dr. Jeeyoung Woo P.E., California State Polytechnic University, Pomona

**Inclusive Leadership Development for Engineering Undergraduate Students**

Dr. Meg Handley, Pennsylvania State University
Ms. Mihee Park, Pennsylvania State University
Dr. Ashley N. Patterson, Pennsylvania State University
Dr. John Jongho Park, Pennsylvania State University

**How Do Human Interaction Labs Contribute to Engineering Leadership Development Growth?**

Mr. Brett Tallman P.E., Montana State University, Bozeman
Mr. Werner Zorman, Harvey Mudd College

**Pilot Study: Impact of Coaching in Leadership Development for Engineering Undergraduate Students**

Mr. Seth C. Sullivan, Texas A&M University
Ms. Maria Polyzoi, Texas A&M University

**Unanticipated Outcomes: Social and Academic Benefits for STEM Peer Mentors**

Adrienne Steele, Louisiana State University and A&M College
Dr. Warren N. Waggenspack Jr., Louisiana State University and A&M College
Dr. Joseph Learned Odenwald

**Embracing Diversity, Equity, and Inclusion in Our Classroom and Teaching**

Dr. Jena Shafai Asgarpoor, University of Nebraska, Lincoln
Dr. Meg Handley, Pennsylvania State University
Dr. Alisha L. Sarang-Sieminski, Franklin W. Olin College of Engineering
Dr. John Brooks Slaughter P.E., University of Southern California
Dr. Meagan C. Pollock, Engineer Inclusion
Dr. Homero Murzi, Virginia Polytechnic Institute and State University
Dr. Monica Farmer Cox, Ohio State University

**T457 - Faculty Development Division Business Meeting**

1:45 P.M. - 3:15 P.M.

**Sponsor:** Faculty Development Division

**Moderator:** Karen High, Clemson University
This is the awesome and exciting business meeting of the Faculty Development Division. Everyone is welcome!

T459 - Equity, Culture, and Social Justice in Education Business Meeting
1:45 P.M. - 3:15 P.M.
Sponsor: Equity, Culture & Social Justice in Education Division
Moderator: James Holly, Jr., Wayne State University
Open to members and interested nonmembers. Our plan is to present/repeat some of the vision that has led to the creation of the division, revisit disambiguation and collaboration with other division missions, and do some collective brainstorming on what we want to see going forward from the division.

T467 - Best Zone Papers
1:15 P.M. - 2:45 P.M.
Sponsor: Council of Sections
Moderator: Brian Self, California Polytechnic State University, San Luis Obispo
Presentation of the outstanding 2020 section Annual Conference papers as selected by each of the four ASEE Zones. One paper will be selected as the 2020 best overall section conference paper winner.

T468 - EDC Public Policy Committee Meeting
1:45 P.M. - 3:15 P.M.
Sponsor: Engineering Deans Council
Moderators: Virona Mehta, American Society for Engineering Education; Nathan Kahl, American Society for Engineering Education
Meeting of the Engineering Deans Council (EDC) Public Policy Committee members.

T477 - Diversity, Equity, and Inclusion: 200
1:45 P.M. - 3:15 P.M.
Sponsor: ASEE Committee on Diversity, Equity & Inclusion
Moderators: Teresa Larkin, American University; Lynn Albers, Hofstra University
Speakers: Kayla R. Maxey, Purdue University at West Lafayette; Ms. Brianna Shani Benedict, Purdue University at West Lafayette; Dr. Meagan C. Pollock, Engineer Inclusion; Dr. Linda Vanasupa, Franklin W. Olin College of Engineering
Diversity, equity, and inclusion starts with us, but individual awareness and action are not enough. In order to transform our institutions and organizations to be more diverse, equitable, and inclusive, we must understand the larger systems we construct, operate within, and sustain. In this session, we will introduce a systems-thinking framework through case-study analysis to assist us in identifying organizational successes and opportunities for improvement as we become catalysts for institutional change. We aim to raise the collective awareness of institutional biases to promote shared accountability to create equitable engineering education communities at every organizational level.

T478 - The Racial Pandemic: Engineering-Specific Problems and Solutions
1:45 P.M. - 3:15 P.M.
Sponsors: Undergraduate Experience Committee; ASEE Committee on Diversity, Equity & Inclusion
Moderators: Cynthia Paschal, Vanderbilt University; Ronald Welch, The Citadel; Jerome Lavelle, North Carolina State University at Raleigh
Speakers: Dr. Robin Coger, North Carolina Agricultural and Technical State University; Dr. Christine S. Grant, North Carolina State University at Raleigh; Myron Anderson
The racial pandemic involves every area of life in the U.S.; indeed racism in various manifestations is a global problem. Engineering is particularly susceptible for three main reasons: (1) Historically, engineering is not a diverse discipline and continues to draw the majority of its students, educators, and practitioners from narrow demographics; (2) the scientific objectivity inherent in engineering contributes to overly strong buy-in to the myth of meritocracy [a,b] and the denial of implicit bias; and (3)
in the U.S. in particular, 29 percent of full-time faculty in science and engineering are not from the U.S. [c] and thus are not necessarily very aware of U.S. racial history and dynamics. In this context, engineering educators committed to supporting BIPOC students are invited to this panel discussion to discuss engineering-specific problems and solutions.

The panel will start with these three framing questions:

1. What specific actions help “wake” engineering faculty to the reality of the racial pandemic and its effects on our students and colleagues?

2. What are effective actions to support BIPOC students in engineering, especially in this time?

3. How do we leverage partnerships with employers, professional organizations, and other identity groups on our campuses (e.g., SWE) to help address the racial pandemic as it affects our engineering communities?


T499 - Infusing Environmental Sustainability Across Engineering Education: Launching and Integrating a Codeveloped Definition and Framework for Engineering for One Planet

1:45 P.M. - 3:15 P.M.

Sponsor: Sponsored Sessions

Moderator: Cindy Cooper, The Lemelson Foundation

Speakers: Cindy Cooper, The Lemelson Foundation; Dr. Natasha Andrade, University of Maryland College Park; Dr. Adam R. Carberry, Arizona State University; Darshan Karwat, Arizona State University; Dr. Jennifer Parham-Mocello, Oregon State University; Dr. Andrea L. Welker P.E., Villanova University; Thomas O’Neal, University of Central Florida; Cindy Cooper, Lemelson Foundation

The impacts of engineering are all around us. Nearly all human-made aspects of our physical and virtual worlds have been developed, created, or grown to scale through the work of engineers. From building “smart cities” to developing medical devices, engineers create solutions that bring vibrancy to our lives and solutions that save lives. Engineers effect change at enormous scale and with significant consequences across every range of the human experience.

Recently, engineers have focused on addressing environmental issues that threaten the livability of our planet, including climate disasters, inhospitable air, plastics in the food chain, and species extinction. Engineering education is preparing engineers to address such problems better than ever. And yet creating solutions to environmental problems or any other kind of challenge is only part of the equation. To ensure the solutions of today do not become the problems of tomorrow, engineers must also operate within the constraints of our planet and avoid potential negative consequences of well-intended solutions.

Increasingly, engineering academics, professional associations, employers, and students are urging change in engineering education to ensure all engineers are equipped with skills, knowledge, and competencies to work with the planet in mind. Courses and programs in engineering ethics and sustainability are more commonplace than ever, as are jobs that require knowledge and skills in environmental
sustainability. In the U.S., ABET-accredited engineering programs are required to ensure students have “an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.” The National Academy of Engineering (NAE) has issued several reports about the need to infuse topics such as ethics, climate change, and environmental impact in modern engineering education. Professional engineering associations are equally concerned about ensuring engineering education prepares graduates for the technical, social, and environmental demands today and in the near future. In collaboration with industry, the Global Engineering Deans Council has underscored the importance of social and environmental consciousness in engineering education.

But engineering graduates are not ubiquitously equipped with fundamental skills in environmental sustainability. There is a need to define the key learning outcomes students need to acquire to be environmentally conscious in their chosen profession, and there is a need for greater support for faculty through pragmatic tools, training, and pedagogy that help foster curricular change.

There is a growing global movement to accelerate changes in engineering education that would meaningfully deepen the environmental acumen of all engineers, across all engineering disciplines. Over the past few years, The Lemelson Foundation and VentureWell, in collaboration with hundreds of engineering stakeholders—including academics, industry professionals, industry associations, policymakers, and foundations—have sought to help address curricular gaps by codeveloping a definition and framework for Engineering for One Planet (EOP) and supporting curricular changes in higher education institutions. In 2020, The Lemelson Foundation awarded grants to five higher education institutions to pilot changes to their curricula drawing from the Engineering for One Planet Framework (EOP Framework). Their experiences and the tools and resources they create will be shared to facilitate adoption by administrators and educators at other institutions.

Presented by The Lemelson Foundation and principal investigators from Engineering for One Planet grantee institutions—Arizona State University, Oregon State University, University of Central Florida, University of Maryland, and Villanova University—this interactive poster session and subsequent panel will share the approach and results of developing the Engineering for One Planet Framework through an open collaboration process and the challenges faced and progress being made to infuse environmental sustainability more broadly into engineering curricula through diverse approaches. The panel will also discuss the value of participating in a community of practice and using institutional change tools, such as landscape analyses and strategic action planning, for advancing curricular change efforts.

**T503 - Biological and Agricultural Engineering Division Technical Session 2**

**3:30 P.M. - 5:00 P.M.**

**Sponsor:** Biological and Agricultural Engineering Division

**Moderators:** Heidi Diefes-Dux, University of Nebraska - Lincoln; Janie Moore, Texas A&M University

Papers are topics of interest to BAE

**Systems Thinking Tools in a Graduate Biological Engineering Class—A Work In Progress**

Dr. John J. Classen, North Carolina State University at Raleigh

Ms. Alison V. Deviney, Biological and Agricultural Department, North Carolina State University

**Using Broad Spectrum Technological Projects to Introduce Diverse Student Populations to Biological & Agricultural Engineering**

Dr. Carol S. Stwalley, Purdue University at West Lafayette

Dr. Robert Merton Stwalley III P.E., Purdue University at West Lafayette

Ms. Virginia Lynn Booth-Womack, Purdue University at West Lafayette

Ms. Grace Lynn Baldwin

Sarah LaRose, Purdue University
T505 - Promoting Mental Health and Wellness in Undergraduate Engineers

3:30 P.M. - 5:00 P.M.
Sponsor: Chemical Engineering Division
Moderators: VJ Tocco, University of Florida; Ashlee Ford Versypt, University at Buffalo, the State University of New York; Sarah Wilson, University of Kentucky
Speaker: Dr. Sarah A Wilson, University of Kentucky

T506 - Project-based and Experiential Learning in Civil Engineering

3:30 P.M. - 5:00 P.M.
Sponsor: Civil Engineering Division
Moderators: Brad Wambeke, United States Military Academy; Anthony Battistini, Angelo State University; Matthew Lovell, Rose-Hulman Institute of Technology; Steven Burian, University of Utah

The authors in this session review several classroom interventions using project-based or experiential learning activities.

Design and Implementation of Experiential Learning Modules for Geotechnical Engineering
Dr. Kyle Kershaw P.E., Rose-Hulman Institute of Technology
Prof. Ronaldo Luna, Saint Louis University
Dr. J. Chris Carroll, Saint Louis University
Dr. Matthew D. Lovell P.E., Rose-Hulman Institute of Technology
Alec Colin Derks, Saint Louis University

Design and Implementation of Experiential Learning Modules for Reinforced Concrete
Dr. Matthew D. Lovell P.E., Rose-Hulman Institute of Technology
Dr. J. Chris Carroll, Saint Louis University
Dr. Kyle Kershaw P.E., Rose-Hulman Institute of Technology
Alec C. Derks, Saint Louis University

Large-scale Timber Shear Wall Experimentation in an Undergraduate Design Course
Mr. Taylor Christian Cardinale, California Polytechnic State University, San Luis Obispo
Michael James Deigert P.E., California Polytechnic State University, San Luis Obispo
Dr. Anahid Behrouzi, California Polytechnic State University, San Luis Obispo
Prof. John W. Lawson, California Polytechnic State University, San Luis Obispo

Project-based Learning in a Persistent COVID-19 Environment
Cade Fleaher
Mr. Dechathon Suwanakeree, United States Military Academy
Mr. Scott Amos Collins
Geoff Kirk
Mr. Antonio La Torre
Lt. Peyton James Pisacane
Lt. Col. Kevin P. Arnett P.E., United States Military Academy
Lt. Col. Brad C. McCoy, United States Military Academy
Col. Aaron T. Hill Jr., United States Military Academy

Seeing Structures: Interactive CAD Models in Mechanics of Materials
Prof. Susan M. Reynolds, Colorado School of Mines

T507 - College Industry Partnerships Division Technical Session 2

3:30 P.M. - 5:00 P.M.
Sponsor: College Industry Partnerships Division
Moderators: Charles Baukal, John Zink Co. LLC; Magdalini Lagoudas, Texas A&M University; Soma Chakrabarti, ANSYS, Inc.

The Transfer of Learning Between School and Work: A New Stance in the Debate About Engineering Graduates’ Preparedness for Career Success Abstract
Mr. Logan Andrew Perry, Virginia Polytechnic Institute and State University
Dr. Jeremi S. London, Virginia Polytechnic Institute and State University

Facilitating Advanced Manufacturing Technicians’ Readiness in the Rural Economy: A Competency-based Deductive Approach
Dr. Faye R. Jones, Florida State University
Dr. Marcia A. Mardis, Florida A&M University - Florida State University
Ms. Priyanka Prajapati, LPL Financial
Pallavi Ramakanth Kowligi, Florida State University
To Infinity and Beyond: Boosting URM Students’ Career Trajectories Through Professional Experiences
Dr. Fethiye Ozis P.E., Northern Arizona University
Dr. Kyle Nathan Winfree, Northern Arizona University
Ms. Elizabeth Glass, Northern Arizona University

T508 - Computers in Education 7 - Modulus 2
3:30 P.M. - 5:00 P.M.
Sponsor: Computers in Education Division
Moderators: Sunay Palsole, Texas A&M University; Steven Barrett, University of Wyoming; Afrin Naz, West Virginia University Institute of Technology

In computing, the modulus operator stands for remainder. This session will highlight some of the papers that simply did not fit into the themes of the other technical sessions.

Computational Thinking: A Pedagogical Approach Developed to Prepare Students for the Era of Artificial Intelligence
Dr. Gulustan Dogan, University of North Carolina Wilmington
Dr. Yang Song, University of North Carolina Wilmington
Ms. Damla Surek, Yildiz Technical University

Joseph Maloba Makokha, Stanford University

Work in Progress: STEM Students’ Experiences with Educational Technology Tools
Mr. Ahmed Ashraf Butt, Purdue University at West Lafayette
Dr. Saira Anwar, University of Florida
Dr. Muhsin Menekse, Purdue University at West Lafayette

Research-practitioner Partnerships Supported by the Computer Science for All Program: A Systematic Evaluation
Rahman Adekunle
Mr. John Kofi Eshirow Jr., University of Virginia
Mr. Jacob Lam Herring, University of Virginia
Sin Lin, University of Virginia
Dr. Rider W. Foley, University of Virginia

Teaching in a COVID-19 Disrupted Semester
Dr. Anu Aggarwal, University of Illinois Urbana Champaign

T508B - Computers in Education 8 - Video Technology
3:30 P.M. - 5:00 P.M.
Sponsor: Computers in Education Division
Moderators: Joshua Nwokeji, Gannon University; Steven Barrett, University of Wyoming; Afrin Naz, West Virginia University Institute of Technology

This session will focus on video technology innovations to enhance education.

A Pilot Study Investigating STEM Learners’ Ability to Decipher AI-generated Video
Mr. Dule Shu, Carnegie Mellon University
Dr. Christopher Doss, RAND Corporation
Dr. Jared Mondschein, RAND Corporation
Denise Kopecky, Challenger Center
Ms. Valerie A. Fitton-Kane, Challenger Center
Dr. Lance Bush, Challenger Center
Dr. Conrad Tucker, Carnegie Mellon University

Using Visualizations of Students’ Coding Processes to Detect Patterns Related to Computational Thinking
Dr. Markus Iseli, University of California, Los Angeles
Ms. Tianying Feng, University of California, Los Angeles
Dr. Gregory Chung, University of California, Los Angeles
Ziyue Ruan
Mr. Joe Shochet, codeSpark
Dr. Amy Strachman, codeSpark

Assessing the Effectiveness of Individual Reflections on Video Feedback
Dr. Walter W. Schilling Jr., Milwaukee School of Engineering

T509 - Lessons Learned From the Pandemic: Looking Forward and Looking Back
3:30 P.M. - 5:00 P.M.
Sponsors: Construction Engineering Division; Engineering Design Graphics Division
Moderators: John Tingerthal, Northern Arizona University; Kimberly Talley, Texas State University; Rachel Mosier, Oklahoma State University; Norman Philipp, Pittsburg State University
This roundtable builds on our conversation from last year. If you participated, please plan on joining us again. The turn-out was fantastic and interdisciplinary. We hope to have a similar conversation this year.

T513A - Design Teams 1
3:30 P.M. - 5:00 P.M.
Sponsor: Design in Engineering Education Division
Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, Ohio State University

DEED technical session
A Cross-disciplinary Investigation of Project Team Functioning
Prof. Margaret Garnett Smallwood, University of Texas at Dallas
Dr. Robert Hart P.E., University of Texas at Dallas
Dr. Todd W. Polk, University of Texas at Dallas

Design and Validation of a System to Assign Students to Projects Based on Student Preferences
Mr. Siqing Wei, Purdue University, West Lafayette
Mr. Amarto Pramanik, Purdue University, West Lafayette
Dr. Matthew W. Ohland, Purdue University, West Lafayette
Dr. Daniel M. Ferguson, Purdue University, West Lafayette

Work in Progress: Qualitative Differences in Learning Processes and Skill Development Across Engineering Capstone Teams
Caroline Clay, Arizona State University
Johannah Daschil
Dr. Melissa Wood Aleman, James Madison University
Dr. Julie S. Linsey, Georgia Institute of Technology
Dr. Robert L. Nagel, James Madison University

Work in Progress: Exploring the Nature of Students’ Collaborative Interactions in a Hands-on, Ill-structured Engineering Design Task
Miss Taylor Tucker, University of Illinois at Urbana Champaign

Evaluating Peer-led Feedback in Asynchronous Design Critiques: A Question-centered Approach
Dr. Ada Hurst, University of Waterloo
Ms. Christine Duong, University of Waterloo
Ms. Meagan Flus, University of Waterloo
Mr. Gregory Litster, University of Waterloo
Mr. Jordan Nickel, University of Waterloo

Mr. Aaron Dai, University of Waterloo

T513B - Capstone Design
3:30 P.M. - 5:00 P.M.
Sponsor: Design in Engineering Education Division
Moderator: Beshoy Morkos, University of Georgia

DEED technical session
Work in Progress: Transformational Change in a Masters-level Integrated Capstone Design Course that Partners Industry and Academia
Dr. Andrew L. Gillen, University College London
Dr. Michael L. Woodrow, University College London
Prof. Jose Luis Torero, University College London

The Benefits of Internal Design Reviews in an Engineering Capstone Course
Ms. Jamie Gravell, University of Texas at Dallas
Dr. Robert Hart P.E., University of Texas at Dallas
Dr. Todd W. Polk, University of Texas at Dallas

Making it Work in the Virtual Capstone Climate and Beyond: Project-based Perspectives Across a Variety of Programs and Universities
Dr. Shraddha Joshi, James Madison University
Mr. Bob Rhoads, Ohio State University
Dr. Kris Jaeger-Helton, Northeastern University
Dr. Sindia M. Rivera-Jiménez, University of Florida

Mechanical Engineering Students’ Perceptions of Design Skills Throughout a Senior Design Course Sequence
Valerie Vanessa Bracho Perez, Florida International University
Anilegna Nuñez Abreu, Florida International University
Mr. Ameen Anwar Khan, Florida International University
Luis Enrique Guardia, Florida International University
Indhira Maria Hasbún, Florida International University
Dr. Alexandra Coso Strong, Florida International University

Students Teaching Students: An Approach to Improving Capstone Design Performance While Enhancing Learning for All
Dr. Kimberly B. Demoret P.E., Florida Institute of Technology
T513C - Empathy and Human-centered Design 2

3:30 P.M. - 5:00 P.M.

Sponsor: Design in Engineering Education Division

Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, Ohio State University

DEED technical session

Assessing Ways of Experiencing Human-centered Design via Student Reflections
Ms. Elizabeth A. Sanders, Purdue University, West Lafayette
Dr. Molly H. Goldstein, University of Illinois at Urbana Champaign
Dr. Justin L. Hess, Purdue University, West Lafayette

Opportunity in Design: Extending and Enriching the Purpose of Engineering Education
Dr. Cole Hatfield Joslyn, University of Texas at El Paso

Pilot Study: Impact of Social Consciousness on Engineering Design Decision Making
Prof. Aaron Carpenter, Wentworth Institute of Technology
Dr. Juval V. Racelis, Wentworth Institute of Technology
Alexander Cabal, Wentworth Institute of Technology
Prof. Beth Anne Cooke-Cornell, Wentworth Institute of Technology
Dr. Gloria Guohua Ma, Wentworth Institute of Technology
James R. McCusker, Wentworth Institute of Technology
Prof. Lynette Panarelli, Wentworth Institute of Technology

Contextual Social Awareness in Design: Engineering Education as a Catalyst for Change
Mrs. Greses Pérez, Stanford University
Dr. Sheri Sheppard, Stanford University
Dr. Swetha Nittala, Stanford University
Dr. Carol B. Muller, Stanford University

Culturally Responsive Engineering Education: Creativity Through “Empowered to Change” in the U.S. and “Admonished to Preserve” in Japan
Miss Xiao Ge, Stanford University
Prof. Daigo Misaki, Kogakuin University
Dr. Nanami Furue, Tokyo University of Science
Chunchen Xu

T514 - Student Engagement, Socioemotional Needs, and Social Support During Pandemic

3:30 P.M. - 5:00 P.M.

Sponsor: Educational Research and Methods Division

Moderators: Nadia Kellam, Arizona State University; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Work in Progress: Investigation of the Psychological and Demographic Characteristics that Impact Performance in Online Modules and Courses
Dr. Sarah E. Zappe, Pennsylvania State University
Dr. Stephanie Cutler, Pennsylvania State University
Dr. Sam Spiegel, Colorado School of Mines
Deb Jordan, Colorado School of Mines
Dr. Ariana C. Vasquez, Colorado School of Mines

Work in Progress: A Cross-sectional Survey Study for Understanding and Addressing the Needs of Engineering Students During COVID-19
Dr. Isabel Hilliger, Pontificia Universidad Católica de Chile
Miss Constanza Melian, Pontificia Universidad Católica de Chile
Miss Javiera Francisca Meza, Pontificia Universidad Católica de Chile
Mr. Gonzalo Cortés, Pontificia Universidad Católica de Chile
Jorge A. Baier, Pontificia Universidad Católica de Chile

Work in Progress: Gender Group Assessment of Metacognitive Thinking and Problem-solving Ability in a Remote Active Learning Environment During COVID-19
Dr. Bahar Memarian, University of Toronto
Prof. Micah Stickel P.Eng., University of Toronto
Mr. Santiago Zuluaga, University of Toronto

Comparing Wellbeing Indicators, Perception of Stress, Competition, and Achievement Between Undergraduate Engineering, Other STEM, and Non-STEM Majors
Matilde Luz Sanchez-Pena, University at Buffalo
Chloe Otis, Purdue University, West Lafayette

Exploring Self-directed Learning Among Engineering Undergraduates in the Extensive Online Instruction Environment During the COVID-19 Pandemic
Dr. Qin Liu, University of Toronto
Ms. Juliette Sweeney, University of Toronto
2021 ASEE Virtual Conference
TUESDAY, JULY 27th SESSIONS

Dr. Greg Evans, University of Toronto
Exploring the Effects of a Targeted Program on Student Social Capital
Dr. Anastasia Marie Rynearson, Campbell University
Jacqueline Gartner, Campbell University
Dr. Michele Miller, Campbell University

T514B - Efforts to Understand and Support Students' Socioemotional Factors
3:30 P.M. - 5:00 P.M.
Sponsor: Educational Research and Methods Division
Moderators: James Huff, Harding University; Kerrie Douglas, Purdue University at West Lafayette

Work in Progress: Challenges and Mitigation Strategies in STEM Courses: Students' Perspectives
Dr. Saira Anwar, University of Florida
Mr. Ahmed Ashraf Butt, Purdue University, West Lafayette
Dr. Muhsin Menekse, Purdue University, West Lafayette

Work in Progress: The Effects of Hands-on Learning on STEM Students' Motivation and Self-efficacy: A Meta-Analysis
Olufunso Oje, Washington State University
Dr. Olusola Adesope, Washington State University
Mr. Adurangba Victor Oje, University of Georgia

Work in Progress: Longitudinal Study of Identity-based Motivation of Students Participating in Chemical Engineering Research Center Programs
Dr. Joana Marques Melo, Purdue University, West Lafayette
Dr. Allison Godwin, Purdue University, West Lafayette

Work in Progress: Measuring Stigma of Mental Health Conditions and Its Impact in Help-seeking Behaviors Among Engineering Students
Matilde Luz Sanchez-Pena, University at Buffalo
Nichole Ramirez, Purdue University, West Lafayette
Xinrui (Rose) Xu, Purdue University, West Lafayette
Dr. Douglas B. Samuel, Purdue University, West Lafayette

A Student-centered Program to Increase STEM Interest Through NASA-STEM Content
Dr. Madasamy Arockiasamy, Florida Atlantic University
Prof. Sudhagar Nagarajan, Florida Atlantic University

Dr. Hassan Mahfuz, Florida Atlantic University
Dr. Michael R. Maniaci, Florida Atlantic University
Ms. Ishwarya Srikanth, Florida Atlantic University
Mr. Stephen Michael Castillo
Mr. Reinaldo L. Dos Santos, Florida Atlantic University

Work in Progress: Effects of Out-of-School STEM Activities on Sixth Grade Students: A Systematic Literature Review
Ms. Nicole Svetlov, Texas A&M University
Mr. Aamir Fidai, Texas A&M University
Ms. Christine M. McCall, Texas A&M University

T515 - Electrical and Computer Engineering Division Technical Session 6
3:30 P.M. - 5:00 P.M.
Sponsor: Electrical and Computer Engineering Division
Moderators: Huihui Wang, St. Bonaventure University; Nader Rafla, Boise State University; Herbert Hess, University of Idaho

Student-designed Assessments in Electrical and Computer Engineering: From Student Perceptions to Their Mastery of Materials
Dr. Saharnaz Baghdadchi, University of California, San Diego
Dr. Leah Klement, University of California, San Diego
Ms. Rachel Bristol, University of California, San Diego
Mr. Paul Andreas Hadjipieris, University of California, San Diego

Impact of Instant Feedback on Student Performance in a 300-level Class
Prof. Jonathon Kenneth Schuh, University of Illinois at Urbana Champaign

Measuring Changes in Professional Skills in a Systems Exploration, Engineering, and Design Laboratory (SEED Lab)
Dr. Vibhuti Dave, Colorado School of Mines
Dr. Stephanie Claussen, San Francisco State University
Dr. Tyrone Vincent, Colorado School of Mines
Dr. Megan Sanders, Colorado School of Mines

Work in Progress: Investigating the Role of Entrepreneurial-minded Learning (EML) in Enhancing Student Learning for a Freshman Engineering Course
Dr. Chandana P. Tamma, Marquette University
Prof. Matthew Curran, Marquette University

ASEE online session locator can be found at www.asee.org/osl.
T519 - Engineering Economy
Course Strategy Panel Session
3:30 P.M. - 5:00 P.M.
Sponsor: Engineering Economy Division
Moderator: James Burns, Western Michigan University

From large lecture halls to online courses to smaller traditional classrooms, Engineering Economy (EE) is taught in a wide variety of ways. This panel discussion will draw insights from submitted papers, authors, and attendees to uncover what really works in EE education. The panel discussion will cover considerations for various instructional environments (department, student audience, school size, etc.); delivery methods (lecture, hybrid, online, etc.); approach to instruction and technology (spreadsheets, case studies, tables/equations/calculators, etc.); topical coverage; and assessment methods. This session is perfect for new educators, those just beginning to teach EE, anyone considering redesigning or updating their course, experienced educators who have their course strategy down to a science, or any instructor looking for insight into teaching EE in light of the changes brought on by the COVID-19 pandemic.

Course Strategy: A Little Bit of Everything is Probably Too Much
Dr. Karen M. Bursic, University of Pittsburgh

Course Strategy: Coupling Industry-centered Analyses and Engineering Design Principles to Develop Skills Relevant to Students’ Careers
Dr. James Burns, Western Michigan University
Dr. Bob White P.E., Western Michigan University

Course Strategy: Executing High-Enrollment Engineering Economics Online
Kellie Grasman, Missouri University of Science and Technology

Course Strategy: Low Stakes Assessment Approach to Engineering Economy instruction using Revised Bloom Taxonomy
Mr. Michael B. O’Connor P.E., New York University

T520 - Our Ethical Actions: A Conversation About the New ASEE Codes
3:30 P.M. - 5:00 P.M.
Sponsor: Engineering Ethics Division
Moderator: Rebecca Bates

ASEE has formed an Ethics Committee to address issues related to the new Code of Ethics for Engineering Educators, the Volunteer Code of Ethics, and the Code of Conduct for Activities and Events. This special session will introduce members of the Ethics Committee and provide an opportunity for discussion about the codes and how they can be used to support ethical conduct ourselves and augment conversations with our students and colleagues. Details about the codes can be found at https://www.asee.org/member-resources/resources.

T521 - Operationalizing Equity, Diversity, Inclusion, and Social Justice (EDISJ) in Engineering Librarianship
3:30 P.M. - 5:00 P.M.
Sponsor: Engineering Libraries Division
Moderators: Nasser Saleh, Queen’s University; Kari Kozak, University of Iowa; David Hubbard, Texas A&M University; Bruce Neville, Texas A&M University

Speakers: Ms. Julia M. Gelfand, University of California, Irvine; Ms. Aditi Gupta, University of Victoria; Mrs. Natasha E. Johnson, Purdue University at West Lafayette; Prof. Ibinrione O. Lawal, Virginia Commonwealth University; Ms. Sarah E. Lester, California Polytechnic State University, San Luis Obispo; Prof. Linda R. Musser, Pennsylvania State University

The panelists explore not just how and why the issues of equity, diversity, inclusion, and social justice (EDISJ) in libraries are important, but also focus on how librarianship can go about achieving EDISJ (a systematic process) and how to practice it (operationalizing) in many areas associated with engineering librarianship (collections, reference services, recruitment, teaching, research support, outreach, and leadership). The panelists will describe their approaches to EDISJ, presenting cases, key challenges they encountered,
success stories, and ideas for how each can help foster a more inclusive organization. Panelists will discuss the professional and personal experiences that led them to become involved in diversity and inclusion within their organizations and emphasized the importance of their work.

T523 - Engineering Technology Potpourri

3:30 P.M. - 5:00 P.M.

Sponsor: Engineering Technology Division

Moderators: Christopher LeBlanc, University of New Hampshire; Clay Gloster, North Carolina Agricultural and Technical State University

Testing Ground-effect Aerodynamics on a Scaled F1 Car
Dr. Maher Shehadi, Purdue University, West Lafayette

Robotics Retrofit: Filling the Gap in Robotics and Automation Curriculum
- Mr. Gregory Lyman, Central Washington University
- Mr. Rowdy A. Sanford, University of Idaho
- Mr. Jeff R. Wilcox, Central Washington University
- Dr. Timothy L. Sorey, Central Washington University

Solar Energy Certificate for Engineering Technology Students
- Dr. Jesus A. Gonzalez-Rodriguez, University of Texas Rio Grande Valley
- Dr. Immanuel Edinbarough P.E., University of Texas Rio Grande Valley

The Development of Techie Times
- Mr. Brian D. Tedeschi, Purdue University, West Lafayette
- Ms. Julia K. Miller, Purdue University, West Lafayette
- Dr. Anne M. Lucietto, Purdue University, West Lafayette
- Prof. Nancy L. Denton P.E., Purdue University, West Lafayette

Engineering Students’ Perceptions of Entrepreneurship: A Qualitative Examination
Ms. Heydi L. Dominguez, New Jersey Institute of Technology
Miss Vibhavari Vempala, University of Michigan
Dr. Prateek Shekhar, New Jersey Institute of Technology
Dr. Aileen Huang-Saad, Northeastern University
Mr. Jacob Frederick Fuher, University of Michigan

Innovation-based Learning: A New Way to Educate Innovation
- Mary Pearson, North Dakota State University
- Ryan Striker P.E., North Dakota State University
- Ellen M. Swartz, North Dakota State University
- Mr. Enrique Alvarez Vazquez, North Dakota State University
- Ms. Lauren Singelmann, North Dakota State University
- Stanley Shie Ng, Biola University
- Dr. Dan Ewert

Leadership in Engineering Innovation and Entrepreneurship
- Dr. Peter Golding P.E., University of Texas at El Paso
- Dr. Scott A. Starks, University of Texas at El Paso
- Dr. Roger V. Gonzalez P.E., University of Texas at El Paso
- Dr. Meagan R. Kendall, University of Texas at El Paso
- Dr. Cole Hatfield Joslyn, University of Texas at El Paso

Cultivating Student Adoption of Design Thinking and Entrepreneurial Skills by Addressing Complex Challenges in Healthcare Through Industry Partnerships
- Dr. Julia A. Scott, Santa Clara University
- Evangelia Bouzos, Santa Clara University
- Matthew Philip Hendricks, Santa Clara University
- Dr. Prashanth Asuri, Santa Clara University

To File or Not to File Intellectual Property is Not the Only Question
- Dr. Chad E. Kennedy, Arizona State University
T526 - Assessment in Laboratory and Project-based Courses: Experimentation and Laboratory-oriented Studies Division

3:30 P.M. - 5:00 P.M.

Sponsor: Experimentation and Laboratory-Oriented Studies Division

Moderators: Jacob Bishop, Southern Utah University; Sally Bird, Tennessee Technological University

Authors in this session will present on the assessment of various constructs in laboratory and project-based courses, including creative thinking and the adaptation of laboratory courses to an online format.

Assessment of Creative Thinking in an Introductory Robotics Course Using Final Project

Dr. Lili Ma, New York City College of Technology
Dr. José M. Reyes Álamo, New York City College of Technology
Dr. Yu Wang, New York City College of Technology

Importance of Laboratory Examination in Introductory Engineering Courses

Dr. Maria Javaid, Indiana State University
Mrs. Edie L. Wittenmyer, Indiana State University

Pair-to-Pair Peer Learning: Comparative Analysis of Face-to-Face and Online Laboratory Experiences

Dr. Nebojsa I. Jaksic, Colorado State University, Pueblo

Work in Progress: Assessment of Automation Labs to Facilitate Continuous Improvement

Mr. Bradley Lane Kicklighter, University of Southern Indiana

T527 - First-Year Programs: Unique Projects and Pedagogies

3:30 P.M. - 5:00 P.M.

Sponsor: First-Year Programs Division

Moderators: Jessica Kuczenski, Santa Clara University; Matthew Wettergreen, Rice University; Kaitlin Mallouk, Rowan University; Timothy Hinds, Michigan State University

Classroom Talking Points

Dr. John Sangster P.E., Northeastern University

Implementing Life Cycle Assessment Module in Introduction to Engineering in Different Modalities

Dr. Haritha Malladi, University of Delaware
Dr. Mary Roth P.E., Lafayette College

Factors Impacting Engagement and Achievement in a First-Year Design Thinking Course

Ms. Wonki Lee, Purdue University at West Lafayette
Prof. Nathan Mentzer, Purdue University at West Lafayette

Team-Teaching a Project-Based First-Year Seminar in Pandemic

Dr. Yanjun Yan, Western Carolina University
Dr. Hugh Jack P.E., Western Carolina University
Prof. James Coffin

Incorporating a Theme Through Literature

Dr. Robin K. Hill, University of Wyoming

T528 - Doing More With More: Increasing Awareness, Applications, and Diversity in Engineering Programs

3:30 P.M. - 5:00 P.M.

Sponsor: Graduate Studies Division

Moderators: Diane Peters, Kettering University; Jeffrey Fergus, Auburn University

Speakers: Ron Hyman, Liaison International; Rishab Malhotra, Illinois Institute of Technology

Even before the pandemic, graduate engineering programs faced growing challenges caused by budget cuts, domestic pipeline worries, and declining international enrollment. At the same time, there are greater calls for diversity and inclusion in the engineering field, a necessary effort that will require time and resources to achieve. These combined imperatives signal that, even as funding sources and staffing shrink in the coming years, graduate admissions teams will be tasked with identifying and engaging new applicant pools.

In this session, engineering leaders will discuss how they’ve found innovative ways to “do more with more.” They will highlight shared, collaborative, and open-source tools they have added to their efforts and detail the practices that have helped them raise their institutions’ profiles, expand recruitment, and gain insights into prospective
student demographics. From a community approach to admissions to rethinking applicant pools and removing traditional barriers to underrepresented groups, attendees will learn about the strategies and resources that will help them create a lasting impact at their institutions.

T530 - Computing and Information Technology Division Technical Session 4

3:30 P.M. - 5:00 P.M.
Sponsor: Computing and Information Technology Division
Moderators: Mudasser Wyne, National University; Tracy Hammond, Texas A&M University; Afsaneh Minaie, Utah Valley University; Reza Sanati-Mehrizy, Utah Valley University

This session presents papers on a variety of topics pertaining to computing and information technology.

Pandemic Response: Hybrid-flexible Course Delivery for General Education Computer Science Courses
Mr. Ben Ralph Bernard, North Dakota State University
Dr. Jeremy Straub, North Dakota State University

Student Senior Project and COVID-19
Dr. Alireza Kavianpour, DeVry University, Pomona
John Castellanos, DeVry University, Pomona
Adam Doty, DeVry University, Pomona
Michael Sweeting, DeVry University, Pomona
Isasio Velez, DeVry University, Pomona
Nathan Watson, DeVry University, Pomona

Work in Progress: Engaging First-year Students in Programming 1 During COVID-19
Dr. Stephany Coffman-Wolph, Ohio Northern University

Impact of COVID-19 on Faculty Teaching and Student Learning
Dr. Mudasser Fraz Wyne, National University
Dr. Shakil Akhtar, Clayton State University
Dr. Muhammad Asadur Rahman, Clayton State University

Uneven Playing Field: Examining Preparation for Technical Interviews in Computing and the Role of Cultural Experiences
Stephanie J. Lunn, Florida International University
Dr. Monique S. Ross, Florida International University

Prof. Zahra Hazari, Florida International University
Dr. Mark A. Weiss, Florida International University
Dr. Michael Georgiopoulos, University of Central Florida
Dr. Ken Christensen P.E., University of South Florida
Mrs. Tiana Solis, Florida International University

T532 - International Division Technical Session 2

3:30 P.M. - 5:00 P.M.
Sponsor: International Division
Moderators: Deborah Walter, Rose-Hulman Institute of Technology; Sanjay Tewari, Missouri University of Science and Technology; Phillip Sanger, Purdue University at West Lafayette; Nick Safai, Salt Lake Community College

Achieving Domestic Internationalization and Global Competence Through On-Campus Activities and Globally Responsive Education
Dr. Sanjay Tewari, Missouri University of Science and Technology
Mr. Peng Zhang, Missouri State University
Dr. Yuan Zhuang, Missouri State University

Cultural Dimensions in Academic Disciplines, a Comparison Between Ecuador and the United States of America
Dr. Homero Murzi, Virginia Polytechnic Institute and State University
Dr. Bianey Cristina Ruiz Ulloa, National University of Táchira
Prof. Francisco Gamboa, Universidad del Táchira
Johnny C. Woods Jr., Virginia Polytechnic Institute and State University
Dr. MiguelAndres Guerra P.E., Universidad San Francisco de Quito USFQ
Mr. Abram Diaz-Strandberg, Virginia Polytechnic Institute and State University
Ms. Karen Dinora Martinez Soto
Reema Helen Azar, Universidad San Francisco de Quito USFQ

Global Engineering Competencies Learned Through Virtual Exchange Project Collaboration
Dr. Deborah Walter, Rose-Hulman Institute of Technology
Megan Diane Lavery, Engineering World Health
Benjamin Fleishman, Engineering World Health

Measuring the Impact of a Study Abroad Program on Engineering Students’ Global Perspective
Mr. Tahsin Mahmud Chowdhury, Virginia Polytechnic Institute and State University

ASEE online session locator can be found at www.asee.org/osl.
Dr. Homero Murzi, Virginia Polytechnic Institute and State University
Ms. Karen Dinora Martinez Soto
Andrea Schuman, Virginia Polytechnic Institute and State University

The Role of Study Abroad Curricular Interventions in Engineering Students’ Intercultural Competence Development
Dr. Sigrid Berka, University of Rhode Island
Dr. Bing Mu, University of Rhode Island
Dr. Lars Olav Erickson, University of Rhode Island
Dr. Iñaki Perez-Ibáñez, University of Rhode Island

T533 - Pre-College Engineering Education Division Technical Session 5
3:30 P.M. - 5:00 P.M.
Sponsor: Pre-College Engineering Education Division
Moderators: Marcelo Caplan, Columbia College; Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University

Research experiences for teachers (RET)
Lessons Learned from Evaluating Three Virtual Research Experiences for Teachers (RET) Programs Using Common Instruments and Protocols (Evaluation)
Dr. Jean S. Larson, Arizona State University
Dr. Megan O'Donnell, Arizona State University
Kristi Lynn Eustice, Arizona State University
Dr. Carolyn Aitken Nichol, Rice University
Ms. Kristen Jaskie, Arizona State University
Prof. Andreas S. Spanias, Arizona State University
Kimberly Farnsworth, Indiana University-Bloomington
Prof. Jennifer M. Blain Christen, Arizona State University
Mi Yeon Lee, Arizona State University

Impact on Teaching Practices of a Summer Research Experience for Teachers (Evaluation)
Mrs. Marialice Mastronardi, University of Texas at Austin
Dr. Maura Borrego, University of Texas at Austin
Mrs. Rita D. Hartman, University of Texas at Austin

Long-Term Outcomes of RET Programs on Female and Minority Student High School Graduation Rates and Undergraduate STEM Major Rates (Fundamental)
Carolyn Nichol, Rice University
Ms. Christina Anlynette Crawford, Rice University
Dr. Christopher Barr, Rice University
Isaias Cerda, Rice University

Providing Support to High School STEM Teachers at Underrepresented Schools Through a Yearlong Professional Development Initiative (WIP, Diversity)
Dr. Bonnie Achee, Southeastern Louisiana University
Dr. Ahmad Fayed, Southeastern Louisiana University
Dr. Mehmet Emre Bahadir, Southeastern Louisiana University
Dr. Deborah Atlas Dardis, Southeastern Louisiana University
Dr. Troy Williams, Southeastern Louisiana University
Dr. Wendy J. Conarro, Southeastern Louisiana University
Dr. Mohammad Saadeh, Southeastern Louisiana University
Tireka Cobb Ph.D., Louisiana Office of Student Financial Assistance

T533B - Pre-College Engineering Education Division Technical Session 6
3:30 P.M. - 5:00 P.M.
Sponsor: Pre-College Engineering Education Division
Moderators: Katey Shirey, EduKatey; Amber Simpson, State University of New York at Binghamton; Amber Simpson, Southern Methodist University; Bradley Bowen, Virginia Polytechnic Institute and State University

Teacher preparation (elementary)
Enhancing Preservice Teachers’ Intention to Integrate Engineering through a Multidisciplinary Partnership (Evaluation)
Mr. Francisco Cima, Old Dominion University
Dr. Pilar Pazos, Old Dominion University
Dr. Jennifer Jill Kidd, Old Dominion University
Dr. Kristie S. Gutierrez, Old Dominion University
Dr. Stacie I. Ringleb, Old Dominion University
Dr. Orlando M. Ayala, Old Dominion University
Dr. Krishnanand Kaipa, Old Dominion University

Preservice Teachers Noticing About Students’ Written Design Performance and Improvement Ideas (RTP)
Dr. Pamela S. Lottero-Perdue, Towson University
Prof. Manuel Alejandro Figueroa, The College of New Jersey
Dr. Jamie Mikeska
T534 - 'Diversity' and Inclusion? Pedagogy, Experiences, Language, and Performative Action

3:30 P.M. - 5:00 P.M.

Sponsor: Liberal Education/Engineering & Society Division

Moderators: Deborah Tihanyi, University of Toronto; Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University

"A New Way of Seeing": Engagement With Women's and Gender Studies Fosters Engineering Identity Formation
Dr. Jenn Stroud Rossmann, Lafayette College
Prof. Mary A. Armstrong, Lafayette College

Engineering’s Systemic Marginalization and Devaluation of Students and Professionals With Disabilities
Dr. Erin A. Cech, University of Michigan

Dr. Kathryn A. Neeley, University of Virginia

A Sojourn of Engineering Identity Conflict: Exploring Identity Interference Through a Performative Lens
Dr. Cole Hatfield Joslyn, University of Texas at El Paso
Dr. Meagan R. Kendall, University of Texas at El Paso

T535 - Manufacturing Division - Workforce Development and Curricular Innovations

3:30 P.M. - 5:00 P.M.

Sponsor: Manufacturing Division

Moderators: Yalcin Ertekin, Drexel University; Aditya Akundi, University of Texas Rio Grande Valley

Best Practices for Attracting Young Talent to the Pennsylvania and U.S. Metalcasting Industry
C. R. Hasbrouck, Pennsylvania State University
Dr. Paul C. Lynch, Pennsylvania State University

Expanding a Mechanical Engineering Technology Curriculum to Include Additive Manufacturing
Dr. Hamid Eisaizadeh
Dr. Mona Torabizadeh
Dr. Daryush Aidun, Clarkson University

Introducing Entrepreneurship and Innovation in a Manufacturing Design Course
Dr. Jaby Mohammed, Illinois State University
Dr. Kevin L. Devine, Illinois State University

What’s Next? The Future of Work for Manufacturing Technicians
Dr. Marilyn Barger P.E., Florida Advanced Technological Education Center
Dr. Richard Gilbert, University of South Florida
Mr. Phil Centonze, FloridaMakes
Prof. Sam Ajlani, College of Central Florida

T537 - Mathematics Division Technical Session 3

3:30 P.M. - 5:00 P.M.

Sponsor: Mathematics Division

Moderators: Jeffrey Hieb, University of Louisville; Amitabha Ghosh, Rochester Institute of Technology

Undergraduate STEM Students’ Comprehension of Function Series and Related Calculus Concepts
Dr. Emre Tokgoz, Quinnipiac University
Elif Naz Tekalp
Berrak Seren Tekalp
Hasan Alp Tekalp
COVID-19: Understanding the Impact of Societal Disruption on Student Learning and Academic Progress
Mr. Luke A. Duncan, Clemson University
Dr. Karen A. High, Clemson University
Dr. D. Matthew Boyer, Clemson University
Ms. Liz McKinley, Clemson University

Work in Progress: Implementing Elements of Engineering Design into Calculus
Dr. Salvador Mayoral, California State University, Fullerton
Dr. Antoinette Sherriese Linton, California State University, Fullerton
Prof. Hassan Yousefi, California State University, Fullerton
Dr. Jidong Huang, California State University, Fullerton

Revising College Algebra Instruction to Accept and Incorporate the Use of Smart Phone Applications
Dr. Zeynep Akcay Ozkan, City University of New York, Queensborough Community College
Dr. Dona Boccio, City University of New York, Queensborough Community College
Dr. Dugwon Seo, City University of New York, Queensborough Community College
Dr. Sirin Budak, University of Wisconsin-Stevens Point

Automation Course and Laboratory on Design and Programming of Multi-axis Industrial Machines
Prof. Hakan Gurocak, Washington State University-Vancouver

Mastery Based Learning in Automatic Controls Class
Dr. Pavan Karra, Minnesota State University, Mankato

Outcomes of the S-STEM Scholarship Program in Our Institution in the Past Three Years
Prof. Liang Zhu, University of Maryland Baltimore County
Dr. Charles D. Eggleton, University of Maryland Baltimore County
Prof. L.D. Timmie Topoleski, University of Maryland Baltimore County

The Effectiveness of Dimples on a NACA Airfoil: A Numerical Investigation Conducted via an Independent Study
Miss Jenna Elizabeth Stolzman, Grand Valley State University
Dr. Sanjivan Manoharan, Grand Valley State University

Transforming Introductory Engineering Courses to Match GenZ Learning Styles
Dr. Sean Michael Quallen, University of Idaho
Dr. John Crepeau P.E., University of Idaho
Dr. Barry Willis, University of Idaho
Dr. Steven W. Beyerlein, University of Idaho
Mr. JJ Petersen, University of Idaho

T538 - Potpourri - A Mix of All Topics
3:30 P.M. - 5:00 P.M.
Sponsor: Mechanical Engineering Division
Moderators: Rungun Nathan, Pennsylvania State University, Berks Campus; Thomas DeNucci, United States Coast Guard Academy; John Crepeau, University of Idaho

In this session, educators get five minutes to demonstrate their most effective classroom demonstrations and hands-on activities.

This session is cosponsored by the Mechanical Engineering, New Engineering Educators, Construction Engineering, and Civil Engineering Divisions, but any and all demonstrations are welcome! C’mon by and show off what you do!

T540 - Minorities in Engineering Division Technical Session 4
3:30 P.M. - 5:00 P.M.
Sponsor: Minorities in Engineering Division
Moderators: Matilde Sanchez-Pena, University at Buffalo, the State University of New York; Lily Gossage, California State Polytechnic University, Pomona; Kristin Imhoff, Saint County
Dr. Ronghui Ma, University of Maryland Baltimore County
Dr. Deepa Madan, University of Maryland Baltimore County

Schedule subject to change. Please go to https://2021asee.pathable.co/ for up-to-date information.
Exploring the Mentoring Needs of Engineering Postdoctoral Scholars of Color: Is Systematic Change Required in the Postdoctoral Training Environment? (Research)

Dr. Sylvia L. Mendez, University of Colorado at Colorado Springs
Dr. Sarah Elizabeth Cooksey, University of Colorado Colorado Springs
Ms. Kathryn Elizabeth Starkey, University of Colorado at Colorado Springs
Dr. Valerie Martin Conley, University of Colorado at Colorado Springs
Dr. Clayton J. Clark II, Florida A&M University
Dr. Natalie Yolanda Arnett, FAMU-FSU College of Engineering
Prof. C. Fred Higgs III, Rice University
Prof. Illya V. Hicks, Rice University
Dr. Comas Lamar Haynes, Georgia Tech Research Institute
Dr. Tammy Michelle McCoy, Georgia Institute of Technology
Molly Stuhlsatz, BSCS Science Learning

Insights Gleaned from The GAIN Peer-Mentoring Program Pilot

Dr. Natalie Schaal, Loyola Marymount University
Mr. Spencer Edwin Chan, Loyola Marymount University
Dr. Julian K. Saint Clair, Loyola Marymount University

Scaffolding Student Success: Developing a Culturally Responsive Approach to Support Underrepresented Minorities in Engineering Undergraduate Research

Dr. Eleazar Marquez, Rice University
Dr. Samuel Garcia Jr., NASA EPDC

The Role of E-Mentoring in the African American Higher Education Experience (Work in Progress)

Mr. Nagash Antoine Clarke, University of Michigan
Dr. Joi-Lynn Mondisa, University of Michigan
Dr. Kinnis Gosha, Morehouse College

Work in Progress: Building Career Goals and Boosting Self-efficacy in Engineering Students

Dr. Sonia M. Bartolomei-Suarez, University of Puerto Rico, Mayaguez
Dr. Carla Lopez del Puerto, University of Puerto Rico, Mayaguez
Dr. Pedro O. Quintero, University of Puerto Rico, Mayaguez
Dr. Luisa Guillemard, University of Puerto Rico, Mayaguez
Dr. Aidsa I. Santiago-Román, University of Puerto Rico, Mayaguez

Dr. Manuel Rodriguez-Martinez, University of Puerto Rico, Mayaguez
Dr. Manuel A. Jimenez, University of Puerto Rico Mayaguez
Dr. Nayda G. Santiago, University of Puerto Rico, Mayaguez
Prof. Nelson Cardona-Martinez, University of Puerto Rico, Mayaguez
Prof. Oscar Marcelo Suarez, University of Puerto Rico, Mayaguez

T541 - Multidisciplinary Experiences: Teaching in a Pandemic

3:30 P.M. - 5:00 P.M.

Sponsor: Multidisciplinary Engineering Division

Moderators: Cynthia Barnicki, Milwaukee School of Engineering; AJ Hamlin, Michigan Technological University; Rajani Muraleedharan, Saginaw Valley State University; Abayomi Ajayi-Majebi, Central State University

Please note the last author will not be presenting at the conference.

Project-based Capstone Design Projects Amidst COVID-19 Restrictions

Dr. Stephen Andrew Wilkerson P.E., York College of Pennsylvania
Dr. Stephen Andrew Gadsden, University of Guelph

Work in Progress: Cultures of Collaboration in Emergency Remote Teaching and Beyond

Prof. Carolyn Kelly Ottman, Milwaukee School of Engineering

Simple Exercises to Provide Continuity and Consistency in the Classroom Amidst Uncertain or Shifting Delivery Modes

Abigail E. Heinz, Rowan University
Matthew Strauss
Dr. Kaitlin Mallouk, Rowan University
Dr. Mary Staehle, Rowan University

Transition from the F2F to the Online Teaching Method During Emergency Status (Engineering Emergency Remote Learning)

Dr. Bahaa Ansaf, Colorado State University - Pueblo
Dr. Nebojsa I. Jaksic, Colorado State University - Pueblo

A Faculty Roundtable on Instructional Challenges During the Pandemic

Dr. Iftekhar Ibne Basith, Sam Houston State University
T542 - Perspectives on Engineering Education During COVID-19

3:30 P.M. - 5:00 P.M.
Sponsor: New Engineering Educators Division
Moderators: Derek Breid, Saint Vincent College; Kerry Widder, Milwaukee School of Engineering; Timothy Chambers, University of Michigan

Differences in Perceptions of Instructional Support between U.S. and International Students Before and During COVID-19
Dr. Ziyan Bai, University of Washington
Dr. Denise Wilson, University of Washington
Ms. Shruti Misra, University of Washington
Ms. Morgan Anderson, University of Washington, Seattle
Neha Kardam, University of Washington

Investigating Students’ Expectations of Instruction in Engineering Laboratory Courses During the COVID-19 Pandemic
Mr. Keven Alkhoury, New Jersey Institute of Technology
Mr. Ahmed Z. Edrees, University of Jeddah & New Jersey Institute of Technology
Dr. Jaskirat Sodhi, New Jersey Institute of Technology
Dr. Ashish D. Borgaonkar, New Jersey Institute of Technology
Prateek Shekhar, New Jersey Institute of Technology

A Survey-Based Study of Students’ Perspective on Different Remote Teaching Styles During COVID-19
Prof. Amr Hassan, University of Pittsburgh
Dr. Ahmed Dallal, University of Pittsburgh
Prof. Mohamed A. S. Zaghoul, University of Pittsburgh

New Instructors Perspectives on Remote Teaching Methods
Dr. Ahmed Dallal, University of Pittsburgh
Prof. Mohamed A. S. Zaghoul, University of Pittsburgh
Prof. Amr Hassan, University of Pittsburgh

T545 - Engineering Physics and Physics Division Executive Business Meeting

3:30 P.M. - 5:00 P.M.
Sponsor: Engineering Physics and Physics Division
Moderators: Robert Ross, University of Detroit Mercy; Bala Maheswaran, Northeastern University

Meeting of officers to discuss ongoing issues of interest

T550 - Diversity and Two-year Colleges Part 1

3:30 P.M. - 5:00 P.M.
Sponsor: Two-Year College Division
Moderators: Philip Regalbuto, Trident Technical College; Elizabeth Adams, Fresno City College

Diversity and the two-year college. Issues that two-year colleges face in creating a more diverse student population and the possible solutions to these issues.

The Road to Strengthening Two-year Hispanic-serving Institution Participation in the NSF ATE Funding Program
Ms. Cynthia Kay Pickering, Arizona State University
Ms. Elaine L. Craft, Florence-Darlington Technical College
Caroline VanIngen-Dunn, Arizona State University
Emery DeWitt, Mentor-Connect, Florence-Darlington Technical College
Ms. Judith Slisz, National Science Foundation
Mr. Richard H. Roberts Jr, Florence-Darlington Technical College, SCATE Center

Work in Progress on a Model to Improve the Preparation and Transition of Hispanic STEM Doctoral Students into Community College Faculty Positions - Lessons Learned
Prof. Miguel Velez-Reyes P.E., University of Texas at El Paso
Dr. Ivonne Santiago P.E., University of Texas at El Paso
Victor Manuel Garcia Jr., University of Texas at El Paso
Irma Y. Torres-Catanach, University of Texas at El Paso
Dr. Dawn M. Horton, University of Massachusetts, Amherst
Dr. Yajaira Mejia, The City College of New York
Dr. Dugwon Seo, Queensborough Community College
Prof. Jorge E. Gonzalez, City University of New York, City College
Prof. Joseph Barba, City University of New York, City College
Dr. Fenot Aklog, Teachers College Columbia University
Prof. Fred Moshary, City University of New York, City College
Dr. Jeff Sivils, El Paso Community College
Dr. Yasser Hassebo, City University of New York, LaGuardia City College

A University-State College Collaborative Project for Hispanic Student Success in STEM
Dr. Ali Zilouchian, Florida Atlantic University
Dr. Nancy Romance, Florida Atlantic University
Dr. Hanqi Zhuang, Florida Atlantic University
Dr. Michael Vitale

Mrs. Diane Nicole Abdullah, Florida International University
Dr. Trina L. Fletcher, Florida International University
Ronald Quintero, Florida International University
Jade R. Moten, Florida International University
Miss Brittany Nicole Boyd, Morgan State University

T551 - Women in Engineering Division Technical Session 3
3:30 P.M. - 5:00 P.M.
Sponsor: Women in Engineering Division
Moderators: Kaitlyn Thomas, University of Nevada, Reno; Michelle Marincel Payne, Rose-Hulman Institute of Technology

Understanding the Impacts of COVID-19 on Feelings of Stress and Anxiety in Women Engineering Students
Dr. Maija A. Benitz, Roger Williams University
Dr. Lillian Clark Jeznach, Roger Williams University
Dr. Selby M. Conrad, Roger Williams University

Increasing the Participation of Women in Computer Science and Engineering: A Systematic Approach for Culture Change
Dr. Jing Wang, University of South Florida
Dr. Zachariah Beasley, University of South Florida
Dr. Ken Christensen P.E., University of South Florida
Prof. Sudeep Sarkar, University of South Florida

Kaitlyn Anne Thomas, University of Nevada, Reno
Dr. Whitney Gaskins, University of Cincinnati
Dr. Kelly J. Cross, University of Nevada, Reno

T556 - Military & Veteran Division Business Meeting
3:30 P.M. - 5:00 P.M.
Sponsor: Military and Veterans Division
Moderators: David Stringer, Kent State University, Kent; Patrick Bass, The Citadel

T559 - Dismantling Microaggressions in STEM
3:30 P.M. - 5:00 P.M.
Sponsor: Equity, Culture & Social Justice in Education Division
Moderator: James Holly, Jr., Wayne State University
Speakers: Tatiana Gerena, Chandler-Gilbert Community College; Kellie Phong, Chandler-Gilbert Community College; Nicole Thompson, Chandler-Gilbert Community College; Mrs. Nichole Neal; Kim Schultz, Chandler-Gilbert Community College; Diana Leon, Chandler-Gilbert Community College

"The young people will save us" is a statement that has been repeated this year as we have experienced the social shifts of 2020. Our young people are watching us, and more importantly, finding their voice in efforts to make a change. Therefore, it may be time to consider the need for us as faculty to become the student and allow the student to become the teacher.

Objectives:
1. Understand microaggressions from students’ perspectives.
2. Create awareness of microaggressions experienced by students and faculty through a survey taken by CGCC faculty and students during the Fall 2020 semester.
3. Explore the outcomes associated with the experience of microaggressions.
4. Discover techniques to minimize the occurrence of microaggressions and ways to respond when someone has been microaggressive.

Activity: Apply what dismantling techniques you have learned by suggesting responses to experiences documented in our community.

**T573 - 2021 Interdivisional Town Hall Meeting**

**3:30 P.M. - 5:00 P.M.**

**Sponsor:** Professional Interest Council  
**Moderators:** John Estell, Ohio Northern University; Joe Tranquillo, Bucknell University

In 2004, the National Academy of Engineering published “The Engineer of 2020: Visions of Engineering in the New Century,” which urged the engineering profession to recognize what engineers can build for the future through not just technical jobs, but also a wide range of leadership roles in industry, government, and academia.

It’s now 2021. Where do we go from here?

Join us as we explore positioning engineering education in preparing the next generation of engineers – the “Engineers of the 2030s.” The Town Hall Planning Committee has been engaged in a visioning process for systematically developing the “Engineers of the 2030s” framework, and has come up with the following eight discussion topics:

- Being stewards of the profession
- Engineering a more just world
- Engineering as meaningful and purposeful
- Engineers as ethical authorities in a technological society
- Engineers as mentors/instructors/coaches
- Rethinking sustainability
- The engineers of the 2030s versus the engineers of 2020
- The ever-evolving and multifaceted engineer

Additional details regarding these topics can be found in our abstract: https://tinyurl.com/2021ASEETownHall.

This session will open with brief statements pertaining to the chosen topics and proceed directly to a set of hands-on, parallel breakout sessions for sharing suggestions and ideas designed to focus the discussions toward generating proposed lists of actionable items. Individuals identified during the Town Hall will be asked to apply their skills, knowledge, and expertise to these action items in crafting deliverables for guiding future efforts in support of the Engineers of the 2030s initiative. These deliverables will be shared with the ASEE membership and also provided to the National Academy of Engineering.

The Interdivisional Town Hall has been an exciting way for us to un-silo our communities and work together across the entire ASEE membership in advancing engineering education. Please join us this year to share your thoughts and ideas!

**Interdivisional Town Hall Meeting Planning Committee:**

- Mahesh Aggarwal
- Atushi Akera
- Lynn Albers
- Maureen Barcic
- Jenna P. Carpenter
- Alan Cheville
- Jennifer Cole
- Phil Cornwell
- John K. Estell
- Eliza Gallagher
- Jamie R. Gurganus
- Timothy Hinds
- Susannah Howe
- Amardeep Kaur
- Alison Kerr
- Rebecca Komarek
- Micah Lande
- Bala Maheswaran
- Mehrube Mehrubeoglu
- Beshoy Morkos
- Shannon L. Isovitsch Parks
T577 - Safe Zone Ally Training - Level 2

3:30 P.M. - 5:00 P.M.
Sponsor: ASEE Committee on Diversity, Equity & Inclusion
Moderators: Henriette Burns, Southern Illinois University Edwardsville; Rachelle Reisberg, Northeastern University
Speakers: Dr. Mahesh Chand Aggarwal, Gannon University; Mr. Hector Enrique Rodriguez-Simmonds, Purdue Engineering Education

Safe Zone Ally Training workshops are interactive, research-informed workshops that seek to foster a more inclusive environment for LGBTQ+ individuals in STEM through building participant knowledge and skills and creating a visible network of allies. Faculty, students, administrators, staff, and other professionals are encouraged to participate in these workshops.

The Level 2 Safe Zone workshop explores the concepts and implications of privilege and bias, the climate for LGBTQ+ individuals in STEM, and ways that allies can support LGBTQ+ students and colleagues, and techniques for creating inclusive classroom environments.

ASEE Safe Zone Ally Training workshops are supported by the National Science Foundation (NSF) through grants EEC-1539140 and EEC-1748499. To learn more and access free ally resources, please visit https://lgbtq.asee.org.

T617 - Engineering and Public Policy Division Business Meeting

5:15 P.M. - 6:45 P.M.
Sponsor: Engineering and Public Policy Division
Moderators: Deanna Matthews, Carnegie Mellon University; Daniel Oerther, Missouri University of Science and Technology

Business meeting for the division. Program update. Ideas for next year’s sessions. Officer reports.

T646 - Software Engineering Division Business Meeting

5:15 P.M. - 6:45 P.M.
Sponsor: Software Engineering Division
Moderators: Robert Hasker, Milwaukee School of Engineering; Afsaneh Minaie, Utah Valley University

This business meeting is open to all interested in the Software Engineering Division. We will elect officers, obtain feedback about the conference, and plan next year's conference.

T679 - ABET SESSION: Make an Impact on STEM Education and Support My Academic Program at the Same Time—Become an ABET Program Evaluator

4:45 P.M. - 6:45 P.M.
Sponsor: ABET Sponsored Sessions
Moderator: Christine Kalambary, American Society for Engineering Education
Speaker: Dr. Jennifer McFerran Brock, University of Alaska Anchorage

This talk is designed for a prospective PEV who is interested in having as much information as possible on what the job really entails. The speaker has also received feedback that it is useful for representatives of institutions who have never gone
through an ABET visit before, as it describes the visit process in detail. The presentation showcases an ABET visit from the perspective of a PEV, from the initial assignment to the campus visit and return home. Topics include communication with the rest of the team, tips for reviewing the materials prepared by the program and communicating with the program before the visit, required documentation, making travel arrangements, and what happens after arrival on campus. The importance of the team as the decision-making body and the support that the more experienced team members will provide are a focus of this talk.

**T704 - Biomedical Engineering Division Social and Awards Ceremony**

**5:10 P.M. - 7:00 P.M.**

**Sponsor:** Biomedical Engineering Division

**Moderators:** Aileen Huang-Saad, Northeastern University; Renata Ramos, Rice University

The ASEE BED Division Social is an opportunity to interact with your BME colleagues in an informal setting. We will also present the winners of this year's BED Division awards. We hope to see you there! (Note: The social will be hosted on a separate platform and is open to all members of the BED division, whether or not you register for the meeting. A link to the social will be sent to the BED listserv 15 minutes prior to the event.)

**T717 - Engineering and Public Policy Social**

**7:00 P.M. - 9:00 P.M.**

**Sponsor:** Engineering and Public Policy Division

**Moderators:** Deanna Matthews, Carnegie Mellon University; Daniel Oerther, Missouri University of Science and Technology

Come chat with division members. PLEASE ALSO JOIN THE DIVISION BUSINESS MEETING IMMEDIATELY PRIOR TO THIS SESSION.

**T721 - Engineering Libraries Division Evening Social Event**

**6:30 P.M. - 11:30 A.M.**

**Sponsor:** Engineering Libraries Division

**Moderators:** Kari Kozak, University of Iowa; David Hubbard, Texas A&M University

Please note: This event is held outside of the ASEE virtual platform. ELD members should check listservs or asee.org/eld to register.

**T733 - MIND/PCEE/WIED Annual Social**

**7:00 P.M. - 9:00 P.M.**

**Sponsors:** Pre-College Engineering Education Division; Minorities in Engineering Division; Women in Engineering Division

**Moderators:** Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University; Kristin Imhoff, Saint Joseph's University; Trina Fletcher, Florida International University; Kristi Shryock, Texas A&M University; Janet Callahan, Michigan Technological University

This is a social function for members of MIND, PCEE, and WIED.

**T745 - Engineering Physics & Physics Social Event**

**7:00 P.M. - 9:00 P.M.**

**Sponsor:** Engineering Physics and Physics Division

**Moderators:** Robert Ross, University of Detroit Mercy; Bala Maheswaran, Northeastern University
W103 - Biological and Agricultural Engineering Division Business Meeting
7:00 A.M. - 7:45 A.M.
Sponsor: Biological and Agricultural Engineering Division
Moderators: Heidi Diefes-Dux, University of Nebraska - Lincoln; Janie Moore, Texas A&M University

This is the annual business meeting of the Biological and Agricultural Engineering (BAE) Division. This meeting is an opportunity to learn about and have input on division direction and activities and get involved.

W104 - Publishing in BME Education
8:00 A.M. - 9:30 A.M.
Sponsor: Biomedical Engineering Division
Moderators: Ann Saterbak, Duke University; Brian Helmke, University of Virginia; Aileen Huang-Saad, Northeastern University; Renata Ramos, Rice University
Speakers: Dr. Ann Saterbak, Duke University; Dr. Brian P. Helmke, University of Virginia; Dr. Aileen Huang-Saad, Northeastern University

As faculty become more reflective of their own teaching and their students’ learning, there are opportunities to document this work and publish it. In this panel session, we will talk about the necessary components of a manuscript, which may include research questions and assessment, as well as different types of papers. We will provide an overview of the publishing landscape for biomedical engineering faculty, including ASEE, Biomedical Engineering Education, Advances in Engineering Education, and other publications. With questions for the audience and discussions on many topics, this session should position you to better consider your own work and what direction you might take to initiate or continue publishing your efforts in biomedical engineering education.

W105 - Chemical Engineering Pedagogy
8:00 A.M. - 9:30 A.M.
Sponsor: Chemical Engineering Division
Moderators: VJ Tocco; Reginald Rogers, University of Missouri - Columbia

At Attitudes Toward and Usage of Animations in an Interactive Textbook for Material and Energy Balances
Mr. Sidney Jay Stone III P.E., The University of Toledo
Prof. Matthew W. Liberatore, The University of Toledo

Can I Have More Problems to Practice? Student Usage and Course Success Related to Auto-graded, End-of-chapter Problems in a Material and Energy Balances Course
Kayla Chapman
Prof. Matthew W. Liberatore, The University of Toledo

Learning Strategy and Verbal-Visual Preferences for Chemical Engineering Students
Dr. Charles E. Baukal Jr. P.E., John Zink Co. LLC

What Kinds of Advice Do Chemical Engineering Students Give to Future Students for Success in High-structure Courses?
Dr. Justin Shaffer, Colorado School of Mines
Mr. Arik Ringsby

Work in Progress: Designing a Chemical Reaction Engineering Course to Teach Problem Solving
Dr. Eric Burkholder, Stanford University
Mr. Francis Ledesma,
Miss Julie C. Fornaciari, University of California, Berkeley

W106 - Civil Engineering Division Business Meeting
7:00 A.M. - 7:45 A.M.
Sponsor: Civil Engineering Division
Moderators: Matthew Lovell, Rose-Hulman Institute of Technology; Steven Burian, University of Utah

Annual business meeting of the Civil Engineering Division
W106B - Educational and Professional Issues of Strategic Importance to the Civil Engineering Profession and ASCE

8:00 A.M. - 9:30 A.M.

Sponsor: Civil Engineering Division

Moderators: Thomas Lenox, Retired -- American Society of Civil Engineers; Leslie Nolen, American Society of Civil Engineers; Matthew Lovell, Rose-Hulman Institute of Technology; Steven Burian, University of Utah

This session will explore several of the important issues that are being addressed (or should be addressed) by the American Society of Civil Engineers.

Progress Towards Educating the Engineer of 2020
Col. Jakob C. Bruhl, United States Military Academy
Dr. Brock E. Barry P.E., United States Military Academy
Major David Carlson P.E., United States Military Academy

Is Engineering Education the Weak Link in Licensure’s Three-legged Stool?
Dr. Matthew K. Swenty, Virginia Military Institute
Dr. Brian J. Swenty P.E., University of Evansville

The Merits of a Civil Engineering Certification to Validate Fulfillment of the CE-BOK
Mr. Bradley F. Aldrich, American Society of Civil Engineers
Ms. Jennifer Hofmann, American Society of Civil Engineers
Dr. Norma J. Mattei P.E., University of New Orleans
Mr. Michael B. O’Connor, New York University

Make Assessment Straightforward: A Case Study on the Successful Implementation of ABET Student Outcomes 1-7
Dr. Anthony Battistini, Angelo State University
Dr. William A. Kitch, Angelo State University

Virtually Speaking: Perspectives on ABET Virtual Reviews
Dr. Camilla M. Saviz P.E., University of the Pacific
Dr. Audra N. Morse, Michigan Technological University
Dr. Brock E. Barry P.E., United States Military Academy
Dr. Nathan M. Kathir P.E., George Mason University
Dr. Norb Delatate P.E., Oklahoma State University

Preparing the Future Civil Engineer: Review and Update of the ABET Civil Engineering Program Criteria
Dr. Stephen J. Ressler P.E., United States Military Academy
Ms. Leslie Nolen CAE, American Society of Civil Engineers

W107 - CIPD Business Meeting

8:00 A.M. - 9:30 A.M.

Sponsor: College Industry Partnerships Division

Moderators: Charles Baukal, John Zink Co. LLC; Magdalini Lagoudas, Texas A&M University

Business meeting for CIPD members and those interested in joining the division

W108 - Computers in Education 9 - Technology 1

8:00 A.M. - 9:30 A.M.

Sponsor: Computers in Education Division

Moderators: Mandayam Thirunarayanan, Florida International University; Steven Barrett, University of Wyoming; Afrin Naz, West Virginia University Institute of Technology

This session will focus on technology innovations to enhance education.

Randomized, Structured, Auto-graded Homework: Design Philosophy and Engineering Examples
Ms. Efthymia Kazakou, zyBooks, A Wiley Brand
Dr. Alex Daniel Edgcomb, zyBooks, A Wiley Brand
Dr. Yamuna Rajasekhar, zyBooks, A Wiley Brand
Prof. Roman Lysecky, University of Arizona; zyBooks, A Wiley Brand
Prof. Frank Vahid, University of California, Riverside

Combining Immersive Technologies and Problem-based Learning in Engineering Education: Bibliometric Analysis and Literature Review
Mahgol Nowparvar, Pennsylvania State University
Mr. Xing Chen, Pennsylvania State University
Dr. Omar Ashour, Pennsylvania State University
Dr. Sabahattin Gokhan Ozden, Pennsylvania State University
Dr. Ashkan Negahban, Pennsylvania State University

Technology Decisions of Engineering Students for Solving Calculus Questions
Dr. Emre Tokgoz, Quinnipiac University
Samantha Eddi Scarpinella, Quinnipiac University
Mr. Michael Giannone, Quinnipiac University
**Work in Progress: Homework in the Digital Age: The Implementation, Effects, and Perception of Randomly Generated Custom Digital Assignments**

Dr. David Beevers, Pennsylvania State University
Dr. Qi Dunsworth, Pennsylvania State University

**The Rise of Program Auto-grading in Introductory CS Courses: A Case Study of zyLabs**

Chelsea L. Gordon, zyBooks, A Wiley Brand
Prof. Roman Lysecky, University of Arizona; zyBooks, A Wiley Brand
Prof. Frank Vahid, University of California, Riverside

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**W109 - Construction Engineering Division Technical Session 1**

**8:00 A.M. - 9:30 A.M.**

**Sponsor: Construction Engineering Division**

**Moderators: Sanjeev Adhikari, Kennesaw State University; Norman Philipp, Pittsburg State University; Rachel Mosier, Oklahoma State University**

Topics for construction: gamification, virtual reality, and learning in the virtual environment

**Assessing the Effectiveness of Active-learning Approaches in Advancing Student Understanding of Construction Scheduling in a Virtual Environment**

Dr. Yewande S. Abraham, Rochester Institute of Technology
Dr. Bilge Gökhan Çelik, Roger Williams University
Max Frasier Spaan, Rochester Institute of Technology
Natalie Mansson

**Incorporating Virtual Reality in Construction Management Education**

Ms. Ramyani Sengupta, Purdue University, West Lafayette
Dr. Anthony E. Sparkling, Purdue University, West Lafayette

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**W108B - Computers in Education 10 - Technology 2**

**8:00 A.M. - 9:30 A.M.**

**Sponsor: Computers in Education Division**

**Moderators: David Titley-Peloquin, McGill University; Steven Barrett, University of Wyoming; Afrin Naz, West Virginia University Institute of Technology**

This session will focus on technology innovations to enhance education.

**Lessons for Effective Use of MATLAB and Simulink to Explore Advanced Topics: Application in a Vibrations Course**

Dr. Tristan M. Ericson, York College of Pennsylvania

**User Interface Design: Applying Heuristics for Improved Usability**

Ms. Irini Spyridakis, University of Washington

**Program Encryption Toolkit: A Tool for Digital Logic Education and Undergraduate Research**

Dr. Jeffrey Todd McDonald, University of South Alabama
Ms. Dawn McKinney, University of South Alabama
Dr. Todd R. Andel, University of South Alabama

**A Study on the Effectiveness of the CLICK Approach in an Operations Research Course**

Christian E. Lopez, Lafayette College
Dr. Omar Ashour, Pennsylvania State University
Mr. James Devin Cunningham, Carnegie Mellon University
Dr. Conrad Tucker, Carnegie Mellon University

**Examining the Social Construction of Cross-reality Technologies in Learning**

Dr. Valerie Varney, TH Cologne
Dr. Dominik May, University of Georgia
W110 - CPDD Presenter and Faculty Breakfast
7:00 A.M. - 7:45 A.M.
Sponsor: Continuing Professional Development Division
Moderator: Keith Plemmons

W111 - CIEC Social
9:00 A.M. - 9:30 A.M.
Sponsors: Cooperative and Experiential Education Division; Engineering Technology Division; College Industry Partnerships Division
Moderators: Katherine McConnell, University of Colorado Boulder; Robin Hammond, Arizona State University

Social function for member divisions associated with the Conference for Industry and Education Collaboration

W111B - CEED Business Meeting
7:00 A.M. - 7:45 A.M.
Sponsor: Cooperative and Experiential Education Division
Moderators: Katherine McConnell, University of Colorado Boulder; Robin Hammond, Arizona State University

Meeting to discuss CEED business. Open to all conference participants.

W113 - Design Teams 2
8:00 A.M. - 9:30 A.M.
Sponsor: Design in Engineering Education Division
Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, The Ohio State University

DEED technical session
Team Formation and Function Decisions and Student Roles on Diverse Engineering Design Teams
Dr. David A. Copp, University of California, Irvine
Ms. Alejandra Hormaza Mejia, University of California, Irvine
Dr. Mark E. Walter, University of California, Irvine
Prof. Natascha Trellinger Buswell, University of California, Irvine
Impacting Team-based Learning of First-year Engineering College Students via the Creation of an Upperclassman Project Management Course
Meghan Leigh Fajarillo
Ms. Angie Moussa
Dr. Yanfen Li, University of Massachusetts Lowell
Work in Progress: First-time Use of CATME in a Design Course
Dr. Joseph Towlles, Stanford University
Mr. Jeff Wood, Stanford University
Work in Progress: Review of Teaching Strategies Towards Development of a Framework for Online Teamwork
Mr. Swapneel Thite P.E., University of New South Wales
Dr. Jayashri Ravishankar, University of New South Wales
Dr. Araceli Martinez Ortiz, NASA Headquarters
Prof. Eliathamby Ambikatrajah, University of New South Wales

W113B - Design Across the Curriculum 2
8:00 A.M. - 9:30 A.M.
Sponsor: Design in Engineering Education Division
Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, The Ohio State University

DEED technical session
“Adding Stuff From Other People”: How Peer Comparison Influences Conceptual Modeling in Precollege Engineering Contexts
Ms. Katelyn Stenger, University of Virginia
Prof. Jennifer L. Chiu, University of Virginia
Dr. Sarah Jennings Fick, Washington State University
Work in Progress: Using Cost-effective Educational Robotics Kits in Engineering Education
Ms. Caroline Grace Sawatzki, Saginaw Valley State University
Dr. Rajani Muraleedharan, Saginaw Valley State University
Design Across the Curriculum: Reinforcing the Design Process in a Chemistry-for-Engineers Course
Prof. Katherine Goodman, University of Colorado Denver
Ms. Susan Garver Stirrup, University of Colorado Denver
The Evolution of Engineering Design Courses to a Hybrid-virtual Environment to Increase Student Engagement and Satisfaction
Nicholas Mulka, Georgia Institute of Technology
Kinsey Herrin, Georgia Institute of Technology
Dr. Amit Shashikant Jariwala, Georgia Institute of Technology

W114 - Innovative Pedagogies Afforded Through Technology and Remote Learning
8:00 A.M. - 9:30 A.M.
Sponsor: Educational Research and Methods Division
Moderators: Tracy Hammond, Texas A&M University; Donna Jaison, Texas A&M University
Remote and Hybrid Learning Environments: A Case for Promoting Student Engagement
Dr. Cijy Elizabeth Sunny, Baylor University
Dr. Gregory Warren Bucks, University of Cincinnati
A Combined E-Portfolio and Microcredentialing Tool for Engineering Identities and Career Pathways
Mr. Shivam Jindal, New York University
Dr. Jack Bringardner, New York University
Podcasting in Geophysics Education: How to Learn Without Removing the Headphones
Hector Zuniga-Robles, Universidad Andres Bello
Dr. Maria Elena Truyol, Universidad Andres Bello
Virtual Reality in STEM Education During COVID-19
Dr. Chadia A. Aji, Tuskegee University
Dr. M. Javed Khan, Tuskegee University
Augmented Reality Mobile Tool for Engineering Education
Ms. Manjina Shrestha, Georgia Institute of Technology
Serious Games in Engineering: The Current State, Trends, and Future
Javeed Kittur, Arizona State University, Polytechnic campus
Mr. Tahzinul Islam, York University

W115 - ECE Business Meeting
8:00 A.M. - 9:30 A.M.
Sponsor: Electrical and Computer Engineering Division
Moderators: Huihui Wang, St. Bonaventure University; Nader Rafla, Boise State University
Electrical and Computer Engineering Division business meeting

W118 - Engineering Design Graphics Division Technical Session 2: VR, AR, and CAD
8:00 A.M. - 9:30 A.M.
Sponsor: Engineering Design Graphics Division
Moderators: Abayomi Ajayi-Majebi, Central State University; Tony Glockler, SolidProfessor
This session features papers on the use of instructional aids such as virtual reality, augmented reality, and CAD to improve course instruction.
Augmented Reality-based Graphics Application to Assist Children with Autism Spectrum Disorder
Dr. Magesh Chandramouli, Purdue University Northwest
Ashayla Williams
Collaboration with Nursing in Computer-aided Design of Emergency Rooms
Prof. Robert P. Leland, Oral Roberts University
Mrs. Rachael Valentz, Oral Roberts University
Work in Progress Pilot Study: Virtual Reality for Computational Thinking Foundations and STEM Enrichment
Dr. Katherine Levenick Shirey, EduKatey
Dr. Magesh Chandramouli, Purdue University Northwest

W120 - Cross-cultural Sensitivity, Moral Imagination, and Diversity in Engineering Ethics Education
8:00 A.M. - 9:30 A.M.
Sponsor: Engineering Ethics Division
Moderators: Thirimachos Bourlai, University of Georgia; Nasser Saleh, Queen’s University
A Graduate-level Engineering Ethics Course: An Initial Attempt to Provoke Moral Imagination
Mr. Yousef Jalali, Virginia Polytechnic Institute and State University
Dr. Christian Matheis, Guilford College
Dr. Marc Edwards, Virginia Polytechnic Institute and State University
Culturally-based Ethical Barriers for American Indian/Alaska Native Students and Professionals in Engineering
Prof. Jani C. Ingram, Northern Arizona University
W121 - ELD Annual Business Meeting

8:00 A.M. - 9:30 A.M.
Sponsor: Engineering Libraries Division
Moderators: Kari Kozak, The University of Iowa; David Hubbard, Texas A&M University

Welcome to all Engineering Libraries Division members. Come hear about the state of the division and Professional Interest Council I. The ELD Business Meeting will take place over the ASEE Pathable platform. Those not registered for the conference but who have signed up on the Google form will be receiving a link to the event roughly 15 minutes before the meeting starts.

This annual business meeting will include updates from the various committees, update from the PIC I chair, and other events. The event will conclude with the Bernhardt, publishing, poster, and longevity awards ceremony.

W122A - CEMAL Meeting

7:00 A.M. - 7:45 A.M.
Sponsor: Engineering Management Division
Moderators: John Richards, US Army Corps of Engineers; Christopher Rowe, Vanderbilt University

Engineering Management Division - Council of Engineering Management Academic Leaders

W122B - Engineering Management Division Technical Session 1

8:00 A.M. - 9:30 A.M.
Sponsor: Engineering Management Division
Moderators: John Richards, US Army Corps of Engineers; Christopher Rowe, Vanderbilt University

Strategic Design of an Introductory Engineering Management Course for Active and Flexible Hybrid Delivery
Kellie Grasman, Missouri University of Science and Technology
Dr. Suzanna Long, Missouri University of Science and Technology

Explainable Artificial Intelligence (XAI) in Project Management Curriculum: Exploration and Application to Time, Cost, and Risk
Mr. Ben D. Radhakrishnan, National University
Dr. James Jay Jaurez, National University

W123A - JET Board Meeting

7:00 A.M. - 7:45 A.M.
Sponsor: Engineering Technology Division
Moderators: Christopher Leblanc, University of New Hampshire; Clay Gloster, North Carolina Agricultural and Technical State University

Summer meeting of the JET publications board

W123B - ECET Department Heads Meeting

8:00 A.M. - 9:30 A.M.
Sponsor: Engineering Technology Division
Moderators: Christopher Leblanc, University of New Hampshire; Clay Gloster, North Carolina Agricultural and Technical State University

Summer meeting of the electrical/computer ET department heads
W123C - Engineering Technology Capstone Projects

8:00 A.M. - 9:30 A.M.

Sponsor: Engineering Technology Division

Moderators: John Irwin, Michigan Technological University; Christopher Leblanc, University of New Hampshire; Clay Gloster, North Carolina Agricultural and Technical State University

Capstone Projects Focused on the Evaluation of Existing Structures
Dr. Jorge Antonio Tito P.E., University of Houston

Integration of Two Unique Senior Design Projects to Engineering Technology
Dr. Reg Pecen, Sam Houston State University
Dr. Ulan Dakeev, Sam Houston State University
Dr. Faruk Yildiz, Sam Houston State University
William Tanner Ursell, Sam Houston State University
Ms. Shelby Amber Spradley

IoT Environmental-monitoring System Development for Mosquito Research Through Capstone Project Integration in Engineering Technology
Dr. Byul Hur, Texas A&M University
Dr. Kevin Myles, Texas A&M University
Zach N. Adelman, Texas A&M University
Dr. Madhav Erraguntla, Texas A&M University
Dr. Mark A. Lawley, Texas A&M University
Dr. Eun Jung Kim, Texas A&M University
Mr. Joseph Louis Burgi
Mr. Kevin Price, Texas A&M University
Mr. Keith Fritz, Texas A&M University
Mr. Dakotah Hawke Stalcup
Mr. Zhihao Pan, Texas A&M University
Zachary Stokes, Texas A&M University
Mr. Blaine Wilson Harris, Texas A&M University
Mr. Fernando Aguado, AIM-N
Carter B. Wheat, Texas A&M University
Jonathan Gavlick, AIM-N
Maxwell Macauley Martin
Mr. Hunter Street, Texas A&M University
Mr. Sungkeun Kim
Miss Xuan T. Dang

Relating Senior Project Time on Task to Student Scores
Dr. Jeunghwan Choi, Central Washington University
Prof. Charles Pringle, Central Washington University

Senior Elective Communications Systems Courses as Pathways to Capstone Projects in Electrical Engineering Technology Program
Dr. Otilia Popescu, Old Dominion University
Dr. Murat Kuzlu, Old Dominion University

W124 - Entrepreneurship and Engineering Innovation Division Technical Session 4

8:00 A.M. - 9:30 A.M.

Sponsor: Entrepreneurship & Engineering Innovation Division

Moderator: Jason Forsyth, James Madison University

Entrepreneurial Intent in Commuter-school Students
Dr. David G. Novick, University of Texas at El Paso
Mr. Nicholas A. Ramirez, University of Texas at El Paso
Mrs. Melanie Anne Realyvasquez

Research on Cultural Origins and Influence on Engineering Entrepreneurial Education Within Colleges and Universities in Chinese Mainland
Dr. Ming Li, Beijing Foreign Studies University

Experiential and Interactive Learning in Engineering Innovation and Entrepreneurship Program
Dr. Bala Maheswaran, Northeastern University

Student Motivation and Self-efficacy in Entrepreneurial-minded Learning (EML): What These Mean for Diversity and Inclusion in Engineering Classrooms
Prof. Erin A. Henslee, Wake Forest University
Dr. Lauren Lowman, Wake Forest University
Dr. Michael D. Gross, Wake Forest University
Dr. Anita K. McCauley, Wake Forest University

The Urgency of Intersectionality: A Review of Racialized Experiences in STEM Entrepreneurship
Jocelyn L. Jackson, University of Michigan
Dr. Aileen Huang-Saad, Northeastern University
Dr. Joi-Lynn Mondisa, University of Michigan
W125 - EED Business Meeting
8:00 A.M. - 9:30 A.M.
Sponsor: Environmental Engineering Division
Moderators: Fethiye Ozis, Northern Arizona University; Michelle Marincel Payne, Rose-Hulman Institute of Technology

W126 - Adaptation of Laboratory-based Courses During a Pandemic: Experimentation and Laboratory-oriented Studies Division
8:00 A.M. - 9:30 A.M.
Sponsor: Experimentation and Laboratory-Oriented Studies Division
Moderators: Jacob Bishop, Southern Utah University; Sally Pardue, Tennessee Technological University

Authors in this session will present on the adaptation of laboratory-based courses to meet the unique circumstances of a pandemic, including the use of hybrid, online, and virtual formats, as well as the use of home-based laboratory kits.

Participation and Learning in Labs Before and During a Pandemic
- Ms. Madalyn Wilson-Fetrow, University of New Mexico
- Dr. Vanessa Svhila, University of New Mexico
- Dr. Ardeshir Raihanian Mashhadi, University at Buffalo
- Tracy L. Mallette, University of New Mexico
- Andrew P. Shreve, University of New Mexico

Teaching and Managing Remote Lab-based Courses
- Dr. Mohamed A. S. Zaghoul, University of Pittsburgh
- Prof. Amr Hassan, University of Pittsburgh
- Prof. Ahmed Dallal, University of Pittsburgh

Undergraduate Engineering Laboratories During COVID-19 Pandemic
- Dr. Maria Javaid, Indiana State University
- Mrs. Edie L. Wittenmyer, Indiana State University
- Oscar Henriquez, Indiana State University
- Mr. Larry D. Pritchett, Indiana State University

Using Collective Wisdom to Enhance Experimental Learning During the COVID-19 Pandemic
- Dr. Jason Yao, East Carolina University
- Dr. Ricky T. Castles, East Carolina University
- Dr. Chris Venters, East Carolina University
- Nic Herndon
- Mrs. Melinda T. Doty, East Carolina University

W127A - First-Year Programs Division Business Meeting
7:00 A.M. - 7:45 A.M.
Sponsor: First-Year Programs Division
Moderators: Timothy Hinds, Michigan State University; Kaitlin Mallouk, Rowan University

This is the First-Year Programs Division (FPD) business meeting; all FPD members are encouraged to attend. Division business (e.g., elections) occurs during this session and opportunities to become more involved in the division are provided.

W127B - First-Year Programs: Virtual Instruction in the First Year II
8:00 A.M. - 9:30 A.M.
Sponsor: First-Year Programs Division
Moderators: Gregory Bucks, University of Cincinnati; Jill Davishahl, Western Washington University; Kaitlin Mallouk, Rowan University; Timothy Hinds, Michigan State University; J. Hylton, Ohio Northern University

Traditional Lecture Format vs. Active Teaching Format in an Online Freshman Engineering Course
- Dr. Nina Kamath Telang, University of Texas at Austin
- Miss Nisha Abraham, University of Texas at Austin
- Mohana Seelan, University of Texas at Austin
- Mr. Ramakrishna Sai Annaluru, University of Texas at Austin

Mechanical Engineering Activity-Based Freshman Course Online During a Pandemic
- Prof. Dani Fadda P.E., University of Texas at Dallas
- Dr. Oziel Rios, University of Texas at Dallas

Project-Based Learning: Contrasting Experience Between Traditional Face-to-Face Instruction and Virtual Instruction
- Dr. Jaya Dofe, California State University, Fullerton
- Dr. Sudarshan T. Kurwadkar, California State University, Fullerton
The Effectiveness of Synchronous vs. Asynchronous Modes of Instruction in an Online Flipped Design Thinking Course

Lakshmy Mohandas, Purdue University at West Lafayette
Prof. Nathan Mentzer, Purdue University at West Lafayette

Transposing Gagne to the Online Realm

Randy Hugh Brooks, Texas A&M University

How Male Students Talk About the Female Student Experience on Teams

Megan Keough, University of Michigan
Dr. Laura Hirshfield, University of Michigan
Dr. Robin Fowler, University of Michigan

W127C - First-Year Programs: Student Perceptions and Perspectives

8:00 A.M. - 9:30 A.M.
Sponsor: First-Year Programs Division

Moderators: Jack Bringardner, New York University; Kyle Gipson, James Madison University; Kaitlin Mallouk, Rowan University; Timothy Hinds, Michigan State University

Bias in First-Year Engineering Student Peer Evaluations
Lea Wittie, Bucknell University
James Bennett, Cornell University
Carly Merrill, Bucknell University
Dr. Jove Graham, Geisinger
Troy Schwab, Bucknell University

Longitudinal Effects of Team-Based Training on Students’ Peer Rating Quality
Mr. Siqing Wei, Purdue University at West Lafayette
Mr. Chuhan Zhou
Dr. Matthew W. Ohland, Purdue University at West Lafayette

Examining In-Person and Asynchronous Information-Seeking Behavior Instruction Among First-Year Engineering Students

Dr. George James Lamont, University of Waterloo
Ms. Stephanie Mutch, University of Waterloo
Chimdindu Ohaegbu, University of Waterloo
Mr. Hamza Z. Butt, University of Waterloo
Dr. Kate Mercer, University of Waterloo
Kari D. Weaver, University of Waterloo

Students’ Concerns and What They Look Forward To: A Comparison of COVID-19 Versus Pre-COVID-19

Dr. Nora Honken, University of Cincinnati
Angela Boronyak, University of Cincinnati
Lt. James Edward Roethler, Spalding University
Dr. Aimee M. Frame, University of Cincinnati
Dr. Cedrick Kwiumy, University of Cincinnati

W128 - Graduate Studies Division Technical Session 4
8:00 A.M. - 9:30 A.M.
Sponsor: Graduate Studies Division

Moderators: Diane Peters, Kettering University; Jeffrey Fergus, Auburn University

Content Analysis of Data Science Graduate Programs in the U.S.
Dr. Duo Li, Shenyang City University
Dr. Elizabeth Milonas, New York City College of Technology
Dr. Qiping Zhang, Long Island University

Pathways to Entrepreneurship (PAtENT) Program: Reimagining STEM Doctoral Programs
Dr. Audrey Rorrer, University of North Carolina at Charlotte
Dr. David K. Pugalee, University of North Carolina at Charlotte
Praveen Ramaprabhu, University of North Carolina at Charlotte
Dr. Mesbah Uddin, University of North Carolina at Charlotte
Dr. Harish P. Cherukuri, University of North Carolina at Charlotte
Prof. Terry Xu, University of North Carolina at Charlotte
Deep Prajapati, University of North Carolina at Charlotte

The Rapid Model: Initial Results From Testing a Model to Set Up a Course-Sharing Consortia for STEM Programs at the Graduate Level
Dr. Thomas L. Acker, Northern Arizona University
Dr. Nena E. Bloom, Northern Arizona University

Theoretical and Applied Perspectives on Online Graduate Engineering Education: Learning-Centered Vision, Administration, and Course Design
Dr. Andrea Gregg, Pennsylvania State University
Catherine G.P. Berdanier, Pennsylvania State University
Prof. Karen A. Thole, Pennsylvania State University

ASEE online session locator can be found at www.asee.org/osl
W129 - Industrial Engineering Division Technical Session 2

8:00 A.M. - 9:30 A.M.

Sponsor: Industrial Engineering Division

Moderators: Raymond Smith, East Carolina University; Ebisa Wollega, Colorado State University - Pueblo; McKenzie Landrum, University of Florida

An interesting assortment of papers with topics related to pedagogy, e-learning acceptance, quizzing effectively, and poetry. All are welcome.

Using Quizzes Effectively: Understanding the Effects of Quiz Timing on Student Motivation and Knowledge Retention

Major John Case, United States Military Academy
Major Dereck Kennedy, United States Military Academy

Effects of Pedagogical Changes to an Engineering Capstone Course During the COVID-19 Pandemic

Dr. Michael Daniel Sherwin P.E., University of Pittsburgh
Prof. Bopaya Bidanda, University of Pittsburgh

Understanding E-Learning Acceptance of Gen Z Students: An Extension of the Technology Acceptance Model (TAM)

Dr. Sanaz Motamedi, University of Florida
Ms. Kierra Marquis
Hannah Levine

Poetry Writing in Engineering Education: Results and Insights From an Exploratory Study

Prof. Elif Akcali, University of Florida
Mariana Buraglia, University of Florida
Ms. Andrea Essenfeld, University of Florida
Dr. Jade Williams, University of Florida

Fundamental Theorem Learning With Optimum Pedagogy for Technology Integration in Quality Control Course

Ms. McKenzie Landrum, University of Florida
Mr. Austin Hayes, University of Florida
Josefina Giamichelle
Dr. Sima Sabahi, University of Florida
Ms. Sanaz Motamedi, University of Florida

W130 - Computing and Information Technology Division Technical Session 5

8:00 A.M. - 9:30 A.M.

Sponsor: Computing and Information Technology Division

Moderators: Mudasser Wyne, National University; Thirimachos Bourlai, University of Georgia; Reza Sanati-Mehrizy, Utah Valley University; Afsaneh Minaie, Utah Valley University

This session presents papers on a variety of topics pertaining to computing and information technology.

A Study of Differential Equation Solver Suites and Real-world Applications Using Python, Maple, and Matlab

Dr. Mohammad Rafiq Muqri, DeVry University, Ontario, CA
Dr. Moe Saouli, DeVry University, Pomona

Broadening the Middle School Computational Thinking Interventions Beyond Block Programming

Dr. Mohsen M. Dorodchi, University of North Carolina at Charlotte
Alexandria Benedict, University of North Carolina at Charlotte
Audrey Rorrer

CS + X: Coordinate Major in Computer Science

Anastasia Kurdia, Tulane University

Social-belonging Intervention in a Computer Science Systems Course

Dr. Shanon Marie Reckinger, University of Illinois at Chicago
Dr. Chris Gregg, Stanford University
Dr. Bryce E. Hughes, Montana State University Bozeman

Summer Coding Camp: Curriculum, Experiences, and Evaluation

Dr. Paea LePendu, University of California, Riverside
Dr. Cecilia Cheung, University of California, Riverside
Mariam Salloum, University of California, Riverside
Pamela Sheffler, University of California, Riverside
Ms. Kelly Downey, University of California, Riverside
W133 - Pre-College Engineering Education Division Technical Session 7

8:00 A.M. - 9:30 A.M.

Sponsor: Pre-College Engineering Education Division

Moderators: Mary Nyaema, The University of Illinois at Chicago; Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University

Student (self-)perceptions

What Factors Influence the Interest of Male and Female Students in STEM (Evaluation)

Samuel Douglas Bast
Ms. Trinity Borland, Wartburg College
Dr. Murad Musa Mahmoud, Wartburg College
Dr. Cristian Gerardo Allen, Wartburg College
Prof. Kurt Henry Becker, Utah State University

Fostering Student Beliefs About Engineering and Mathematics Through Integrated Instruction (RTP)

Latanya Robinson, Florida International University
Dr. Adam Kirn, University of Nevada, Reno
Dr. Candice Guy-Gaytán, BSCS Science Learning
Dr. Joshua Alexander Ellis, Florida International University

Development of a K-12 STEM Observation Protocol (STEM-OP) (RTP)

Dr. Emily Anna Dare, Florida International University
Mr. Benny Mart Reblando Hiwatig, University of Minnesota - Twin Cities
Khomson Keratithamkul, University of Minnesota
Dr. Joshua Alexander Ellis, Florida International University
Dr. Gillian Roehrig, University of Minnesota - Twin Cities
Dr. Elizabeth A. Ring-Whalen, St. Catherine University
Dr. Mark Rouleau, Michigan Technological University
Ms. Farah Faruqi, University of Minnesota - Twin Cities
Mr. Corbin Rice
Dr. Preethi Titu, Kennesaw State University
Dr. Feng Li, Florida International University
Dr. Jeanna R. Wieselmann, Southern Methodist University
Elizabeth A. Crotty, University of Wisconsin - Eau Claire

W133B - Pre-College Engineering Education Division Technical Session 8

8:00 A.M. - 9:30 A.M.

Sponsor: Pre-College Engineering Education Division

Moderators: Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University; Joni Lakin, The University of Alabama

Teacher PD (Secondary)

Improving Integrated STEM Education: The Design and Development of the Fit of Personal Interests and Perceptions of Engineering Survey (F-PIPES) Instrument (Fundamental)

Dr. Morgan M. Hynes, Purdue University at West Lafayette
Mrs. Kayla R. Maxey, Purdue University at West Lafayette
Prof. Rong Su, University of Iowa

Engineering Pedagogy Scale (EPS): Preliminary Development of an Observational Instrument to Detect Elementary Teachers’ Level of Engineering-Pedagogical Content Knowledge (E-PCK) (Fundamental)

Dr. Ibrahim H. Yeter, National Institute of Education, Nanyang Technological University

Improving In-Service Science and Mathematics Teachers’ Engineering and Technology Content and Pedagogical Knowledge (Evaluation)

Emel Cevik, Texas A&M University
Dr. Bugrahan Yalvac, Texas A&M University
Dr. Michael D. Johnson, Texas A&M University
Dr. Mathew Kuttolamadom, Texas A&M University
Dr. Jay R. Porter, Texas A&M University
Jennifer Whitfield
Dr. Joseph A. Morgan, Texas A&M University

W134A - Social Justice: Pedagogy, Curricular Reform, and Activism

8:00 A.M. - 9:30 A.M.

Sponsor: Liberal Education/Engineering & Society Division

Moderator: Marie Stettler Kleine, Colorado School of Mines

Towards Justice in Undergraduate Computer Science Education: Possibilities in Power, Equity, and Praxis

Gabriel Medina-Kim, Rensselaer Polytechnic Institute
Experiences of Engineering Students Participating in an Abolitionist Labor Strike
Joseph Valle, University of Michigan - Ann Arbor
Israa Ali, University of Michigan
Dr. Corin L. Bowen, California State University, Los Angeles
Dr. Donna M. Riley, Purdue University at West Lafayette

Strategic Disruptions Toward a More Liberatory Engineering Education
Dr. Rachel Koh, Smith College
Dr. Jenn Stroud Rossmann, Lafayette College

W134C - Creating an Engineering Communication Community Within ASEE and Beyond
9:45 A.M. - 11:15 A.M.
Sponsor: Liberal Education/Engineering & Society Division
Moderators: Kathryn Neeley, University of Virginia; Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University
Speakers: Mr. Michael Alley, Pennsylvania State University; Dr. Judith Shaul Norback, Georgia Institute of Technology; Dr. Kathryn A. Neeley, University of Virginia

Quantitative analysis of papers presented at the ASEE annual conference over the last five years suggests that interest in communication is both growing and becoming more dispersed across ASEE (67 papers in 2019 vs. 33 in 2015; 20 divisions with papers on communication in 2019 vs. 15 in 2015; 13 sessions with all or most papers focusing on communication in 2019 vs. 6 in 2015). Given these circumstances, creating a network of the people working in the area becomes simultaneously more important and more challenging. This special session is designed to make those people and their scholarship more visible to each other and to begin building an engineering communication community within ASEE and beyond.

The panelists in this session will explore the possibilities for consolidating research in engineering communication so that we can build on each other’s work more effectively and get a clearer view of the commonality that exists despite local variations in how communication pedagogy is organized and funded across institutions. The speakers represent a broad range of institutions, program trajectories, and individual career patterns.

Organizers:
Michael Alley, Associate Professor of Engineering Communication, Pennsylvania State University
Judith Norback, President, Center of Excellence for Workplace Communications, LLC
Kay Neeley, Associate Professor of Science, Technology, and Society, University of Virginia

Panelists:
Lisa Bourgeois, Georgia Tech
Brandiff Caron, Concordia University

W134B - Engineering Communication I: History and Praxis
8:00 A.M. - 9:30 A.M.
Sponsor: Liberal Education/Engineering & Society Division
Moderators: Deborah Tihanyi, University of Toronto; Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University

Engineering Judgment and Decision Making in Undergraduate Student Writing
Dr. Royce Francis, George Washington University
Dr. Marie C. Paretti, Virginia Polytechnic Institute and State University
Dr. Rachel Riedner, George Washington University

Scaling and Sustaining of a Liberal Arts Speaking Course That Targets Engineering Students
Dr. Marcy Bloom Milhomme, Pennsylvania State University
Mr. Michael Alley, Pennsylvania State University
Lori B. Miraldi, Pennsylvania State University

Dr. Kathryn A. Neeley, University of Virginia
Mr. Michael Alley, Pennsylvania State University
W134D - Liberal Education/Engineering and Society (LEES) Division Business Meeting

7:00 A.M. - 8:00 A.M.
Sponsor: Liberal Education/Engineering & Society Division
Moderators: Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University; Justin Hess, Purdue University at West Lafayette

W135 - Manufacturing Division Technical Session - Innovative Pedagogy in Manufacturing Education

8:00 A.M. - 9:30 A.M.
Sponsor: Manufacturing Division
Moderators: Arif Sirinterlikci, Robert Morris University; Zhenhua Wu, Virginia State University

Innovative Delivery of 3D Printing
- Dr. Ismail Fidan, Tennessee Technological University
- Dr. George Chitiyo, Tennessee Technological University
- Dr. Perihan Fidan, Tennessee Technological University
- Mr. Ankit Gupta, Tennessee Technological University
- Mr. Seymur Hasanov, Tennessee Technological University
- Dr. Allen Munyarakidi Mathende, Tennessee Technological University
- Mr. Zhicheng Zhang, Tennessee Technological University

Industry-Driven Design and Manufacturing Course for Aerospace Engineering
- Dr. Zhenhua Wu, Virginia State University
- Mr. Lorin Scott Sodell, Virginia State University
- Prof. A.A. Elmustafa, Old Dominion University and The Applied Research Center-Thomas Jefferson National Accelerator Facility

Dr. Dawit Haile, Virginia State University

Innovating in the Time of National Emergency: Manufacturing PPE during Covid-19, A Case Study
- Dr. Shuvra Das, University of Detroit Mercy
- Dr. Megan O. Conrad, University of Detroit Mercy

Quality Control in System Optimization of an Electrohydraulic System
- Dr. Mustafa Shraim, Ohio University
- Dr. Yuqiu You, Ohio University

W136 - Hybrid and Online Learning

8:00 A.M. - 9:30 A.M.
Sponsor: Materials Division
Moderators: Lessa Grunenfelder, University of Southern California; Nicole Johnson-Glauch, California Polytechnic State University, San Luis Obispo

An Investigation of the Benefits of Short Online Interviews in a Materials Science Course
- Dr. Alison K. Polasik, The Ohio State University
- Dr. Anastasia Marie Rynearson, Campbell University

Re-inventing a Mechanical Properties of Materials Laboratory Course for Online Learning
- Dr. Susan P. Gentry, University of California, Davis
- Gianmarco Sahragard-Monfared, University of California, Davis
- Edward Thomas Conley, University of California, Davis

Teaching Materials Science Labs Online Asynchronously
- Dr. Surendra "Vinnie" K. Gupta, Rochester Institute of Technology

The Development of a Virtual Research Preparation and Professional Development Program
- Dr. Tiffany A. Mathews, Pennsylvania State University
- Dr. Kirstin Purdy Drew, Pennsylvania State University
- Kristin Ann Dreyer, Center for Nanoscale Science (an NSF-funded MRSEC)
W138 - Machine Design Related
8:00 A.M. - 9:30 A.M.

Sponsor: Mechanical Engineering Division

Moderators: David Mikesell, Ohio Northern University; Rungun Nathan, Pennsylvania State University, Berks Campus; Thomas DeNucci, United States Coast Guard Academy

Papers in this session are related to machine design or design.

**Longitudinal Study of a Project-Based Learning Methods Replacement for Lecture-Based Courses**
Dr. Alan Jones, Indiana University - Purdue University, Indianapolis
Mr. Michael Golub, Indiana University - Purdue University, Indianapolis

**Switching Gears in Machine Design; A Focus Toward Technical Writing Skills in Lieu of a Hands-On Semester Design and Fabrication Project**
Dr. Dennis O'Connor, California State University, Chico

**Teaching GD&T Fundamentals in the Course Design of Machine Elements**
Dr. Xiaobin Le P.E., Wentworth Institute of Technology
Prof. Anthony William Duva P.E., Wentworth Institute of Technology
Prof. Richard L. Roberts, Wentworth Institute of Technology

**The Development and Use of Moderated Engineering Teaming Exercises (METE)**
Dr. John A. Mirth, St. Cloud State University

**Using 3D Printed Teaching Pass-Arounds for Mechanical Design Courses**
Dr. Edward James Diehl P.E., University of Hartford

W138B - ME Department Head Meeting
8:00 A.M. - 9:30 A.M.

Sponsor: Mechanical Engineering Division

Moderators: Rungun Nathan, Pennsylvania State University, Berks Campus; Thomas DeNucci, United States Coast Guard Academy

The is the ASME mechanical engineering department head or chairs meeting.

W139 - MASS: Mastery, Assessment and Success of Students
8:00 A.M. - 9:30 A.M.

Sponsor: Mechanics Division

Moderators: Geoffrey Recktenwald, Michigan State University; Jordan Jarrett, Colorado State University; Julian Davis, University of Southern Indiana; Masoud Rais-Rohani, University of Maine

Interested in learning more about mastery, assessment and preparing students to be successful in your classroom? You need to be here!

**Stimulating Student Preparation in Introductory Engineering Mechanics**
Major Brad Gregory Davis, United States Military Academy
Dr. Kevin Francis McMullen, United States Military Academy
Mr. J. Adam Pegues, United States Military Academy

Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo
Jenna Landy, California Polytechnic State University, San Luis Obispo
Dr. James M. Widmann, California Polytechnic State University, San Luis Obispo
Dr. John Chen, California Polytechnic State University, San Luis Obispo
Christina Grigorian, California Polytechnic State University, San Luis Obispo
Michelle Kerfs, California Polytechnic State University, San Luis Obispo

**Toward Benchmarking Student Progress in Mechanics: Assessing Learning Cycles through Mastery Learning and Concept Questions**
Dr. Christopher Papadopoulos, University of Puerto Rico, Mayaguez Campus
Dr. Aidsa I. Santiago-Román, University of Puerto Rico, Mayaguez Campus
Edward Fritz Hillman, University of Puerto Rico, Mayaguez Campus
Mr. Gerald Luciano Figueroa, University of Puerto Rico, Mayaguez Campus
Isamarie Vega Morales, University of Puerto Rico, Mayaguez Campus
Turning Office Hours into Study Sessions: Impacts on Students’ Homework and Exam Grades

Prof. Liza Boyle, Humboldt State University
Mr. Jason Patrick Marcus Reid, Humboldt State University

What Do Students Know After Statics? Using Mastery-based Grading to Create a Student Portfolio

Dr. Amie Baisley, University of Florida
Prof. Keith D. Hjelmstad, Arizona State University

W140 - Minorities in Engineering Division Technical Session 5

8:00 A.M. - 9:30 A.M.

Sponsor: Minorities in Engineering Division

Moderators: Nasser Saleh, Queen’s University; Kristin Imhoff, Saint Joseph’s University; Trina Fletcher, Florida International University

A Systematic Review of Social Constructivist Pedagogies in Computing and their Effects on Broadening Participation for Women in Undergraduate Computing (Research)

Jasmine Skye Batten, Florida International University
Dr. Monique S. Ross, Florida International University

Allies, Advocates, and Accomplices: A Critical Look at the Relationships Between White and Black Women in Engineering Education

Dr. Kristen Moore, University at Buffalo, The State University of New York
Dr. Monica Farmer Cox, The Ohio State University

Work in Progress: Early Exploration of Engineering Students’ Perspectives about Diversity, Equity, and Inclusion in an Introductory Materials Science and Engineering Course

Dr. Aroba Saleem, University of Florida
Dr. Sindia M. Rivera-Jimenez, University of Florida
Idalis Villanueva, University of Florida

Queering Engineering Through a Student-Driven LGBTQIA+ Reading Group (Experience)

Brandon Bakka, University of Texas at Austin
Ms. Vivian Xian-Wei Chou, University of Texas at Austin
Dr. Maura Borrego, University of Texas at Austin
Patricia Clayton, University of Texas at Austin
Gabriella P. Sugerman, University of Texas at Austin
Cassandra Prince, LGBTQ+ STEM Issues and Advocacy
Jeffrey Marchioni, The University of Texas at Austin
Ms. Ria Upreti

W141 - Multidisciplinary Engineering Division Business Meeting

8:00 A.M. - 9:30 A.M.

Sponsor: Multidisciplinary Engineering Division

Moderators: Cynthia Barnicki, Milwaukee School of Engineering; AJ Hamlin, Michigan Technological University

Get involved in the MULTI Division. The business meeting is open to all interested ASEE members.

W145 - Engineering Physics and Physics Division Technical Session 2

8:00 A.M. - 9:30 A.M.

Sponsor: Engineering Physics and Physics Division

Moderators: Robert Ross, University of Detroit Mercy; Bala Maheswaran, Northeastern University

Simulation of Multiple-Degree-of-Freedom Oscillatory Systems Within an Undergraduate Project-based Learning Environment

Dr. Günter Bischof, Joanneum University of Applied Sciences
Lukas Eckstein, Joanneum University of Applied Sciences
Benjamin Gahleitner, Joanneum University of Applied Sciences
Mr. Mario Gasparic, Joanneum University of Applied Sciences
Mr. Moritz Reisenberger, Joanneum University of Applied Sciences
Mr. Sascha Savoric, Joanneum University of Applied Sciences
Mr. Christian J. Steinmann, HM&S IT Consulting
Mr. Alexander Tretton

Aliasing Effect Near Sampling Frequency

Prof. Yumin Zhang, Southeast Missouri State University

Harvesting Electricity from Sound Waves: An Application of Faraday’s Law

Dr. Bala Maheswaran, Northeastern University
Smeet Patel, Northeastern University
James Flanagan
Carly Tamer, Northeastern University
Nadav Nielsen, Northeastern University
Mr. Matt Prescott
W150 - Workforce Preparation at the Two-Year College

8:00 A.M. - 9:30 A.M.

Sponsor: Two-Year College Division

Moderators: Philip Regalbuto, Trident Technical College; Deepak Bhatia, MathWorks

A look at programs that focus on workforce preparation of two-year college students.

Adding Industry-Based Certification and a Recruiting Partnership to Increase High School Participation in a Workforce Pathways Project

- Ms. Alicia Boudreaux Kiremire, FlowStream Management LLC
- Mr. Gerry Caskey, Louisiana Delta Community College
- Mr. Marvin Nelson Jr., Bossier Parish School for Technology & Innovative Learning
- Miss Sidney Taylor Thomas, Applied Research for Organizational Settings (AROS)
- Dr. Michael K. Swanbom PE, Louisiana Tech University

Building a Student-to-Workforce Pipeline for 21st Century Cloud Industry Careers

- Dr. Elodie Billionniere, Miami Dade College
- Prof. Lawrence Eric Meyer Jr., Miami Dade Community College

Design and Development of a Horizontal CTE Curriculum to Prepare Students for the New Manufacturing Economy (Work in Progress)

- Ketan Thakare, Texas A&M University
- Mr. Osazuwa John Okundaye Jr, Texas A&M University
- Miss Qing Li, The Embodied Learning & Experience LAB
- Dr. Malini Natarajarathinam, Texas A&M University
- Dr. Sharon Lynn Chu, University of Florida
- Dr. Mathew Kuttolamadom, Texas A&M University
- Prof. Francis Quek, Texas A&M University

The Need for ABET Accreditation of Associate’s Cybersecurity Programs

- Dr. Rajendra K. Raj, Rochester Institute of Technology
- Dr. Cara Tang, Portland Community College
- Dr. David Gibson, United States Air Force Academy
- Dr. Lawrence G. Jones, Accreditation Board for Engineering and Technology
- Casey W. O’Brien, National CyberWatch Center

W151 - Women in Engineering Division Technical Session 10

8:00 A.M. - 9:30 A.M.

Sponsor: Women in Engineering Division

Moderators: Kleio Avrithi, Mercer University; June Keller, Houston Community College

Gender Segregation in the Occupations of Finnish Engineers

- Dr. Johanna Naukkarinen, Lappeenranta-Lahti University of Technology LUT
- Mrs. Susanna Bairoh, TEK (Academic Engineers and Architects in Finland)
- Ms. Sanna Putila, TEK (Academic Engineers and Architects in Finland)

Reversing Gender Stereotypes in STEM Education in a Gender-Segregated Region

- Safia Malallah, Kansas State University
- Mr. Salah Alfailakawi, Kansas State University
- Ms. Taiba Yousef Alkhurafi, Kuwait University
- Dr. Joshua Levi Weese, Kansas State University

A Study of Gender Differences in Career Choice in STEM Disciplines: The Case of Chilean Students

- Prof. Cristian Saavedra-Acuna, Universidad Andres Bello, Concepcion, Chile
- Dr. Monica Quezada-Espinoza, Universidad Andres Bello, Santiago, Chile

Women in Science and Technology Bio-Bio Meeting:
Empowering Young Women in Chile
Dr. Nacarid Delgado, Universidad Andres Bello, Concepcion, Chile
Dr. Karen Judith Correa, Universidad Andres Bello, Concepcion, Chile
Prof. Angeles Dominguez, Tecnologico de Monterrey, Monterrey, Mexico and Universidad Andres Bello, Santiago, Chile

Women’s Autonomy, Relatedness and Competence: A Comparison of Engineering Programs in Two Different Cultures
Nolgie Oquendo-Colon, University of Puerto Rico, Mayagüez Campus
Dr. Lourdes A. Medina, University of Puerto Rico, Mayagüez Campus
Dr. Maria Angelica Velazquez, Montana State University
Prof. David Claudio, Montana State University
Dr. Aidsa I. Santiago-Román, University of Puerto Rico, Mayagüez Campus

W152 - Community-Engaged Engineering Education Challenges and Opportunities in Light of COVID-19 Paper Presentations 1
12:00 P.M. - 1:30 P.M.
Sponsors: Community Engagement Division; Equity, Culture & Social Justice in Education Division; Liberal Education/Engineering & Society Division
Moderators: Kelly Bohrer, University of Dayton; Sarah Brownell, Rochester Institute of Technology; Joan Schuman, Missouri University of Science and Technology; Marybeth Lima, Louisiana State University and A&M College

This session is to follow the panel of invited speakers at the crossroads of ethics, community engagement, liberal education, and engineering and society. In this paper session, adapting engineering design projects serving vulnerable community partners in light of the pandemic will be explored.

This session is designed to advance conversations, connections, and practices within the multi-faceted field of inclusive and equitable community engagement in engineering education. After papers are presented, we will facilitate time for dialogue and critical reflection, essential practices of this field of engineering education. The session will end with collecting possible next-step action items proposed by attendees to continue this conversation through practice, pedagogy, and scholarship.

Teaching STEM to K-12 Students: Undergraduate Students Engaged in Engineering Pedagogical Development in a COVID-Persistent Learning Environment
Mr. Reed Marshall
Daylen James McGhee, United States Military Academy
Mr. Lixrine Epie Ngeme, United States Military Academy
Joseph Carl Price
Col. Aaron T. Hill Jr., United States Military Academy
Lt. Col. Brad C. McCoy, United States Military Academy
Lt. Col. Kevin P. Arnett P.E., United States Military Academy

Development and Delivery of an Interactive Renewable Energy Program for Under-Represented Minority High School Students in Philadelphia
Dr. Pritpal "Pali" Singh, Villanova University

Leveling the Playing Field: A Virtual Summer Camp for Women of Color
Dr. Whitney Gaskins, University of Cincinnati
Mrs. Paula Davis Lampley Esq., University of Cincinnati
Mrs. Krizia Leonela Cabrera-Toro, University of Cincinnati

Engagement in Practice: Performing STEM Outreach During a Pandemic
Dr. Bob Schaffer, Mission College

Making the Most of Virtual Community Engagement for International Projects During the COVID-19 Pandemic
Angelina Nicole Rivera, Colorado School of Mines
Dr. Jessica Mary Smith, Colorado School of Mines
Dr. Juan C. Lucena, Colorado School of Mines
Prof. Robin Bullock, Colorado School of Mines
Dr. Thomas J. Phelan, United States Air Force Academy
Prof. Kathleen M. Smits, The University of Texas at Arlington

W156 - Military and Veterans Division Technical Session 2
8:00 A.M. - 9:30 A.M.
Sponsor: Military and Veterans Division
Moderators: Rahul Verma, United States Military Academy; David Stringer, Kent State University, Kent; Patrick Bass, The Citadel

A Look into Increasing the Number of Veterans and Former Government Employees Converting to Career and Technical
Cybersecurity Teachers
Dr. Vukica M. Jovanovic, Old Dominion University
Mr. Michael Anthony Crespo, Granby High School, Norfolk Public Schools
Mr. Drew E. Brown, Old Dominion University
Ms. Deborah Marshall, Norfolk Public Schools Career & Technical Ed. Dept.
Dr. Otilia Popescu, Old Dominion University
Dr. Murat Kuzlu, Old Dominion University
Dr. Petros J. Katsiouloudis, Old Dominion University
Dr. Linda Vahala, Old Dominion University
Prof. Hongyi Michael Wu

Adapting Online Learning for the United States Military Academy
Major Raymond Vetter, United States Military Academy

Gendered Experience of Engineering Knowledge in Military Technology Class
Dr. Jae Hoon Lim, University of North Carolina at Charlotte
Dr. Peter Thomas Tkacik, University of North Carolina at Charlotte
Dr. Jerry Lynn Dahlberg Jr., University of North Carolina at Charlotte
Ms. Arna Erega, University of North Carolina at Charlotte

Non-Tactical Infrastructure Education to Support Special Operations (In-Progress)
Mr. Rahul Verma P.E., United States Military Academy

Leveraging DoD Relationships and Interests to Improve Undergraduate Education and Enhance the Structural Engineering Profession
Zachary Jordan Bunn, United States Military Academy
Julia Lyn Wyatt, United States Military Academy
Joshua N. Burns, United States Military Academy
Major Brian Riser, United States Military Academy
Lt. Col. Kevin P. Arnett P.E., United States Military Academy
Dr. Michael Gerhardt Oesterle, Naval Facilities Engineering and Expeditionary Warfare Center

High, Clemson University
This session focuses on research, practice, and lessons learned in faculty development. Traditional 12-minute presentations will be given, followed by three minutes of clarifying questions. The final 15-30 minutes will be for the group to synthesize major items learned, feedback for presenters, and future directions for faculty development. The audience will be engaged through polls, chats, and other features to make the session enjoyable for all.

Faculty Development Aimed at Sustaining and Enhancing Entrepreneurial-minded Learning
Dr. Nadiye O. Erdil, University of New Haven
Dr. Ronald S. Harichandran, University of New Haven
Dr. Maria-Isabel Carnasciali, University of New Haven
Dr. Jean Nocito-Gobel, University of New Haven
Dr. Goli Nossoni, University of New Haven
Dr. Emese Hadnagy, University of New Haven
Dr. Joseph A. Levert, University of New Haven
Dr. Junhui Zhao, University of New Haven

Quality Mentorship Matters: An Innovative Approach to Supporting Student Success in Engineering Undergraduate Research
Dr. Eleazar Marquez, Rice University
Dr. Samuel Garcia Jr., NASA EPDC

Faculty Mentorship and Research Productivity, Salary, and Job Satisfaction
Dr. Li Tan, Purdue University, West Lafayette
Dr. Joyce B. Main, Purdue University, West Lafayette

Supporting Students' Skillful Learning: Lessons Learned from a Faculty Development Workshop
Dr. Patrick Cunningham, Rose-Hulman Institute of Technology
Dr. Holly M. Matusovich, Virginia Polytechnic Institute and State University
Dr. Cheryl Carrico P.E., E4S, LLC
Dr. Rachel McCord Ellestad, University of Tennessee at Knoxville
Dr. Stacy Tantum, Duke University
Dr. Sophia T. Santillian, Duke University
Dr. Rebecca Simmons, Duke University

Creating a Peer Review of Teaching Process to Enhance Instructor Feedback in Engineering Education
Dr. Ann D. Christy P.E., Ohio State University
Dr. Jennifer L. Herman, Ohio State University
Lynn Hall, Ohio State University
Dr. David A. Delaine, Ohio State University

W157A - Faculty Development 3: Research, Practice, and Lessons Learned
8:00 A.M. - 9:30 A.M.
Sponsor: Faculty Development Division
Moderators: Sunay Palsole, Texas A&M University; Karen...
W160A - ASEE Fellows Networking Session (Fellows Only)

8:00 A.M. - 9:30 A.M., VIRTUAL, ONLINE
Sponsor: ASEE Headquarters
Moderator: Sarah Rajala, Iowa State University of Science and Technology

W166 - CMC Business Meeting

7:00 A.M. - 7:45 A.M., VIRTUAL, ONLINE
Sponsor: Corporate Member Council
Moderators: Dora Smith, Siemens Digital Industries Software; Dan Sayre, New World Associates, LLC
Annual business meeting

W167A - Zone I Business Meeting

7:30 A.M. - 8:30 A.M.
Sponsor: Council of Sections
Moderator: Brian Self, California Polytechnic State University, San Luis Obispo

Zone I promotes, encourages, and facilitates the various activities of ASEE's Mid-Atlantic, Northeast, and St. Lawrence sections. This meeting is open to all attendees.

W167B - Zone II Business Meeting

7:30 A.M. - 8:30 A.M.
Sponsor: Council of Sections
Moderator: Brian Self, California Polytechnic State University, San Luis Obispo

Zone II promotes, encourages, and facilitates the various activities of ASEE's Illinois-Indiana, North Central, and Southeastern sections. This meeting is open to all attendees.

W167C - Zone III Business Meeting

7:30 A.M. - 8:30 A.M.
Sponsor: Council of Sections
Moderator: Brian Self, California Polytechnic State University, San Luis Obispo

Zone III promotes, encourages, and facilitates the various activities of ASEE's Gulf Southwest, Midwest, and North Midwest sections. This meeting is open to all attendees.

W167D - Zone IV Business Meeting

7:30 A.M. - 8:30 A.M., VIRTUAL, ONLINE
Sponsor: Council of Sections
Moderator: Brian Self, California Polytechnic State University, San Luis Obispo

Zone IV promotes, encourages, and facilitates the various activities of ASEE's Pacific Northwest, Pacific Southwest, and Rocky Mountain sections. This meeting is open to all attendees.

W167E - Council of Sections Meeting

8:30 A.M. - 9:30 A.M., VIRTUAL, ONLINE
Sponsor: Council of Sections
Moderator: Brian Self, California Polytechnic State University, San Luis Obispo
Meeting of the Section and Zone leadership to promote discussion, discover promising opportunities, and chart future direction.

**W168 - EDC Business Meeting**
8:00 A.M. - 9:30 A.M.

**Sponsor:** Engineering Deans Council

**Moderators:** Virona Mehta, American Society for Engineering Education; Nathan Kahl, American Society for Engineering Education

This panel seeks to give a platform to center the voices of queer STEM students. In this panel, students from different backgrounds will get a chance to share their own experiences navigating the intersections of engineering and their queer identity. Participants will develop a better understanding of queer students in STEM and will learn actionable ways to apply this at their institution.

**W202 - Architectural Engineering Division Poster Session**
9:45 A.M. - 11:15 A.M.

**Sponsor:** Architectural Engineering Division

**Moderators:** John Phillips, Oklahoma State University; Carisa Ramming, Oklahoma State University

Join the Biomedical Engineering Division’s poster session for a showcase of ongoing effort in educational research or evidence-based practice specific to BME education. Papers in this session are works in progress, and will include ideas that have yet to be put into practice, or studies in which assessment data is still in the process of being collected and analyzed for impact. This interactive session promises novel and implementable takeaways, plus opportunities to provide authors with feedback as they continue to strengthen their BME education studies.

**W177 - Student Panel: Understanding Queer Experiences in Engineering**
8:00 A.M. - 9:30 A.M.

**Sponsor:** ASEE Committee on Diversity, Equity & Inclusion

**Moderators:** Jeanne Sanders, University of Nevada, Reno; Meagan Pollock, Engineer Inclusion

**Speakers:** Brandon Bakka, University of Texas at Austin; Madeleine Jennings, Arizona State University, Polytechnic campus; Mr. Hector Enrique Rodriguez-Simmonds, Purdue Engineering Education; Shannon Clancy, University of Michigan; Anna Pasek, University of Michigan; Jerry Austin Yang, Stanford University

**W199 - SPONSORED SESSION: Publishing Advanced Engineering Textbooks with Wiley - Presented by Wiley**
8:00 A.M. - 8:40 A.M.

**Sponsor:** Sponsored Sessions

**Speakers:** Lauren Poplawski, Wiley; Aileen Storry, Wiley

In this webinar, Lauren Poplawski, Editor, Mechanical Engineering, and Aileen Storry, Publisher, Electrical Engineering, will discuss the signs that you should write a new advanced textbook and how to go about planning it. The session will cover the process of book publishing, recent feedback on learning materials from instructors and students, what Wiley looks for in a textbook, and how to develop your ideas and pedagogy. All questions and feedback welcome!

**W204 - Biomedical Engineering Division Poster Session (Works in Progress)**
9:45 A.M. - 11:15 A.M.

**Sponsor:** Biomedical Engineering Division

**Moderators:** Aileen Huang-Saad, Northeastern University; Renata Ramos, Rice University; Tanya Nocera, The Ohio State University

In this webinar, Lauren Poplawski, Editor, Mechanical Engineering, and Aileen Storry, Publisher, Electrical Engineering, will discuss the signs that you should write a new advanced textbook and how to go about planning it. The session will cover the process of book publishing, recent feedback on learning materials from instructors and students, what Wiley looks for in a textbook, and how to develop your ideas and pedagogy. All questions and feedback welcome!
2021 ASEE Virtual Conference

Wednesday, July 28th Sessions

WIP: Student Outcomes From Rapidly Flipping a Large-Scale Biomedical Electronics Course
Dr. Charles W. Peak, Texas A&M University

WIP: Biomedical Sensors Laboratory Activities Using Labview and Adaptation for Virtual Instruction
Prof. Benjamin Hawkins, California Polytechnic State University, San Luis Obispo

WIP: Virtual Vs. Face-to-Face Synchronous Laboratory Instruction for Programming MATLAB for Biomedical Engineers
Prof. Benjamin Hawkins, California Polytechnic State University, San Luis Obispo

WIP: Enhancing Student Understanding of Impact Dynamics Using a Jupyter-Based Simulation Tool for Injury Analysis
Mr. Nicholas J. Caccese, CBE Consultants, Inc.
Dr. Robert S. Cargill II P.E., CBE Consultants, Inc.
Dr. Ruth Ochia P.E., Temple University

WIP: Mozilla Hubs Classes Fight Feelings of Isolation and Online Fatigue
Dr. Eric Gary Fuller, University of Florida

WIP: A New Undergraduate Biomedical Engineering Program: An Innovative Program in a Liberal Arts Institution
Dr. Loay A. W. Al-Zube, University of Mount Union
Dr. Chad S. Korach, University of Mount Union
Dr. Joshua Gargac, University of Mount Union

WIP: Conversion of a Biotransport Course From Face-to-Face to Online
Dr. Charles W. Patrick Jr., Texas A&M University

WIP: Defining Design as a Guide for Quality Improvement
Dr. Arash Mahboobin, University of Pittsburgh
Mark Gartner, University of Pittsburgh

WIP: Integration of Computational Modeling Active Learning Activities Within a Core Graduate Organ Systems Physiology Course
Dr. Timothy E. Allen, University of Virginia

WIP: Student Training in Data Analytics Approaches for Bioprocessing Through Co-Curricular Activities
Dr. Maryam Mobed-Miremadi, Santa Clara University
Navid Shaghaghi, Santa Clara University
Gangshu Cai, Santa Clara University
Dr. Prashanth Asuri, Santa Clara University

WIP: Supporting Student Mental Health: Understanding the Use of Biometrics Analysis in an Engineering Design Project to Promote Wellness
Isabel Miller, University of Illinois at Urbana - Champaign
Sara Xochilt Lamer, University of Illinois at Urbana - Champaign
Dr. Karin Jensen, University of Illinois at Urbana - Champaign
Prof. Holly M. Golecki, University of Illinois at Urbana - Champaign

WIP: Integration of Inclusive Mindset in a Middle-Year Biomedical Engineering Course: A Study Over Healthcare Disparities via Story-Driven Learning
Dr. Maysam Nezafati, Georgia Institute of Technology
Prof. Joseph M. LeDoux, Georgia Institute of Technology
Mr. Kelvin D’wayne Pierre II, Georgia Institute of Technology
Ms. Katherine Tsai Shook, Georgia Institute of Technology

WIP: Adaptive Design Engineering to Enable People With Disabilities in the University Setting
Dr. Tye D. Martin, University of New Mexico
Veronica Mitchell
Dr. Heather E. Canavan, University of New Mexico

WIP: Effectiveness of Different Reflection Approaches for Improving Mastery in an Engineering Laboratory Course
Ms. Amy N. Adkins, Northwestern University
Prof. David P. O’Neill, Northwestern University
Dr. Casey Jane Ankeny, Northwestern University

W205 - Chemical Engineering Division Poster Session

9:45 A.M. - 11:15 A.M.
Sponsor: Chemical Engineering Division
Moderators: VJ Tocco; Ashlee Ford Versypt, University at Buffalo, The State University of New York

Work-in-Progress: The Design of Up-to-Date Industry Problems for a Sophomore Chemical Engineering Course: Challenges and Gains of Industry Mentors
Dr. Betul Bilgin, The University of Illinois at Chicago
Prof. James W. Pellegrino, The University of Illinois at Chicago
Dr. Vikas Berry, The University of Illinois at Chicago

Work in Progress: Teamwork Skills Development in ChemE Car
Mr. Declan Thomas Mahaffey-Dowd, University of California,
2021 ASEE VIRTUAL CONFERENCE
WEDNESDAY, JULY 28th SESSIONS

W207 - College Industry Partnerships Division Poster Session
9:45 A.M. - 11:15 A.M.
Sponsor: College Industry Partnerships Division
Moderators: Charles Baukal, John Zink Co. LLC; Magdalini Lagoudas, Texas A&M University

Berkeley
Dr. Shannon Ciston, Lawrence Berkeley National Laboratory
Negar Beheshti Pour, University of California, Berkeley

Creating Data-Driven Undergraduate Student Engineering Typologies to Shape the Future of Work
Dr. David Pistrui, University of Detroit Mercy
Dr. Nassif E. Rayess, University of Detroit Mercy

Developing Undergraduate Water Program Courses: Meeting the Needs of the Egyptian Workforce
Mr. Mohammad Al Mestiraihi, Utah State University
Prof. Kurt Henry Becker, Utah State University
Dr. R. Ryan Dupont, Utah State University
Dr. David K. Stevens, Utah State University

Study of Organizational Knowledge Retention Practices in the Utilities
Eric G. Barnfather Jr., Purdue University at West Lafayette
Dr. Kelly A. McFall, Purdue University at West Lafayette
Dr. Anne M. Lucietto, Purdue University at West Lafayette

W215 - Electrical and Computer Engineering Division Poster Session
9:45 A.M. - 11:15 A.M.
Sponsor: Electrical and Computer Engineering Division
Moderators: Huihui Wang, St. Bonaventure University; Nader Rafla, Boise State University; Aaron Carpenter, Wentworth Institute of Technology; Kamran Iqbal, University of Arkansas at Little Rock

Enhancing Student Learning via Hardware in Homework
Dr. Selahattin Sayil, Lamar University

Develop a Remotely-Accessible, Open-Source, Portable, Software-Defined Radio-Based Antenna Range for Research, Education, and Outreach
Carl B. Dietrich, Virginia Polytechnic Institute and State University
Dr. Nicholas F. Polys, Virginia Polytechnic Institute and State University
Dr. Christian W. Hearn, Weber State University
Dr. Kenneth Reid, University of Indianapolis
Mr. Joshua Alexéi García Sheridan, Virginia Polytechnic Institute and State University
Mr. Xavier Gomez

Development, Implementation, and Evaluation of an Asynchronous Online Electric Circuits Laboratory
Prof. Wesley G. Lawson, University of Maryland College Park
Dr. Jennifer L. Kouo, Towson University

An Undergraduate Independent Study Project on the Design of a Home Automation System Using Global System for Mobile Communication
Dr. Eleanor Leung, York College of Pennsylvania

WIP: Detection of Student Misconceptions of Electrical Circuit Concepts in a Short-Answer Question Using NLP
Prof. James P. Becker, Montana State University, Bozeman
Dr. Indika Kahanda, University of North Florida
Nazmul H. Kazi, Montana State University

WIP: Support to Success: How Institutional Resources Foster Increased Academic Outcomes for Marginalized Students in Electrical and Computer Engineering Departments
Ms. Corrine M. Schwarting, Iowa State University
Mr. Kent A. Crick, Iowa State University
Prof. Mack Shelley, Iowa State University
Elise A. Frickey, Iowa State University
Ms. Madelyne Losby, Iowa State University
Dr. Lisa M. Larson, Iowa State University

A Super Department Model for Multi-University Collaboration
Dr. Kenneth A. Connor, Rensselaer Polytechnic Institute
Dr. Pamela Leigh-Mack, Virginia State University
Dr. Craig J. Scott, Morgan State University
Dr. Mohamed F. Chouikha, Prairie View A&M University
Dr. John C. Kelly, North Carolina Agricultural and Technical State University
Dr. Miguel Velez-Reyes, University of Texas at El Paso
Dr. Shiny Abraham, Seattle University
John Janowiak  
Claire Seifert  
Megan Bekolay  
Michelle Klein, Electrical and Computer Engineering Dept.  
Heads Assoc. (ECEDHA)  
Ms. Kim Simpao, Electrical and Computer Engineering Dept.  
Heads Assoc. (ECEDHA)  
Dr. Otsebele E. Nare, Hampton University  
Dr. Abdelnasser A. Eldek, Jackson State University  
Dr. Mandoye Ndoye, Tuskegee University

**Project in a Box: Self-Contained Instructional Hands-On Kits for Electrical Engineering Outreach**

Ms. Phuong Truong, University of California, San Diego  
Nicholas Stein, University of California, San Diego  
Prof. Truong Nguyen, University of California, San Diego

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**W216 - Energy Conversion and Conservation Division Poster Session**

**9:45 A.M. - 11:15 A.M.**

**Sponsor:** Energy Conversion and Conservation Division  
**Moderators:** Robert Kerestes, University of Pittsburgh; Ted Song, John Brown University

**W220 - Engineering Ethics Division Poster Session: Neuroethics and Secondary STEM Classrooms**

**9:45 A.M. - 11:15 A.M.**

**Sponsor:** Engineering Ethics Division  
**Moderator:** Kristen Bergsman, University of Washington  
**Partnerships and Pedagogies for Introducing Neuroethics to Secondary STEM Classrooms [Poster]**

Dr. Kristen Clapper Bergsman, University of Washington  
Sara Goering, University of Washington  
Dr. Eric H. Chudler, University of Washington

**W221 - Engineering Libraries Division Poster Session**

**9:45 A.M. - 11:15 A.M.**

**Sponsor:** Engineering Libraries Division  
**Moderators:** Kari Kazak, The University of Iowa; David Hubbard, Texas A&M University; Kelly Durkin Ruth, United States Naval Academy; Kristyn Caragher, The University of Illinois at Chicago; Renee Romero, University of California, Los Angeles; Christina Mayberry, California State University, Northridge  
**Augmented Library: A Vertically Integrated Project**

Dr. Matthew Frenkel, New York University  
Jada Forrester  
Mr. Andrew Qu  
Shinkyum (Kevin) Rho, New York University  
Sofia Rose Larson  
**Engineering Literature Retractions: Applications to Scholarly Communications Training**

Mrs. Daniela Solomon, Case Western Reserve University  
Christopher Heckman, St. Mary's College of Maryland  
**Online OER Champion Courses: How a Scrapy Solution to Cope With Capacity Turned Into a Vital Tool to Build OER Awareness, Interest, and Knowledge on Campus**

Emily Bongiovanni, Colorado School of Mines  
Ms. Brianna B. Buljung, Colorado School of Mines  
Mr. Alexander Luis Odicino, Colorado School of Mines  
Allyce Horan, Colorado School of Mines  
**The (Augmented) World Is Our Campus**

Mr. David S. Pixton, Brigham Young University  
Mr. Jared Aaron Landetta, Brigham Young University

**W226 - Experimentation and Laboratory-Oriented Studies Division Poster Session**

**9:45 A.M. - 11:15 A.M.**

**Sponsor:** Experimentation and Laboratory-Oriented Studies Division  
**Moderators:** Jacob Bishop, Southern Utah University; Sally Pardue, Tennessee Technological University  
**Development of Attachments for the Quanser Qube**

Dr. Diane L. Peters, Kettering University  
Mr. Aaron-Joseph Michael Jones
W227 - First-Year Programs Division Poster Session

9:45 A.M. - 11:15 A.M.
Sponsor: First-Year Programs Division
Moderators: Timothy Hinds, Michigan State University; Kaitlin Mallouk, Rowan University

WIP: Understanding the Communication Preferences of First-Year Students Before and During a Global Pandemic
Dr. Oziel Rios, University of Texas at Dallas
Prof. Dani Fadda P.E., University of Texas at Dallas

First-Year Engineering Students and Factors in Their Selection of a Major
Dr. Michael Elmore P.E., State University of New York at Binghamton
Mr. Koenraad E. Gieskes, State University of New York at Binghamton

WIP: Developing a Virtual Information Literacy Training Program for a Multi-Disciplinary First-Year Engineering Program
Mr. Alexander James Carroll, Vanderbilt University
Dr. Joshua Daniel Borycz, Vanderbilt University
Dr. Julianne Vernon, Vanderbilt University

WIP: Practical Applications for Students With Autism Spectrum Disorders in the Freshman Engineering Curriculum
Deana R. Delp Ph.D., Arizona State University

Leveraging Curriculum to Mitigate Engineering Killer Courses
Dr. Stephen Andrew Wilkerson P.E., York College of Pennsylvania
Prof. Inci Ruzybayev, York College of Pennsylvania
Dr. Ashley J. Earle, York College of Pennsylvania

WIP: Hands-On Learning in a Summer Bridge Program Targeting Underclassmen and Transfer Students at an HSI
Dr. Matthew Lucian Alexander P.E., Texas A&M University-Kingsville
Dr. Breanna Michelle Weir Bailey P.E., Texas A&M University-Kingsville
Mr. Rajashekar Reddy Mogiligidda, Texas A&M University-Kingsville
Dr. Mahesh Hosur, Texas A&M University-Kingsville
Dr. David Hicks, Texas A&M University-Kingsville
Dr. Michael Preuss, Exquiri Consulting, LLC

Introducing Simple Harmonic Motion – A Teaching Module in a First-Year Engineering Course
Dr. Christopher Horne, North Carolina Agricultural and Technical State University
Dr. Alexandra Kurepa, North Carolina Agricultural and Technical State University

WIP: A Layered Mentorship Program (LMP) for Engineering Student Success and Retention
Mr. Gregory Edward Simon, University of Colorado Denver
Dr. Maryam Darbeheshti, University of Colorado Denver
Miriam Howland Cummings, University of Colorado Denver
William Taylor Schupbach, University of Colorado Denver
Prof. Tom Altman, University of Colorado Denver
Dr. Michael S. Jacobson, University of Colorado Denver
Prof. Katherine Goodman, University of Colorado Denver

Crafting a Virtual Studio: Some Models and Implementations
Dr. Zachary Riggins del Rosario, Franklin W. Olin College of Engineering
Riya Aggarwal, Franklin W. Olin College of Engineering
Ms. Caitlin Anna Coffey, Franklin W. Olin College of Engineering
Arwen Sadler, Franklin W. Olin College of Engineering
Stephanos Matsumoto, Franklin W. Olin College of Engineering
Dr. Alison Wood, Franklin W. Olin College of Engineering
Prof. Paul Ruvolo, Franklin W. Olin College of Engineering
Dr. C. Jason Woodard, Franklin W. Olin College of Engineering

Effectiveness of Online Web-Native Content vs. Traditional Textbooks
Dr. Ashraf Badir P.E., Florida Gulf Coast University
Dr. Jeanette Hariharan, Florida Gulf Coast University

WIP: Effects of Arduino Microcontroller on First-Year Engineering Students
Mr. Aamir Fidai, Texas A&M University
Samiha Momin
Asma Salim Maredia, Texas A&M University
Insha Ashirali Umatiya

WIP: Short Online Films to Help First-Year Students Write Reports as Engineers
Mr. Michael Alley, Pennsylvania State University
Ms. Kaitlyn Pigeon, Pennsylvania State University
Dr. Stephanie Cutler, Pennsylvania State University

WIP: Halting Attrition in Civil Engineering Programs Through Lower-Division Engagement Course Implementation
**WIP: Enhancing Freshman Seminars With Themes: An Architectural Engineering Approach**
- Dr. Ryan Solnosky P.E., Pennsylvania State University
- Prof. M. Kevin Parfitt, Pennsylvania State University
- Dr. Sez Atamturktur Ph.D., Pennsylvania State University
- Prof. Moses Ling P.E., Pennsylvania State University

**Ten Years and Ten Lessons Learned: Design of an Introduction to Engineering Course in a Nascent School of Engineering**
- Mr. Jonathan Aurand P.E., Dunwoody College of Technology
- David Andrew Adolfson, Dunwoody College of Technology

**WIP: Diversity and Inclusion Responses From an Introduction to Engineering Lecture and Lab**
- Dr. Jessica A. Kuczenski, Santa Clara University
- Dr. Laura Doyle, Santa Clara University

**WIP: Impacts of COVID-19 on Diverse Engineering Students’ Sense of Belonging**
- Dr. Jessica Beleu Buckley, University of Louisville
- Dr. Brian Scott Robinson, University of Louisville
- Dr. Tom Trettter, University of Louisville
- Mrs. Alexandria Hammond, University of Louisville
- Dr. Angela Thompson P.E., University of Louisville
- Dr. James E. Lewis, University of Louisville

**WIP: Impact of COVID-19 Pandemic on a First-Year Engineering Cohort Ranging From Learning Methods, Personal Decisions and University Experience**
- Dr. Monica B. Setien, North Carolina Agricultural and Technical State University
- Dr. Tobin N. Walton, North Carolina Agricultural and Technical State University
- Dr. Matthew B. A. McCullough, North Carolina Agricultural and Technical State University
- Prof. Stephen B. Knisley, North Carolina Agricultural and Technical State University

**Balancing the Engineering Disciplines: An Interdisciplinary First-Year Design Project**
- Dr. Peter L.L. Walls, Dunwoody College of Technology
- Mr. Jonathan Aurand P.E., Dunwoody College of Technology

**A Semester Like No Other: Use of Natural Language**

**Processing for Novice-Led Analysis on End-of-Semester Responses on Students’ Experience of Changing Learning Environments Due to COVID-19**
- Dr. Sreyoshi Bhaduri, McGraw Hill
- Dr. Michelle Soledad, The Ohio State University
- Dr. Tamoghnna Roy, DeepSig Inc.
- Dr. Homero Murzi, Virginia Polytechnic Institute and State University
- Prof. Tamara Knott, Virginia Polytechnic Institute and State University

**First-Year Engineering Students’ Experiences and Perceptions Viewed Through the Lens of Transdisciplinary Knowledge and Threshold Concepts**
- Dr. Gerald Gallego Tembrevilla, McMaster University
- Prof. Susan Nesbit P.Eng., University of British Columbia, Vancouver
- Dr. Peter M. Ostafichuk P.Eng., University of British Columbia, Vancouver
- Prof. Naoko Ellis P.Eng., University of British Columbia, Vancouver

**WIP: Personality Types and Learning Preferences of First-Year Gen Z Engineering Students**
- Dr. Goli Nossoni, University of New Haven

**Understanding the Educational Path of Non-Calculus-Ready Students in Engineering**
- Mrs. Anika Coolbaugh Pirkey, West Virginia University
- Dr. Lizzie Santiago, West Virginia University

**WIP: Engineering As a Social Discipline: Shaping First-Year Students’ Understanding**
- Stacie Edington, University of Michigan
- Dr. Steven J. Skerlos, University of Michigan
- Claudia G. Cameratti-Baeza, University of Michigan
- Abby M. Chapin, University of Michigan
- Frank J. Marsik, University of Michigan

**Development of Multidisciplinary, Undergraduate-Led Research Program in Soft Robotics**
- Ms. Adia Radecka, University of Illinois at Urbana-Champaign
- Ms. Alyssa Bradshaw, University of Illinois at Urbana-Champaign
- Mr. Javi Cardenas, University of Illinois at Urbana-Champaign
- Sara Xochilt Lamer, University of Illinois at Urbana-Champaign
- Mrs. Ilalee Harrison James, University of Illinois at Urbana-Champaign
- Prof. Holly M. Golecki, University of Illinois at Urbana-Champaign

**Lessons Learned From the First-Year Enrichment Program**
for Engineering and Computer Science Students in the ASSURE-US Program

Dr. Doina Bein, California State University, Fullerton
Dr. Jidong Huang, California State University, Fullerton
Dr. Yu Bai, California State University, Fullerton
Dr. Sudarshan T. Kurwadkar, California State University, Fullerton
Dr. Paulina Reina, California State University, Fullerton

Improving Retention in Entry-Level Engineering Education by Adding Hands-On Courses of Clinics of Engineering in the First Year of Study

Dr. Reza Kamali, California State University San Marcos

Introduction to Engineering Virtual Labs - Challenges and Improvements

Dr. Gloria Guohua Ma, Wentworth Institute of Technology
Dr. John Peter Vocci, Wentworth Institute of Technology
Mr. David E. Perkins, Wentworth Institute of Technology
Prof. Theodore Greene, Wentworth Institute of Technology

WIP: The Role of [Onboarding Program] in Fostering a Sense of Belonging and Sociocultural Competence in New Engineering Students

Mr. Ramsey George Jabaji, University of Maryland, College Park
Dr. Shannon Hayes Buenafior, University of Maryland, College Park
Mr. Brian Farrington Dillehay, University of Maryland, College Park
Ms. Rebecca Z. Kenemuth, University of Maryland, College Park
Dr. Elizabeth Kurban, University of Maryland, College Park
Dr. Paige E. Smith, University of Maryland, College Park

Dr. Christina Gardner McCune, University of Florida
Mr. Amanpreet Kapoor, University of Florida

Lovelace’s Program: A Challenging but Achievable Assignment for Undergraduate Students in Engineering and Computer Science

Dr. Erica Haugtvedt, South Dakota School of Mines and Technology
Dr. Duane L. Abata, South Dakota School of Mines and Technology

Oral Proficiency Exams in High-Enrollment Computer Science Courses

Dr. Scott J. Reckinger, University of Illinois at Chicago
Dr. Shanon Marie Reckinger, University of Illinois at Chicago

Quantifying the Impact of Students’ Semester Course Load on Their Academic Performance

Mr. Shahab Boumi, University of Central Florida
Prof. Adan Ernesto Vela, University of Central Florida

Rapid Development of Software Solutions to Enhance Course Infrastructure and the Educational Experience of Student Developers

Ms. Geraghty Anne Ellis, Georgia Institute of Technology
Mr. Nicholas Mulka, Georgia Institute of Technology
Dr. Amit Shashikant Jariwala, Georgia Institute of Technology

Linear Transform Sort

Mr. Soren Peter Henrichsen, Utah Valley University
Dr. Reza Sanati-Mehrizy, Utah Valley University
Dr. Afsaneh Minaie, Utah Valley University

IoT Privacy and Security in Teaching Institutions: Inside The Classroom and Beyond

Dr. M. Abdullah Canbaz, Indiana University Kokomo
Mr. KeeJoh OHearon
Mr. Michael McKee, Indiana University Kokomo
Dr. Md Nour Hossain

W230 - Computing and Information Technology Division Poster Session

9:45 A.M. - 11:15 A.M.

Sponsor: Computing and Information Technology Division

Moderators: Reza Sanati-Mehrizy, Utah Valley University; Afsaneh Minaie, Utah Valley University

Reflection and Transformational Learning in a Data Structures Course

Ms. Cheryl Lynn Resch, University of Florida

Dr. Christina Gardner McCune, University of Florida
Mr. Amanpreet Kapoor, University of Florida

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W233 - Pre-College Engineering Education Division Poster Session

9:45 A.M. - 11:15 A.M.

Sponsor: Pre-College Engineering Education Division

Moderators: Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University; Hoda Ehsan, Georgia Institute of Technology

Development and Validation of the Draw-an-Engineer and
Applications of Mathematics and Science Instrument (Work in Progress)
- Dr. Rebekah J. Hammack, Montana State University
- Dr. Toni Ivey, Oklahoma State University
- Dr. Juliana Utley, Oklahoma State University

Adapting Soft Robotics Outreach to Teacher-Delivered Curriculum in the Virtual Classroom (Work in Progress)
- Ms. Sapna Shah, Harvard University
- Mr. Alex Beaudette, Harvard University
- Mr. David R. Bergandine, University of Illinois Laboratory High School
- Savindi N. Devmal, University of Illinois Laboratory High School
- Prof. Conor Walsh P.E., Harvard University
- Prof. Holly M. Golecki, University of Illinois at Urbana - Champaign

Utilizing an Engineering Design-Based Research Approach to Study and Strengthen a Teacher Preparation Program in STEM at the Secondary Level (Work in Progress)
- Dr. Katherine C. Chen, Worcester Polytechnic Institute
- Shari Weaver, Worcester Polytechnic Institute
- Prof. Gretchen Fougere, STEM Leadership Advisors

Pre-Service Teachers’ Experiences Teaching Engineering to Elementary Students During the Time of COVID (Work in Progress)
- Dr. Nick Lux, Montana State University - Bozeman
- Blake Wiehe
- Dr. Rebekah J. Hammack, Montana State University - Bozeman
- Dr. Brock J. LaMeres P.E., Montana State University - Bozeman
- Dr. Paul Gannon, Montana State University - Bozeman

Virtual Introduction to Engineering Workshop for High School Math Teachers (Work in Progress)
- Dr. J. Chris Carroll, Saint Louis University
- Dr. Shannon M. Sipes, Indiana University - Bloomington
- Dr. Sana M. Syed, Saint Louis University
- Mrs. Traci Aucoin

When a Pandemic Requires a Pivot in the Modality of Teacher Professional Development (Work in Progress)
- Dr. Jennifer Kouo, Towson University
- Dr. Stacy G. Klein-Gardner, Vanderbilt University
- Dr. Medha Dalal, Arizona State University
- Prof. W. Ethan Eagle, University of Maryland

A Case Study on How Teachers’ Knowledge and Beliefs Influence Their Enactment of the Project Lead The Way Curriculum (Evaluation)
- Dr. Mary K. Nyaema, The University of Illinois at Chicago
- Dr. David G. Rethwisch, The University of Iowa
- Mark Andrew McDermott

The Effect of Summer Engineering Camps on Parents’ Perceptions About STEM (Work in Progress)
- Luke G. Grzech, Wartburg College
- Ms. Jessica Marie Faber, Wartburg College
- Murad Musa Mahmoud, Wartburg College
- Prof. Kurt Henry Becker, Utah State University

Introducing Multidisciplinary Engineering in a Diverse Interdisciplinary Virtual Summer Camp for Underrepresented 9th - 12th Graders in Rural Louisiana (Evaluation, Diversity)
- Dr. Deborah Athas Dardis, Southeastern Louisiana University
- Dr. Ahmad Fayed, Southeastern Louisiana University
- Dr. Bonnie Achee, Southeastern Louisiana University
- Dr. Mehmet Emre Bahadir, Southeastern Louisiana University
- Dr. Wendy J. Conarro, Southeastern Louisiana University
- Dr. Troy Williams, Southeastern Louisiana University
- Dr. Mohammad Saadeh, Southeastern Louisiana University
- Tireka Cobb, Louisiana Office of Student Financial Assistance

Interventions to Improve Mentoring Over an Eight-Session Out-Of-School Workshop for High School Students (Work in Progress)
- Mrs. Katherine Dornian, University of Calgary
- Prof. Laleh Behjat P.Eng., University of Calgary
- Dr. Mohammad Moshipour, University of Calgary

Action Research Revelations: The Challenges and Promises of Implementing Informal STEM Experiences in K-12 School Settings (Work in Progress, Diversity)
- Mr. Amari T. Simpson, University of Illinois at Urbana - Champaign
- Lara Hebert, University of Illinois at Urbana - Champaign
- Dr. Luisa-Maria Rosu, University of Illinois at Urbana - Champaign
- Dr. Irfan S. Ahmad, University of Illinois at Urbana - Champaign
- Dr. Meagan C. Pollock, Engineer Inclusion

Computational Thinking in First-Grade Students Using a Computational Device (Work in Progress)
- Ms. Barbara Fagundes, Purdue University
- Nrupaja Bhide, Purdue University
- Prof. Tamara J. Moore, Purdue University
Kristina Maruyama Tank, Iowa State University of Science and Technology

Computer Science and Computational Thinking Across the Early Elementary Curriculum (Work in Progress)
Dr. Kenneth Berry, Southern Methodist University

Middle School Capstone Engineering Projects (Work in Progress)
Dr. Kenneth Berry, Southern Methodist University

Designing Solutions in Middle School Engineering: An Exploration of Epistemic Practices of Engineering in Small Group Contexts (Work in Progress)
Ms. Ramya Sivaraj, University of Minnesota
Dr. Jeanna R. Wieselmann, Southern Methodist University
Dr. Gillian Roehrig, University of Minnesota - Twin Cities

Overview of a Multi-Disciplinary Online Engagement Model for Female Hispanic Students in Pre-College STEM-Oriented Programs (Work in Progress)
Ms. Kaylee Andree Wersant, University of Texas at El Paso
Dr. Diane Elisa Golding, University of Texas at El Paso
Dr. Irma Y. Torres-Catanach, University of Texas at El Paso
Karla Alejandra Ayala, University of Texas at El Paso
Nora Cuvelier, University of Texas at El Paso
Ms. Sarah Huizar, University of Texas at El Paso
Ms. Crystal Lak Cholewa
Dr. Ivonne Santiago P.E., University of Texas at El Paso
Victor Manuel Garcia Jr., University of Texas at El Paso

Exploring the Impact of High School Engineering Exposure on Science Interests (Work in Progress)
Bailey Bond-Trittipo, Florida International University
Dr. Bruk T. Berhane, Florida International University
Dr. Eunsil Lee, Florida International University

Studying the Impact of a Residential Program on High School Students’ Interest in Transportation Engineering (Evaluation)
Dr. Tirupalavanam G. Ganesh, Arizona State University
Jennifer Velez, Arizona State University

Effect of COVID on a High School Engineering Curriculum (Work in Progress)
Dr. Kenneth J. Reid, University of Indianapolis
Mrs. Tina Marie Griesinger, Virginia Polytechnic Institute and State University

Industry-Based STEM Lab Implementation (Work in Progress)
Mr. William Harrison Walls, Purdue University

Dr. Greg J. Strimel, Purdue University

Expanding Literacy’s Boundaries in K-12 with Cloud Literacy (Work in Progress)
Dr. Elodie Billionniere, Miami Dade College
Prof. Lawrence Eric Meyer Jr., Miami Dade College

Preparing the Next Generation Advanced Manufacturing Workforce Using Collaborative Robots and Experiential Learning (Work in Progress)
Mr. Kenechukwu Churchill Mbanisi, Worcester Polytechnic Institute
Dr. Purvi Shah, Worcester Polytechnic Institute
Dr. Gbetonmasse B. Somasse, Worcester Polytechnic Institute
Miss Dhvani Gangadia, Worcester Polytechnic Institute
Prof. Michael A. Gennert, Worcester Polytechnic Institute
Dr. Walter Towner, Worcester Polytechnic Institute
Dr. Torbjorn S. Bergstrom, Worcester Polytechnic Institute

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Dr. Walter Towner, Worcester Polytechnic Institute
Dr. Torbjorn S. Bergstrom, Worcester Polytechnic Institute

W238 - Mechanical Engineering Division Poster Session
9:45 A.M. - 11:15 A.M.
Sponsor: Mechanical Engineering Division

Moderators: Rungun Nathan, Pennsylvania State University, Berks Campus; Thomas DeNucci, United States Coast Guard Academy

ME Division posters are presented in this session. The posters will be related to mechanical engineering and can cover a wide variety of topics. Many work in progress (WIP) papers will be assigned to this session. You can interact with the author and have a heart-to-heart discussion and maybe even strike up a relationship to do a collaborative work for next year's ASEE Conference.

Machine Vision-Based Detection of Surface Defects of 3D-Printed Objects
Mr. M.A. Mukhadir, North Carolina A&T State University
Dr. Sun Yi, North Carolina A&T State University
W240 - Minorities in Engineering Division Poster Session

9:45 A.M. - 11:15 A.M.
Sponsor: Minorities in Engineering Division
Moderators: Kristin Imhoff, Saint Joseph’s University; Trina Fletcher, Florida International University

A Quarter Century of Minorities in Engineering: Design, Development and Team Teaching of Institutional Core Curricula
- Dr. Peter Golding, University of Texas at El Paso
- Dr. Diane Elisa Golding, University of Texas at El Paso
- Hector Erick Lugo Nevarez, University of Texas at El Paso
- Ms. Ana Karen Jimenez Enciso, University of Texas at El Paso
- Carla Ann Judith Navar, University of Texas at El Paso

WIP: Assessing Engineering State of Mind of First-Year Undergraduate African American/Black Students in Scholar Programs
- Jameka Wiggins, University of Maryland, Baltimore County
- Dr. Jamie R. Gurganus, University of Maryland, Baltimore County

Parental Academic Socialization and the Advancement of Black Women in STEM: A Literature Review (Research)
- Ms. Amanda Melinda McLeroy, North Carolina Agricultural and Technical State University
- Dr. Evelyn Sowells-Boone, North Carolina Agricultural and Technical State University

W257 - Faculty Development Division Poster Session

9:45 A.M. - 11:15 A.M.
Sponsor: Faculty Development Division
Moderators: Christopher Horne, North Carolina Agricultural and Technical State University; Maria-Isabel Carnasciali, University of New Haven; Karen High, Clemson University

This session is quick "posters" discussing faculty development in general. Each presenter will give a 2-3 minute presentation of their "poster." Next, we will organically develop breakout rooms for discussions between poster authors and audience on a rotating basis. The final time will be for the group to synthesize major items learned, feedback for presenters and future directions for faculty development. The audience will be engaged through polls/chats/breakout rooms/other features to make the session enjoyable for all.

From Lack of Time to Stigma: Barriers Facing Faculty at Minority-Serving Institutions Pursuing Federally Funded Research
- Dr. Rocio C. Chavela Guerra, American Society for Engineering Education
- Ms. Carolyn Wilson, Southeastern Universities Research Association

Exploring How Faculty Mentoring Influences Faculty Productivity
- Steven Edalgo, Clemson University
- Dr. Karen A. High, Clemson University
- Dr. Gary Lichtenstein, Arizona State University
- Dr. Cindy M. Lee, Clemson University
- Dr. Joyce B. Main, Purdue University at West Lafayette

WIP: A Faculty Learning Community That Includes a Strong Support System to Promote Implementation of New Teaching Practices
- Mrs. Megan Morin, University of North Carolina at Chapel Hill
- Dr. Richard Goldberg, University of North Carolina at Chapel Hill

Faculty Motivations and Barriers for Engineering Education Research
- Ms. Mia Ko, University of Illinois at Urbana - Champaign
- Mr. Joseph Francis Mirabelli, University of Illinois at Urbana - Champaign
- Dr. Allyson Jo Barlow, University of Nevada, Reno
- Dr. Karin Jensen, University of Illinois at Urbana - Champaign
- Dr. Kelly J. Cross, University of Nevada, Reno

Exploring GTA Skills and Responsibilities to Inform a GTA Professional Development Program in Computer Science
- Dr. Jill K. Nelson, George Mason University
- Dr. Yutao Zhong, George Mason University
- Dr. Mark Huntington Snyder, George Mason University
- Prof. Elizabeth L. White, George Mason University

Design Systems Thinking for Innovation in an Engineering Faculty Development Program
- Dr. Douglas E. Melton, Kern Entrepreneurial Engineering Network
- Dr. Heather Dillon, University of Washington Tacoma
- Dr. Mark L. Nagurka, Marquette University

W299A - SPONSORED SESSION: Engineering for US All (e4usa)
Program Overview - Presented by the University of Maryland

9:45 A.M. - 10:25 A.M.
Sponsor: Sponsored Sessions
Speakers: Jackelyn Raquel Lopez Roshwalb, University of Maryland College Park; Dr. Adam R Carberry, Arizona State University; Ms. Marla S. Rudnick

Engineering for US All (e4usa) is an NSF-funded high school engineering program that opens engineering to a new generation of students and educators. Core to the e4usa mission is the nationwide expansion of student and teacher access to engineering, with intentional efforts to reach populations traditionally underrepresented in the field. To date, e4usa involves 55 participating high schools with approximately 2,000 students. Current e4usa students are 42% female, 30% Hispanic, and 37% Black/African American. e4usa students explore engineering in society, develop professional skills, and engage in community-focused engineering design experiences, all aimed at helping them see themselves as engineers.

During this session, we will provide an overview of the e4usa program as well as discuss progress and future work in the areas of curriculum development, professional development, partnerships, and research. Join us to learn more about how e4usa is demystifying engineering and making it accessible to all.

W299B - SPONSORED SESSION: Modernize Your ECE Lab Without Breaking the Bank: Elevate Your Program, Enhance Your Curriculum, Recruit More Students, All Within Budget - Presented by Keysight Technologies

9:45 A.M. - 10:25 A.M.
Sponsor: Sponsored Sessions
Speakers: Dr. Douglas Baney, Keysight Technologies; Noah Schmitz, Keysight Technologies

Do you want to be able to teach your engineering students the skills that employers value most, but your current lab equipment is outdated or basic? Electrical engineering, after all, is at the heart of just about every technology revolution, including autonomous vehicles, quantum computing, and smart energy, and hands-on labs are critical to exposing students to the tools needed to enable future innovations. Imagine a showcase lab with modern, hybrid-ready, fully-functional oscilloscopes, function generators, digital multimeters, and power supplies – the same test instruments used by industry. Picture prospective students and parents marveling at the impressive display, while the dean pats you on the back for staying under budget. Join our session to learn best practices for incorporating industry-focused curriculum and to hear from some of your peers who have made this dream a reality.

W299C - SPONSORED SESSION: Pearson Digital Learning Platforms for Your Undergrad Engineering Courses (Intro Through Advanced) - Presented by Pearson

9:45 A.M. - 10:25 A.M.
Sponsor: Sponsored Sessions
Speakers: Holly Stark, Pearson Education; Terry Austin, Pearson Education; Wayne Stephens, Pearson Education

MyLab and Mastering are the teaching and learning platforms that empower you to reach every student. Whether you are enlightening first-year students on engineering fundamentals or diving deeper into engineering mechanics and circuits, these flexible digital platforms offer the unrivaled content, online assessments, and customizable features you need to personalize learning and improve results, one student at a time.

In this session, you’ll hear first-hand how Pearson allows instructors to maximize the unique benefits and personalized tools in MyLab Engineering and Mastering Engineering. We will walk you through how the new MATLAB Grader functionality in MyLab Engineering is designed to be used with the new 5th edition of Thinking Like an Engineer text. We will also explore the Mastering Engineering platform and learn about classroom performance analytics, early alert systems for student productivity, tutorial homework problems, and more.
W299D - SPONSORED SESSION:
Engineering Assessment Strategies for Remote Course Delivery - Presented by Wiley
9:45 A.M. - 10:25 A.M.
Sponsor: Sponsored Sessions
Speakers: Kellie Grasman, Missouri University of Science and Technology; Dr. Jeff Thomas P.E., Missouri University of Science and Technology

Problem-based engineering courses yield unique challenges when assessment must be completed online. This session explores the challenges of remote engineering assessment and offers an overview of alternative and traditional assessment approaches for online. We also take a deep dive into a proven strategy to deliver frequent problem-based assessments, mapped to Bloom’s taxonomy, using powerful algorithmic coded questions.

W299E - SPONSORED SESSION:
Advancements in Test and Measurement Equipment for Teaching Labs - Presented by Rohde & Schwarz
9:45 A.M. - 10:25 A.M.
Sponsor: Sponsored Sessions
Speaker: Rich Markley, Rohde & Schwarz USA, Inc.

Over the past few years, there have been many advancements in test and measurement gear and how it can be best used in teaching labs. In this presentation, we’ll review these new capabilities and how they could be used to make your students’ experiences better (and your life easier!).

W299F - SPONSORED SESSION:
Instruction Success with a New Hands-On, Personal Control System - Presented by STMicroelectronics
9:45 A.M. - 10:25 A.M.
Sponsor: Sponsored Sessions
Speakers: Dr. David L. Whitman P.E., University of Wyoming; Dr. Bobby "Grant" G. Crawford P.E., Quinnipiac University

This session highlights best practices in outcomes assessment using the NCEES Subject Matter Reports to provide participants with information about the strengths and weaknesses of students in a program. The presentation will specifically focus on using the FE results as one of a
W299H - SPONSORED SESSION: Are You Ready for AI? Integrating AI Into Your Courses with MATLAB - Presented by MathWorks

10:35 A.M. - 11:15 A.M.
Sponsor: Sponsored Sessions
Speaker: Dr. Elvira Osuna-Highley, MathWorks

Prepare your students to tackle current industry challenges using AI. With MATLAB, you are ready for AI even if you have little experience with machine learning. A leader in the 2021 Gartner Magic Quadrant for Data Science and Machine Learning platforms, MathWorks has focused on how to make it easier to bring AI into courses to prepare our engineers of tomorrow.

In this session, we explore how to:

• Enhance teaching and student engagement in AI with MATLAB
• Easily integrate AI using domain-specific toolboxes and apps
• Use MATLAB tools for a complete AI workflow
• Accelerate bringing AI to your course - whether it is online, hybrid, or in person - with teaching resources

W299J - SPONSORED SESSION: Demystifying Partnership: Leadership Advice and Challenges for the Future of Higher Education - Presented by HackerU

10:35 A.M. - 11:15 A.M.
Sponsor: Sponsored Sessions
Moderator: Jim Fong, UPCEA
Speakers: Ms. Diane Landsiedel, University of Michigan; Mr. Paul Andrew Marca, Parallax Global Advisors, LLC; Mr. Edward G. Borbely, University of Wisconsin - Madison

Join us for an exclusive session sponsored by HackerU, to discuss how leaders from across the country approach continuing education partnerships. Learn more about how business techniques have evolved amid the COVID-19 pandemic and how partnerships are playing a role in today’s higher education.

This session will explore the challenges we faced in the past year and the changes we’re anticipating in the years to come. Jim Fong, Chief Research Officer and Director of the Center for Research and Strategy at UPCEA, will be leading this panel discussion featuring some of our own industry leaders:

- Diane Landsiedel, executive director, Nexus at the University of Michigan Engineering, Ann Arbor
- Paul Marca, managing member, Parallax Global Advisors, LLC
- Ed Borbely, associate dean, College of Engineering, University of Wisconsin-Madison

The panel will share some of the key lessons higher education leaders have learned in 2020 and open a
discussion on what business will look like for the rest of 2021 and beyond. This panel will explore the role partnerships will play in overall business strategy moving forward.

Attend the Demystifying Partnership: Leadership Advice and Challenges for the Future of Higher Education panel to learn more about:

- The role of partnerships in overall strategy
- Key considerations when choosing a potential partner
- How to gain buy-in and support for partnerships
- Services provided and which are most important
- Department lessons learned from the global pandemic
- Challenges and opportunities for the upcoming academic year

W299K - SPONSORED SESSION: The 3 Cs of Post-Pandemic Engineering Admissions - Presented by EngineeringCAS

10:35 A.M. - 11:15 A.M.

Sponsor: Sponsored Sessions

Speakers: Ron Hyman, Liaison International; Tandilyn R. Morrel, Texas A&M University; Mr. David T. Poole, University of Miami

Engineering programs face unprecedented changes in 2021 and beyond as public health, immigration, and economic factors have converged in a perfect storm for higher education. Where will your next class come from, and how will you reach prospective students?

During this session, our presenters will share the three C's of post-pandemic engineering admissions (Continuity, Communication, Community) to help your program weather the current storm—and thrive in the years to come.

W299L - SPONSORED SESSION: Presented by Gradescope by Turnitin

10:35 A.M. - 11:15 A.M.

Sponsor: Sponsored Sessions

W360 - NETWORKING SESSION: The Post-COVID Academic World - Lessons Learned from Lockdown

1:00 P.M. - 1:45 P.M.

Sponsor: ASEE Headquarters

Moderator: Nathan Kahl, American Society for Engineering Education

NETWORKING SESSION: The Post-COVID Academic World: Lessons Learned from Lockdown

W366A - WEDNESDAY PLENARY: Featuring Best Zone and PIC Papers & Corporate Member Council Keynote Speaker, Sponsored by EngineeringCAS

11:30 A.M. - 1:00 P.M.

Sponsor: Corporate Member Council

Moderators: Adrienne Minerick, Michigan Technological University; Dora Smith, Siemens Digital Industries Software; Beth Holloway, Purdue University at West Lafayette; Nathan Kahl, American Society for Engineering Education

Speaker: Dr. Jeffrey A. Abell P.E., General Motors Corp.

Featuring:
- The 2020 overall best Zone and PIC papers and the Outstanding Teaching Award winner
- Corporate Member Council speaker

2020 BEST PIC III PAPER and BEST OVERALL PAPER WINNER Do Open-Ended Design Projects Motivate First-Year Engineering Students?

Dr. Chao Wang, Arizona State University

2020 BEST ZONE IV PAPER and BEST OVERALL ZONE WINNER - BOOSTing Preparedness Through Engineering Project-based Service Learning

Dr. Deborah Won, California State University, Los Angeles

Dr. Gisele Ragusa, University of Southern California

Dr. Gustavo B. Menezes, California State University, Los Angeles
W401 - Aerospace Division Technical Session 4

1:45 P.M. - 3:15 P.M.

Sponsor: Aerospace Division

Moderators: Michael Hatfield, University of Alaska Fairbanks; Tracy Yother, Purdue University at West Lafayette; Sharan Asundi, Old Dominion University; Nadir Yilmaz, Howard University; Pradip Sagdeo

Design Courses 2, Aerospace Assets

A Program for Managing Unmanned Aircraft Systems in Engineering Education

Col. Richard Melnyk, United States Military Academy

Honeycomb Panel Buckling: An Exercise in Flight Vehicle Structures Course

Dr. Sanjay Jayaram, Saint Louis University
Dr. Krishnaswamy Ravindra P.E., Saint Louis University
Dr. Sridhar S. Condooor, Saint Louis University

Building 1U CubeSat as a Tool to Promote Project-Based Learning in Paraguay, a Case Study

Mr. Cristhian David Coronel, Nihon Gakko University
Miss Mayra Luján Mosqueda, Nihon Gakko University
Mr. Blas Fernando Vega BV, Agencia Espacial del Paraguay
Dr. Diego Herbin Stalder, Universidad Nacional de Asunción
Dr. Jorge H. Kurita, Universidad Nacional de Asunción

A Scaffolded, Semester-Long Design/Build/Fly Experience for the Mid-Career Aerospace Engineering Student

Dr. Tobias Rossmann, Lafayette College

W402 - Architectural Engineering Division Technical Session 3

1:45 P.M. - 3:15 P.M.

Sponsor: Architectural Engineering Division

Moderator: Christina McCoy, Oklahoma State University

Technical session including topics of interest to the professions and industry of architecture, engineering, and construction.


Mr. Eugene Kwak, State University of New York, College of Technology at Farmingdale

Remote Delivery of an Introductory Architectural Engineering Design-Build Activity

Mr. Spencer Arbuckle, University of Waterloo
Mr. Patrick Andersen Angkiriwang
Ms. Joyceline Nathaniel
Dr. Rania Al-Hammoud P.Eng., University of Waterloo
Prof. Scott Walbridge P.E., University of Waterloo

The COVID-19 Pandemic: The Hallmarks of Online and Hybrid Teaching in the Engineering Classroom

Prof. Keith E. Hedges, Drury University

Work In Progress: Middle School Architectural Engineering Education Pilot Program: Exploring Building Industry Careers as a Catalyst for Pursuing Engineering Careers

Ms. Laura Jun Chee Yong, Pennsylvania State University
Dr. Linda M. Hanagan P.E., Pennsylvania State University
Dr. Allison Godwin, Purdue University at West Lafayette

W404 - Improving the BME Classroom on the Ground and Virtually

1:45 P.M. - 3:15 P.M.

Sponsor: Biomedical Engineering Division

Moderators: Nicole Ramo, West Chester University; Casey Ankeny, Northwestern University; Aileen Huang-Saad, Northeastern University; Renata Ramos, Rice University

Biomedical engineering instructors continuously seek new ways to improve student learning. In this session,
authors will share a number of ways they have sought to improve the student learning experience both online and in the classroom.

Adapting a Cell and Tissue Engineering Laboratory Course to an Online-Delivery Format
Abhishek Bhattacharjee, University of Illinois at Urbana Champaign
Mona Jawad, University of Illinois at Urbana Champaign
Eileen M. Johnson, University of Illinois at Urbana Champaign
Anna M. Busza, University of Illinois at Urbana Champaign
Mr. Riley John Lehmann
Benjamin M. David, University of Illinois at Urbana Champaign
Prof. Pablo Perez-Pinera, University of Illinois at Urbana Champaign
Dr. Karin Jensen, University of Illinois at Urbana Champaign

Facilitating Student Metacognition Using Exam Wrappers and Concept Maps in a Problem Solving-based BME Course
Dr. Rucha Joshi, University of California, Davis
Dr. Jennifer H. Choi, University of California, Davis

Improving Programming Content Delivery in an Introductory Biomechanics Course Using a Blended Classroom Approach
Mr. Jeffery Ethan Joll II, Vanderbilt University
Dr. W. David Merryman, Vanderbilt University

Teaching an Immersive Experiential Introductory Biomedical Engineering Course in the Land of Covid (AKA: An Old Dog Has to Learn New Tricks)
Dr. Charles J. Robinson, Clarkson University
Ms. Loretta Driskel, Clarkson University
Erin Blauvelt, Clarkson University
Ms. Laura J. Perry, Clarkson University

W405 - Inclusion in Chemical Engineering: Reflections From the Conversation Series on Inclusion and Thriving
1:45 P.M. - 3:15 P.M.
Sponsor: Chemical Engineering Division
Moderators: VJ Tocco; Ashlee Ford Versypt, University at Buffalo, The State University of New York
Speaker: Dr. Ashlee N. Ford Versypt, University at Buffalo, The State University of New York

The ASEE Chemical Engineering Division held a weekly discussion group during the 2020-2021 academic year called the Conversation Series on Inclusion and Thriving. This session is designed to reflect on what the participants got out of the series and actions that can be incorporated into diversity, equity, and inclusion efforts in chemical engineering programs and in the discipline more broadly.

W406 - Supporting Successful Progression From First-year Studies
1:45 P.M. - 3:15 P.M.
Sponsor: Civil Engineering Division
Moderators: Jennifer Retherford, University of Tennessee at Knoxville; Paul Leidig, Purdue University at West Lafayette; Matthew Lovell, Rose-Hulman Institute of Technology; Steven Burian, University of Utah

This session explores activities designed to build foundational skills and support student success in the first two years of CE/ConE/CEM programs.

An Evolving Face-to-Face Freshman Experience Course During a Pandemic
Dr. Allen C. Estes, California Polytechnic State University, San Luis Obispo
John W. Lawson, California Polytechnic State University, San Luis Obispo

Building a Sense of Community for Freshman Civil Engineering Students
Ms. Erica J. Marti, University of Nevada, Las Vegas
Prof. Eakalak Khan, University of Nevada, Las Vegas
Mr. Amit Gajurel, University of Nevada, Las Vegas
Mr. Neil Christian Ledesma Tugadi

Investigating the Effect of Engineering Undergraduates’ Writing Transfer Modes on Lab Report Writing in Entry-level Engineering Lab Courses
Dr. Charles Riley P.E., Oregon Institute of Technology
Dr. Dave Kim, Washington State University Vancouver
Dr. Ken Lulay, University of Portland
Dr. John D. Lynch, Washington State University Vancouver
Dr. Sean St. Clair, Oregon Institute of Technology

Strengthening Connections: The Effectiveness of Review Problems on Student Retention of Mechanics Concepts
Col. Jakob C. Bruhl, United States Military Academy
Prof. Joseph P. Hanus, United States Military Academy
2021 ASEE VIRTUAL CONFERENCE
WEDNESDAY, JULY 28th SESSIONS

Lt. Col. Kevin P. Arnett P.E., United States Military Academy

The Role of Prior Knowledge in the Performance of Engineering Students

Ms. Rubab Saher, University of Nevada, Las Vegas
Dr. Haroon Stephen, University of Nevada, Las Vegas
Dr. Jee Woong Park, University of Nevada, Las Vegas
Cristian David Arteaga Sanchez, University of Nevada, Las Vegas

Dr. Rachel Mosier P.E., Oklahoma State University
Dr. Heather N. Yates, Oklahoma State University

W409 - Construction Engineering Division Technical Session 5

1:45 P.M. - 3:15 P.M.
Sponsors: Construction Engineering Division; Architectural Engineering Division

Moderators: Rachel Mosier, Oklahoma State University; Sanjeev Adhikari, Kennesaw State University; Norman Philipp, Pittsburg State University

Issues of diversity, inclusion and pandemic response in Construction Education

Gender Differences in Construction Management Students’ Sense of Belonging

Dr. Luciana Debs, Purdue University Programs
Ms. Bhavya Rathna Kota, Purdue University at West Lafayette

Construction Education Delivery Method Changes During COVID-19: Student Perspectives

Dr. Sanjeev Adhikari, Kennesaw State University
Dr. Rachel Mosier P.E., Oklahoma State University
Dr. Sandeep Langar, The University of Texas at San Antonio

Responding to the COVID Pandemic: Results and Reflections on Round-Table Discussions at ASEE 2020

Dr. John Tingerthel P.E., Northern Arizona University
Dr. Nicholas Tymvios, Bucknell University
Dr. Rachel Mosier P.E., Oklahoma State University
Dr. Kimberly Grau Talley P.E., Texas State University

Student Internships During Times of Pandemic: A Historical View of Pandemics, Recession and Their Effect on Education

Dr. Rachel Mosier P.E., Oklahoma State University
Dr. Heather N. Yates, Oklahoma State University
Dr. Sanjeev Adhikari, Kennesaw State University

COVID-19 Effects on Student Internships in the Construction Industry: Experiences from Georgia and Oklahoma

Dr. Sanjeev Adhikari, Kennesaw State University
W411 - Support a Diverse Student Body for Experiential Learning Opportunities

1:45 P.M. - 3:15 P.M.
Sponsor: Cooperative and Experiential Education Division

Moderators: Katherine McConnell, University of Colorado Boulder; Robin Hammond, Arizona State University
Speaker: Prof. Truong Nguyen, University of California, San Diego

The speakers from both universities and industry in this session will discuss what has been done to best support a diverse student body for experiential learning opportunities, including co-op and internship programs.

W411B - Cooperative and Experiential Education Division Technical Session 2

1:45 P.M. - 3:15 P.M.
Sponsor: Cooperative and Experiential Education Division

Moderators: Katherine McConnell, University of Colorado Boulder; Robin Hammond, Arizona State University

This session features technical papers covering an array of topics related to student experiential education within and beyond the curriculum. Following the paper presentations, participants will have an opportunity to both ask questions and join the presenters in breakout rooms to discuss their work.

A Call to Create an Open-source Project Initiative for Cybersecurity Virtual Labs
Dr. Radana Dvorak, City University of Seattle
Mr. John L. Whiteman, University of Portland

Operations of a Research Experience for Undergraduates Program During a Pandemic
Dr. Jeremy Straub, North Dakota State University

Work in Progress: Examining the Literature on Virtual Internships for Insights Applicable to Engineers
Ms. Kristen Koopman, Virginia Polytechnic Institute and State University
Dr. Robert S. Emmett, Virginia Polytechnic Institute and State University

Dr. Nicole P. Sanderlin, Virginia Polytechnic Institute and State University
Dr. Robert S. Emmett, Virginia Polytechnic Institute and State University

Web-based Game vs. Virtual Reality Field Surveying Labs Towards Enhancing Experiential Education
Dr. Dimitrios Bolkas, Pennsylvania State University
Dr. Mojgan A. Jadidi, York University
Mr. Jeffrey Chiampi, Pennsylvania State University
Dr. Muhammad Usman, York University

W413 - Best in DEED

1:45 P.M. - 3:15 P.M.
Sponsor: Design in Engineering Education Division

Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, The Ohio State University

Session for the best in DEED papers

Emergency Transition of Intro Communication and Design Course to Remote Teaching
Mr. Clay Swackhamer, University of California, Davis
Dr. Jennifer Mullin, University of California, Davis

An Exploration of Social and Educational Influences on User-centered Design: Revisiting a Compatibility Questionnaire
Dr. Megan Hammond, University of Indianapolis
Dr. Joan Martinez, University of Indianapolis
Dr. Elizabeth Ziff, University of Indianapolis

Engineering Ethics in Engineering Design Courses: A Preliminary Investigation
Dr. Andrew Katz, Virginia Polytechnic Institute and State University
Ms. Isil Anakok, Virginia Polytechnic Institute and State University
Mr. Umair Shakir, Virginia Polytechnic Institute and State University
Dr. Homero Murzi, Virginia Polytechnic Institute and State University

Managing Uncertainty in CAD-enabled Engineering Design Tasks
Mrs. Ying Ying Seah, Purdue University, West Lafayette
Dr. Tugba Karabiyik, Purdue University, West Lafayette
Dr. Alejandra J. Magana, Purdue University, West Lafayette

Framing Engineering Problems in an Intramural Context
Dr. Andrew Olewnik, University at Buffalo, The State University of New York
Dr. Vanessa Svihla, University of New Mexico

W414A - Faculty Perspectives of Active Learning, Inequity, and Curricular Change

1:45 P.M. - 3:15 P.M.
Sponsor: Educational Research and Methods Division
Moderators: Jenna Carpenter, Campbell University; James Huff, Harding University

Review of In-class Active Learning Observation Protocols
Ms. Allison Van Beek, University of Toronto
Dr. Susan McCahan, University of Toronto

Conceptualizing Faculty Adaptability in Enacting Curricular Change
Hadi Ali, Arizona State University
Dr. Ann F. McKenna, Arizona State University
Dr. Jennifer M. Bekki, Arizona State University
Dr. Rod D. Roscoe, Arizona State University

Exploring Engineering Faculty’s Use of Active-learning Strategies in Their Teaching
Dr. Aliye Karabulut-Ilgu, Iowa State University
Dana AlZoubi, Iowa State University
Dr. Evrim Baran, Iowa State University

Thinking as Argument: A Theoretical Framework for Studying How Faculty Arrive at Their Deeply-held Beliefs About Inequity in Engineering
Jeremy Grifski, Ohio State University
Dr. Emily Dringenberg, Ohio State University
Miss Dira Melissa Delpech, Ohio State University

Work in Progress: Barriers Instructors Encounter When Using Active Learning in an Online Classroom Setting
Ms. Lea K. Marlor, University of Michigan
Dr. Cynthia J. Finelli, University of Michigan
Laura J. Carroll, University of Michigan

Instrumentation for Evaluating Design-learning and Instruction Within Courses and Across Programs
Steven Santana, Harvey Mudd College

W414B - Assessing Hard-to-Measure Constructs in Engineering Education: Assessment Design and Validation Studies

1:45 P.M. - 3:15 P.M.
Sponsor: Educational Research and Methods Division
Moderators: Nathan Hicks, University of Tennessee at Knoxville; Hillary Merzdorf, Purdue University at West Lafayette

Critically Quantitative: Measuring Community Cultural Wealth on Surveys
Daiki Hiramori, University of Washington
Dr. Emily Knaphus-Soran, University of Washington
Dr. Elizabeth Litzler, University of Washington

Design of CAIR Assessment-monitoring Display
Dr. Bahar Memarian, University of Toronto
Dr. Susan McCahan, University of Toronto

A Systematic Review of Argument-assessment Frameworks in Engineering Education
Madison E. Andrews, University of Texas at Austin
Mr. Priyadarshan N. Patil, University of Texas at Austin

Developing a Measure to Capture Middle School Students’ Interpretive Understanding of Engineering Design
Dr. Jeremiah Pina, Smith College
Dr. Glenn W. Ellis, Smith College
Mr. Al Rudnitsky, Smith College
Dr. Rebecca Mazur, Collaborative for Educational Services
Prof. Beth McGinnis-Cavanaugh, Springfield Technical Community College
Ms. Isabel Huff, Springfield Technical Community College

Work in Progress: The Development of a Tactile Spatial Ability Instrument for Assessing Spatial Ability in Blind and Low-vision Populations
Dr. Wade H. Goodridge, Utah State University
Dr. Natalie L. Shaheen, Illinois State University
Dr. Anne Therese Hunt
Daniel Kane, Utah State University

Assessing Drawing Self-efficacy: A Validation Study Using Exploratory Factor Analysis (EFA) for the Drawing Self-efficacy Instrument (DSEI)
Ms. Donna Jaison, Texas A&M University
Hillary E. Merzdorf, Purdue University, West Lafayette
Dr. Blake Williford, Sketch Recognition Lab
Mr. Lance Leon Allen White, Texas A&M University
Dr. Karan Watson P.E., Texas A&M University
Dr. Kerrie A. Douglas, Purdue University, West Lafayette
Dr. Tracy Anne Hammond, Texas A&M University
Dr. Julie S. Linsey, Georgia Institute of Technology

The Student Attitudinal Success Inventory III (SASI III): Construct Validity and Measurement Invariance
Dr. Jiaqi Zhang, University of Cincinnati
Dr. P.K. Imbrie, University of Cincinnati

W414C - Medley of Undergraduate Programming and Pedagogies
1:45 P.M. - 3:15 P.M.
Sponsor: Educational Research and Methods Division
Moderators: Farrah Fayyaz, Concordia University; Kerrie Douglas, Purdue University at West Lafayette

Identifying Signature Pedagogies in a Multidisciplinary Engineering Program
Dr. Kimia Moozeh, University of Toronto
Lisa Romkey, University of Toronto
Nikita Dawe, University of Toronto
Ms. Rubaina, Khan, University of Toronto

Quality Improvement Using a Stage Gate Approach in Engineering Programmes and Courses
Dr. Calvin Sophistus King, MCET
Dr. Venugopalan Kovaichelvan, TVS Institute for Quality and Leadership

Rethinking the Curricular Complexity Framework for Transfer Students
Dr. David Reeping, University of Michigan
Dustin Grote, Weber State University

Student Motivation and Engagement Across Time and Context Through the COVID-19 Pandemic
Dr. Matthew J. Ford, Cornell University
Dr. Soheil Fatehboroujeni, Cornell University
Prof. Elizabeth Mills Fisher, Cornell University
Dr. Hadas Ritz, Cornell University

Understanding How Social Agents and Communicative Messages Influence Female Students’ Engineering Career Interest From High School to First Semester of College (Fundamental)
Ms. Yue Liu, Arizona State University
Dr. Dina Verdin, Arizona State University
Gerhard Sonnert, Harvard Smithsonian Center for Astrophysics
Dr. Philip Michael Sadler, Harvard Smithsonian Center for Astrophysics

Use of Personas in Exploring Scholarship Applicants
Dr. Anastasia Marie Rynearson, Campbell University
Jacqueline Gartner, Campbell University
Dr. Michele Miller, Campbell University

WIP: Assessing Community Cultural Wealth and Funds of Knowledge for Students Attending a Co-Op-Based Engineering Program
Gretchen A. Dietz, University of Florida
Miss Leann Wishah, University of Florida
Dr. Elliot P. Douglas, University of Florida
Erica D. McCray, University of Florida

W415 - Electrical and Computer Engineering Division Technical Session 7
1:45 P.M. - 3:15 P.M.
Sponsor: Electrical and Computer Engineering Division
Moderators: Leonard Bohmann, Michigan Technological University; Huihui Wang, St. Bonaventure University; Nader Rafia, Boise State University

A Direct Method of Determining the Natural Frequency and Dimensionless Damping Coefficient of any Second-order Circuit
Dr. James A. Kearns, York College of Pennsylvania
Jennifer Owrutsky

Student Usage of Auto-graded Activities in a Web-based Circuit Analysis Textbook
Dr. Nikitha Sambamurthy, zyBooks, A Wiley Brand
Ms. Efthymia Kazakou, zyBooks, A Wiley Brand
Dr. Yasaman Adibi, zyBooks, A Wiley Brand

Exploring Students’ Learning of Electric Circuits in Real-world Context
Mr. Alejandro H. Espiera Jr., Virginia Polytechnic Institute and
State University
Dr. Nicole P. Pitterson, Virginia Polytechnic Institute and State University

Work in Progress: Synergy of Visualization and Experiment in Undergraduate Engineering Electromagnetics Course
Dr. Yang Victoria Shao, University of Illinois Urbana-Champaign
Dr. Zuofu Cheng

Teaching First-order Systems to Electrical Engineering Students Using Visual and Intuitive Examples
Dr. Daniel Raviv, Florida Atlantic University
Mr. Daniel Ryan Barb
Mr. George Roskovich, Florida Atlantic University

W416 - ECCD Business Meeting
1:45 P.M. - 3:15 P.M.
Sponsor: Energy Conversion and Conservation Division
Moderators: Robert Kerestes, University of Pittsburgh; Ted Song, John Brown University

W420 - Industrial, Professional, and Practical Contexts of Engineering Ethics
1:45 P.M. - 3:15 P.M.
Sponsor: Engineering Ethics Division
Moderators: Sergio Guillen Grillo, Australian National University; Chandra Asthana, Elizabeth City State University

Decision-making in a Competitive Business Environment: A Guided Case Study Discussion
Dr. Yilmaz Hatiparasulu, University of Texas at San Antonio

Encountering Engineering Ethics in the Workplace: Stories from the Trenches
Ms. Dayoung Kim, Purdue University, West Lafayette
Ms. Shiloh James Howland, Brigham Young University
Prof. Brent K. Jesiek, Purdue University, West Lafayette

Work in Progress: Organizational Culture and Engineers’ Moral Values Across Industry Sectors: Study Overview
Ms. Dayoung Kim, Purdue University, West Lafayette
Prof. Brent K. Jesiek, Purdue University, West Lafayette

Dr. Michael C. Loui, University of Illinois at Urbana Champaign
Prof. Chuck Huff

W421 - Engineering Libraries Division Technical Session 2: Special Topics
1:45 P.M. - 3:15 P.M.
Sponsor: Engineering Libraries Division
Moderators: Kari Kozak, The University of Iowa; David Hubbard, Texas A&M University; Denise Wetzel, Florida A&M University - Florida State University; John Teleha, North Carolina Agricultural and Technical State University

Embedded Librarians to Support Data-management Needs of a Multidisciplinary Research Program
Ms. Qianjin Zhang, University of Iowa
Mr. Brian Westra, University of Iowa

Examining the Teaching Needs of Engineering Faculty: How the Library and Librarian Fit In
Ms. Erin Rowley, University at Buffalo

Using the Fundamentals of Engineering (FE) Exam as an Assessment Tool for Engineering Schools and Their Libraries
Ms. Jean L. Bossart, University of Florida

W422 - EMD Business Meeting
1:45 P.M. - 3:15 P.M.
Sponsor: Engineering Management Division
Moderators: John Richards, US Army Corps of Engineers; Christopher Rowe, Vanderbilt University

Business meeting of the Engineering Management Division

W423 - Tau Alpha Pi Meeting
1:45 P.M. - 3:15 P.M.
Sponsor: Engineering Technology Division
Moderators: Christopher Leblanc, University of New Hampshire; Clay Gloster, North Carolina Agricultural and Technical State University

Annual meeting of the ET honor society
W423B - Remote Instruction/COVID-19 Strategies

1:45 P.M. - 3:15 P.M.
Sponsor: Engineering Technology Division
Moderators: Gary Steffen, Purdue University Fort Wayne; Christopher Leblanc, University of New Hampshire; Clay Gloster, North Carolina Agricultural and Technical State University

Different Zoom Breakout Room Methods' and Techniques' Effects on Engineering Students' Learning Outcomes for Engineering Courses
- Dr. Khalid Zouhri, University of Dayton
- Prof. Carson Lee Running, University of Dayton

Impact of COVID-19 on Engineering and Technology Course Outcomes
- Dr. Sheikh Fahad Ferdous, Indiana State University
- Dr. M. Afman Badar, Indiana State University
- Dr. Maria Javaid, Indiana State University

Education in a Remote World: Focus on Workforce Readiness
- Dr. Christine Delahan, Bucks County Community College
- Susan Herring, Bucks County Community College
- Tracy Timby, Bucks County Community College
- Dr. Vladimir Genis, Drexel University

Educational Experiences of a Mechanical Engineering Technology Program During COVID-19
- Dr. Steven Nozaki, Pennsylvania State University
- Dr. David Clippinger, Pennsylvania State University
- Dr. Yabin Liao, Pennsylvania State University
- Dr. Nancy E. Study, Pennsylvania State University
- Mr. Philip A. Jones, Pennsylvania State University
- Mr. Shannon K. Sweeney, Pennsylvania State University
- Ms. Susan Daigle
- Mr. Adam Jeffrey Wielobob
- Prof. Liyong Sun, Pennsylvania State University

Face-to-Face and E-learning Styles for Undergraduate Engineering Technology Students During COVID-19 Pandemic
- Dr. Suleiman M. Obeidat, Texas A&M University
- Dr. Jumanah A. Hajjat, Texas A&M University

W427 - First-Year Programs: Virtual Instruction in the First Year III

1:45 P.M. - 3:15 P.M.
Sponsor: First-Year Programs Division
Moderators: Jonathan Aurand, Dunwoody College of Technology; Joshua Hertz, Northeastern University; Kaitlin Mallouk, Rowan University; Timothy Hinds, Michigan State University

The Use of Virtual Design Modules in an Introduction to Engineering Course: Impact on Learning Outcomes and Engineering Identity
- Dr. Shannon Barker, University of Virginia

Virtual vs. In-Person Learning: A Study on Student Motivation, Experience, and Perception in a First-Year Introduction to Engineering Course
- Dr. Chao Wang, Arizona State University

Understanding Remote Student Motivation in Hybrid and Remote Engineering Lab Modes
- Dr. Rui Li, New York University
- Dr. Jack Bringardner, New York University

Engaging Students in Synchronous, Remote, or Hybrid First-Year Engineering Courses
- Dr. AJ Hamlin, Michigan Technological University
- Ms. Amber Kemppainen, Michigan Technological University
- Miss Amanda Marie Singer, Michigan Technological University
- Dr. Nathan D. Manser, Michigan Technological University
- Dr. Brett Hamlin, Michigan Technological University
- Dr. Michelle E. Jarvis-Eggart, Michigan Technological University
- Ken Thiemann, Michigan Technological University

W427B - First-Year Programs: Recruiting and Retention

1:45 P.M. - 3:15 P.M.
Sponsor: First-Year Programs Division
Moderators: Randy Brooks, Texas A&M University; Brooke Morin, The Ohio State University; Kaitlin Mallouk, Rowan University; Timothy Hinds, Michigan State University

Psychological Cost, Gender, and Retention Among Engineering Students
2021 ASEE VIRTUAL CONFERENCE
WEDNESDAY, JULY 28th SESSIONS

Sarah E. French, University of Louisville
Dr. Campbell R. Bego, University of Louisville
Dr. Jeffrey Lloyd Hieb, University of Louisville
Dr. Patricia A. Ralston, University of Louisville

Redesigning a Summer Math and Engineering Bootcamp for Virtual Instruction During the COVID-19 Pandemic
Dr. Zahrasadat Alavi, California State University, Chico
Dr. Kevin Buffardi, California State University, Chico
Dr. Kun Zhang P.E., California State University, Chico
Dr. Kathleen Meehan, California State University, Chico
Dr. Webster R. Johnson, California State University, Chico

Cohort-Based Supplemental Instruction Sessions as a Holistic Retention Approach in a First-Year Engineering Course
Miss Nisha Abraham, University of Texas at Austin
Dr. Nina Kamath Telang, University of Texas at Austin

Engineering Living Learning Community Experience: A Model for Improving First-Year Retention and Academic Performance of Black Students
Dr. Charmane V. Caldwell, Florida A&M University-Florida State University College of Engineering
Dr. Roxanne Hughes, National High Magnetic Field Laboratory

Motivating Factors That Encourage Rural Students to Pursue Engineering
Ms. Joanne Kay Beckwith, University of Michigan
Laura Hirshfield, University of Michigan

System
Mr. Michael Porter, Alabama A&M University
Dr. Ralph (Phil) Bording, Alabama A&M University
Dr. Yujian Fu P.E., Alabama A&M University

Understanding Professional Identity Development Among Computer Science Students
Sami N. Rollins, University of San Francisco
Prof. Alark Joshi, University of San Francisco
Xornam Apedoe, University of San Francisco
Prof. Sophie Engle, University of San Francisco
Prof. Matthew Malensek
Mr. Gian Bruno, University of San Francisco

Work in Progress: Developing Undergraduate Research Experiences in Unmanned Aircraft Systems (UAS) Cybersecurity
Dr. Matthew A. Verleger, Embry-Riddle Aeronautical University
Prof. Richard S. Stansbury, Embry-Riddle Aeronautical University
Dr. Mustafa Ilhan Akbas, Embry-Riddle Aeronautical University
Prof. Philip Craiger, Embry-Riddle Aeronautical University

Work in Progress: Leveraging a Virtual Precollege Summer Coding Day Camp to Promote DEI in Recruiting Students to Computer Science and Information Technology
Dr. Bonnie Achee, Southeastern Louisiana University

W430 - Computing and Information Technology Division Technical Session 6

1:45 P.M. - 3:15 P.M.
Sponsor: Computing and Information Technology Division

Moderators: Reza Sanati-Mehrizy, Utah Valley University; Afsaneh Minaie, Utah Valley University

This session presents papers on a variety of topics pertaining to computing and information technology.

A Journey from End Systems to Backbone Routers: A Virtual Lab Environment for Online Computer Networking Courses
Dr. Zhaohong Wang, California State University, Chico
Dr. Jing Guo, California State University, Chico

UML-based Design of Vendor and Employee Management

W432 - Global Engineering Education During and After Covid-19 Pandemic

1:45 P.M. - 3:15 P.M.
Sponsor: International Division

Moderators: Phillip Sanger, Purdue University at West Lafayette; Nick Safai, Salt Lake Community College

Speakers: Mrs. Amy Henry, Georgia Institute of Technology; Dr. Sigrid Berka, The University of Rhode Island; Ms. Mary Cook, Colorado School of Mines; Ahmarlay Myint, Texas A&M University; Dr. Maria Claudia Alves, Texas A&M University; Prof. Zaida M. Gracia, Texas Tech University

Considering the current Covid-19 pandemic and the impact it has had on global education, this panel discussion with global engineering education leaders in the United States will share best practices in handling and overcoming this situation. The premise of this discussion will be that the Covid-19 pandemic showed that situations across the globe
can affect us at home. Therefore, we need to be informed and aware of what happens in the world. Also, that we need to work together to solve this and other global issues we face nowadays. Consequently, preparing engineering students with a global mindset is crucial for industry success and for society.

W433 - Engineering For Us All (e4usa) – Meet the Teachers!
1:45 P.M. - 3:15 P.M.
Sponsor: Pre-College Engineering Education Division

Moderators: Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University; Stacy Klein-Gardner, Vanderbilt University; Darryll Pines, University of Maryland College Park; Jennifer Kouo, Towson University

Speakers: Kayla Cantrell; Richard Maxwell; Nate Raynor, Mescalero Apache High School

The NSF-funded Engineering For Us All (e4usa) project is an advanced high school course in engineering intended for broadening participation. Pilot efforts undertaken during the 2019-2020 academic year included schools around the United States (TN, VA, PA, DC, MD, and AZ) field testing the first draft of the curriculum. The nine teachers involved in the first cohort of e4USA bring a variety of past engineering or teaching experiences that range from being trained as engineers themselves and having taught the subject for a few years to no prior training in engineering and never having considered teaching engineering before this course. Our field tests of the revised curriculum continue in 2020-2021 with 38 teachers in twelve states, DC, and the USVI. Join us for this panel to hear directly from the teachers about their experiences and recommendations for the future growth of authentic engineering at the high school level. The panel will begin with a brief description of the e4usa project, address prepared questions, and conclude with audience questions.

W434B - Engineering Education Culture: Mental Health, Inclusion, and the Soul of Our Community
1:45 P.M. - 3:15 P.M.
Sponsor: Liberal Education/Engineering & Society Division

Moderators: Elizabeth Cady, National Academy of Engineering; Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University

Work in Progress: Departmental Analysis of Factors of Engineering Culture
Isabel Miller, University of Illinois at Urbana - Champaign
Dr. Kelly J. Cross, University of Nevada, Reno
Dr. Karin Jensen, University of Illinois at Urbana - Champaign
Relationship Between Mental Health Distress and Help-Seeking Behaviors Among Engineering Students
Lucy Elizabeth Hargis, University of Kentucky
Ms. Courtney Janaye Wright, University of Kentucky
Dr. Ellen L. Usher, University of Kentucky
Dr. Joseph H. Hammer, University of Kentucky
Dr. Sarah A. Wilson, University of Kentucky
Melanie E. Miller, University of Kentucky

Investigating Engineering Culture During COVID-19
Jessica R. Deters, Virginia Polytechnic Institute and State University
Dr. Marie C. Paretti, Virginia Polytechnic Institute and State University

A Collaborative Autoethnographic Dialog Exploring the Soul of Engineering Education
Mr. Hector Enrique Rodriguez-Simmonds, Purdue University
Dr. Avneet Hira, Boston College

W435 - Manufacturing Division
Technical Session - Online and Remote Learning Communities
1:45 P.M. - 3:15 P.M.
Sponsor: Manufacturing Division
Moderator: Yalcin Ertekin, Drexel University

Offering Hands-on Manufacturing Workshops Through Distance Learning
Dr. Khalid H. Tantawi, University of Tennessee at Chattanooga
Dr. Ismail Fidan, Tennessee Technological University
Dr. George Chitiyo, Tennessee Technological University
Ms. Mel Cossette, Edmonds College

Teaching Advanced Manufacturing Online to STEM Early-college and High-school students
Dr. Ahmed Cherif Megri, North Carolina Agricultural and Technical State University
Dr. Sameer Hamoush, North Carolina Agricultural and Technical State University
Dr. Taher M. Abu-Lebdeh P.E., North Carolina A&T University

Sustainable Green Design and Life Cycle Assessment for Engineering Education
Prof. Tzu-Liang Bill Tseng, University of Texas at El Paso
Mr. Md Fashiar Rahman, The University of Texas at El Paso
Dr. Richard Chiou, Drexel University

Dr. Amit J. Lopes
Sreenath Chalil Madathil, University of Texas at El Paso
Prof. Johnny C. Ho, Columbus State University

An Online Learning Community to Conduct Collaborative Education and Innovation in Renewable Energy, Environment, and Manufacturing
Dr. Richard Chiou, Drexel University
Prof. Tzu-Liang Bill Tseng, University of Texas at El Paso
Dr. Irina Nicoleta Ciobanescu Husanu, Drexel University
Dr. Michael G. Mauk, Drexel University
Regina Ruane Ph.D., Temple University

W436 - Computational Tools & Analysis
1:45 P.M. - 3:15 P.M.
Sponsor: Materials Division
Moderators: Lessa Grunenfelder, University of Southern California; Susan Gentry, University of California, Davis
Speaker: Dr. Timothy Chambers, University of Michigan

A Multi-level Diffusion Unit: Connecting Submicro- and Macro-levels with Computational, Graphical, and Mathematical Representations
Jacob Z. Kelter, Northwestern University
Prof. Jonathan Daniel Emery, Northwestern University
Prof. Uri Wilensky, Northwestern University

Incorporating the Use of a Materials Database into a Materials Science and Engineering Freshman Course
Kisung Kang, University of Illinois at Urbana - Champaign
Dr. Matthew D. Goodman, University of Illinois at Urbana - Champaign
Prof. Jessica A. Krogstad, University of Illinois at Urbana - Champaign
Dr. Cecilia Leal, University of Illinois at Urbana - Champaign
Prof. Dallas R. Trinkle, University of Illinois at Urbana - Champaign
Prof. Pinshane Y. Huang, University of Illinois at Urbana-Champaign
Prof. Andre Schleife, University of Illinois at Urbana - Champaign

Material Property Variation in an Additive Manufacturing Lab
Prof. Charles Pringle P.E., Central Washington University
Dr. Craig Johnson P.E., Central Washington University
Dr. Jeunghwan Choi, Central Washington University

Schedule subject to change. Please go to https://2021asee.pathable.co/ for up-to-date information.
W438 - Capstone Design
1:45 P.M. - 3:15 P.M.
Sponsor: Mechanical Engineering Division
Moderators: Brian Novoselich, United States Military Academy; Rungun Nathan, Pennsylvania State University, Berks Campus; Thomas DeNucci, United States Coast Guard Academy

Papers related to capstone design are all brought together in this session.

Assessing the Impact of an Intro to ME Course on the Capstone Design Process
Lt. Col. Brian J. Novoselich, United States Military Academy
Lt. Col. James E. Bluman, United States Military Academy
Dr. Rebecca Zifchock, United States Military Academy
Col. Matthew Dabkowski, United States Military Academy

Augmenting Traditional ME Curriculum with Digital Badge Microcredentials
Dr. Andrea Gregg, Pennsylvania State University
Dr. Eric Marsh, Pennsylvania State University
Prof. Karen A. Thole, Pennsylvania State University

Capstone Design - Unexpected Challenges and Opportunities Due to the Covid-19 Pandemic
Dr. Nathan M. Kathir P.E., George Mason University
Dr. Erik Knudsen, George Mason University

Creating a Communications Curriculum for the Modern Engineer
Dr. Geoffrey Recktenwald, Michigan State University
Mr. Danny Rubin

The Influence of Participation in a Multi-Disciplinary Collaborative Service Learning Project on the Effectiveness of Team Members in a 100-level Mechanical Engineering Class
Dr. Stacie I. Ringleb, Old Dominion University
Dr. Pilar Pazos, Old Dominion University
Miss Julia Noginova, Old Dominion University
Mr. Francisco Cima, Old Dominion University
Dr. Orlando M. Ayala, Old Dominion University
Dr. Krishnanand Kaipa, Old Dominion University
Dr. Jennifer Jill Kidd, Old Dominion University
Dr. Kristie Gutierrez, Old Dominion University

W439 - The 'Strengths' of Mechanics
1:45 P.M. - 3:15 P.M.
Sponsor: Mechanics Division
Moderators: Andrew Conkey; Amie Baisley, University of Florida; Julian Davis, University of Southern Indiana; Masoud Rais-Rohani, University of Maine

A look into a variety of topics in strength of materials

Development of a New Concept Inventory for Mechanics of Materials
Dr. Stephen N. Kuchnicki, York College of Pennsylvania
Dr. Tristan M. Ericson, York College of Pennsylvania

Effect of a Concept Review Intervention on the Student’s Knowledge Retention and Demonstration of Pre-requisite Fundamental Concepts
Mr. Gaurav Chauda, Michigan State University
Dr. Geoffrey Recktenwald, Michigan State University

Work in Progress: Thematic Analysis of Engineering Students’ Technical Writing
Dr. Reihaneh Jamshidi, University of Hartford

Work in Progress: Implementing Project-based Learning Into Sophomore Mechanics Course
Mr. Casey Daniel Kidd, Louisiana Tech University
Dr. Ethan Clark Hilton, Louisiana Tech University

W440 - Minorities in Engineering Division Technical Session 6
1:45 P.M. - 3:15 P.M.
Sponsor: Minorities in Engineering Division
Moderators: Tracy Hammond, Texas A&M University; Kristin Imhoff, Saint Joseph’s University; Trina Fletcher, Florida International University

Creating a Diverse Next Generation of Technically- and Community-Minded STEM Professionals (Experience)
Dr. Denise M. Driscoll, Purdue University at West Lafayette
Maeve Drummond Oakes, CISTAR, Purdue University

Engaging Minority and Underrepresented Engineering Students to Fight “Sophomore Slump” Through a Summer Research and Enrichment Program (Research)
Dr. Lei Miao, Middle Tennessee State University
Dr. Cen Li, Middle Tennessee State University
Increasing Access to Undergraduate Research: Housing Student Research in the Engineering Diversity Office

Dr. Cynthia Howard-Reed, Pennsylvania State University
Mrs. Erin A. Hostetler, Pennsylvania State University

Virtual Summer Research Program with Professional Development and Financial Literacy Training

Dr. Hua Li, Texas A&M University - Kingsville
Prof. Kai Jin, Texas A&M University - Kingsville
Mr. Ricardo Miguel Garcia Pineda, Texas A&M University - Kingsville
Dr. Jaya S. Goswami, Texas A&M University - Kingsville

W441 - Assessment in Multidisciplinary Learning Environment

1:45 P.M. - 3:15 P.M.
Sponsor: Multidisciplinary Engineering Division

Moderators: Cynthia Barnicki, Milwaukee School of Engineering; AJ Hamlin, Michigan Technological University; Leah Newman, Milwaukee School of Engineering; Mojgan Jadidi, York University

Please note the last author will not be presenting at the conference.

Anonymous Online Peer Review for Innovation-Based Learning

Ryan Striker P.E., North Dakota State University
Mary Pearson, North Dakota State University
Ellen M. Swartz, North Dakota State University
Mr. Enrique Alvarez Vazquez, North Dakota State University
Ms. Lauren Singelmann, North Dakota State University
Stanley Shie Ng, Biola University

Assessing the Value and Implementation of Interdisciplinary Activities in Academic Makerspaces and Machine Shops

Dr. Lennon Rodgers, University of Wisconsin – Madison
Caroline Benish

Innovating Assessment: Using Innovative Impact as a Metric to Evaluate Student Outcomes in an Innovation-Based Learning Course

Ellen M. Swartz, North Dakota State University
Ryan Striker P.E., North Dakota State University
Ms. Lauren Singelmann, North Dakota State University
Mr. Enrique Alvarez Vazquez, North Dakota State University
Mary Pearson, North Dakota State University
Stanley Shie Ng, Biola University

Work-in-Progress: Defining Criteria to Evaluate Achievement of the NAE Grand Challenges Scholars Program Competencies

Dr. Haolin Zhu, Arizona State University
Amy Trowbridge, Arizona State University

The Engineering Epic Finale – An Authentic Alternative Assessment Method for Final Exams

Dr. Sara A. Atwood, Elizabethtown College
Dr. Brenda Read-Daily, Elizabethtown College
Dr. Jean Carlos Batista Abreu, Elizabethtown College

Quantitative Assessment of Writing Register in Engineering Technology Students

Dr. David Clippinger, Pennsylvania State University, Behrend College
Dr. Steven Nozaki, Pennsylvania State University, Behrend College
Ms. Ruth Camille Pfueger, Pennsylvania State University, Behrend College

W445 - Engineering Physics and Physics Panel Discussion on Accreditation

1:45 P.M. - 3:15 P.M.
Sponsor: Engineering Physics and Physics Division

Moderators: Robert Ross, University of Detroit Mercy; Bala Maheswaran, Northeastern University

Speakers: Dr. David K. Probst P.E., Greenville College; Dr. Steve H. Cobb P.E., Murray State University; Dr. Baha Jassemnejad, ASRC Federal System Solutions, Federal Aviation Administration; Dr. Harold T. Evensen, University of Wisconsin - Platteville

This session will provide valuable information for those interested in developing an ABET-accredited program. The expert panel consists of experienced ABET program evaluators who can help with answers to a wide variety of questions. It will benefit those with established programs as well as those just starting and covers the following:

- What is the overall landscape of engineering physics (EAC) and physics (ANSAC) programs?
- New ABET criteria for engineering physics and physics: changes in the ABET criteria
• Expansion from engineering physics and physics to other engineering and natural science disciplines
• What are the biggest hurdles and overlooked items for programs undergoing initial accreditation?
• The importance of industrial advisory boards and other outreach to the community/local/regional entities
• Program evaluation during a pandemic

W446 - Crafting the Future of Computing Education in CC2020

1:45 P.M. - 3:15 P.M.
Sponsor: Software Engineering Division
Moderators: Robert Hasker, Milwaukee School of Engineering; Afsaneh Minaie, Utah Valley University
Speakers: Dr. Stephen T. Frezza, Gannon University; Jeffry Babb, West Texas A&M University

Computing Curricula 2020, based on its predecessor CC2005, is a joint project launched by professional computing societies to examine the current state of curricular guidelines for academic programs granting undergraduate degrees in computing. The panel will examine the motivations for CC 2020, how the committee anticipates its impact on undergraduate computing education in the future. This will be an interactive discussion in which the audience will have an opportunity to help formulate this vision for the future of computing. The curricula is available at https://www.acm.org/binaries/content/assets/education/curricula-recommendations/cc2020.pdf.

W449 - Technological and Engineering Literacy/Philosophy of Engineering (TELPhE) Division Business Meeting

1:45 P.M. - 3:15 P.M.
Sponsor: Technological and Engineering Literacy/Philosophy of Engineering Division
Moderators: John Reisel, University of Wisconsin - Milwaukee; Katherine Goodman, University of Colorado Denver

Annual business meeting of the Technological and Engineering Literacy/Philosophy of Engineering Division

W450 - Two-Year College Division Business Meeting

1:45 P.M. - 3:15 P.M.
Sponsor: Two-Year College Division
Moderators: Philip Regalbuto, Trident Technical College; Dominic Dal Bello, Allan Hancock College

The annual business meeting of the two-year college division

W451 - Panel: Advocacy and Allyship by Men for Women in Engineering-related Fields at the College Level

1:45 P.M. - 3:15 P.M.
Sponsor: Women in Engineering Division
Moderator: Brian Kirkmeyer, Miami University

Diversity enables better and more creative problem solving, with greater financial impact on organizations, according to multiple studies in the past 10 years. One long-standing limitation on diversity in the engineering, computing, and technology fields is the persistently low representation of women. This is often seen in the collegiate environment more than in the professional world, and greater efforts need to be made among students and faculty to address it. Most succinctly, more men need to directly involve themselves as advocates for and allies of women. This panel engages with professionals of both binary gender identities who currently ally and advocate for women in engineering, computing, and technology fields. The goals of the panel are to identify common reasons why men should advocate for women, create support around the simple actions that can be taken in advocacy, and encourage greater allyship for women in the academic world and beyond. The panelists include both men and women from across multiple intersectional identities. The questions include: (1) for what reasons are you an ally or advocate for women in engineering-related fields, (2) what experiences have you had in which you have had to take immediate action as an advocate or ally, (3) what do you recommend for easy-to-implement actions to advocate, and (4) how can advocates and allies help implement change at their own institutions. For the paper, each panelist will be asked these questions and their answers will be provided.
unedited, followed by a summary discussion of actionable items. Existing resources regarding allyship will also be presented. For the panel presentation session, each panelist will have the opportunity to highlight aspects of their answers that bring life to their thoughts to each question and together with other members of the panel can build for an in-depth discussion.

**W452 - What Are Crucial Barriers and Opportunities to Bring Our Whole Selves to Engineering Education? Moving Watermelons Together**

**1:45 P.M. - 3:15 P.M.**

**Sponsor:** Community Engagement Division

**Moderators:** Joan Schuman, Missouri University of Science and Technology; Marybeth Lima, Louisiana State University and A&M College; Malini Natarajarathinam, Texas A&M University

**Speakers:** Dr. Angela R. Bielefeldt P.E., University of Colorado Boulder; Dr. Marybeth Lima P.E., Louisiana State University and A&M College; Dr. Jon A. Leydens, Colorado School of Mines; Dr. Ann D. Christy P.E., The Ohio State University; Dr. Malini Natarajarathinam, Texas A&M University; Dr. Julia D. Thompson, University of San Francisco

Many of us in engineering education are working towards the transformation and healing of the engineering profession and engineering education cultures—while individually striving to be more authentically ourselves. We recognize that our inner work is directly linked to our outer community. This panel represents the collective thinking of a group of engineering educators in different paths and stages in our careers. We come together to discuss how we—with your help—might move engineering education and the engineering profession in a more humanitarian, soul-fulfilling direction. We recognize the task in front of us is massive. Think of it as moving a pile of watermelons a few kilometers. The movement towards transformation requires all of us to stand up and take a share. However, we must also recognize our personal limitations—we cannot hold too many watermelons and expect to move forward. We need to come together and balance the load.

We hope to have a lively discussion among participants around the following queries:

-What are the barriers to bringing your whole self to your work?
-What opportunities can help you bring your whole self to work?
-If you were able to bring your whole self to work, what does that look like for you?
-What principles of inclusion and healing might facilitate a cultural transformation in engineering education and the engineering profession?
-What could be possible?

**What Are Crucial Barriers and Opportunities to Bringing Our Whole Selves to Engineering Education? Moving Watermelons Together**

Dr. Angela R. Bielefeldt, University of Colorado Boulder
Dr. Jon A. Leydens, Colorado School of Mines
Dr. Ann D. Christy P.E., The Ohio State University
Dr. Marybeth Lima P.E., Louisiana State University and A&M College
Dr. Malini Natarajarathinam, Texas A&M University
Dr. Julia D. Thompson, University of San Francisco

**W455 - Embracing Diversity, Equity, and Inclusion in Our Classroom and Teaching**

**1:45 P.M. - 3:15 P.M.**

**Sponsor:** Engineering Leadership Development Division

**Moderators:** Jena Asgarpoor, University of Nebraska - Lincoln; Meg Handley, Pennsylvania State University; Meagan Kendall, University of Texas at El Paso; David Nino, Massachusetts Institute of Technology

**Speakers:** Dr. Alisha L. Sarang-Sieminski, Franklin W. Olin College of Engineering; John Slaughter; Dr. Monica Farmer Cox, The Ohio State University; Dr. Meagan C. Pollock, Engineer Inclusion; Dr. Homero Murzi, Virginia Polytechnic Institute and State University

Recent events have brought to light the gravity of the challenges that our society faces relative to systemic racism and its impact on equity and access. Marginalized groups face daily micro-aggressions and bias due to the impacts of systemic racism. Recently, the National Academy of Engineering’s annual meeting included a keynote speaker, Dr. John Slaughter, who has committed his life’s work to dismantling racism specifically in engineering education. Dr. Slaughter called on the NAE and its members to
recognize the challenges that systemic racism poses for the engineering field and to take action in changing the way our students are educated. Dr. Slaughter pointed out that without an inclusive engineering workforce, we are missing viable and important solutions to engineering problems. As engineering leadership educators, our obligation to our students extends beyond the transmission of technical knowledge. We have a responsibility to infuse our curriculum with knowledge of systemic racism, how bias can impact our solutions, and how engineers can lead and create teams that foster belonging and inclusivity. The fabric of our society has become fragile and is breaking apart rapidly. We must help engineering leadership students develop a growth mind-set and discover the sophistication of mind to celebrate diversity, equity, and inclusion in their daily lives, school, and workplace. This requires us to consider inclusive leadership as a foundational approach to engineering leadership development.

Inclusive leadership has been shown to positively impact team performance, decision-making, collaboration, innovation, and motivation. Inclusive leaders celebrate differences and recognize and challenge attacks on DEI. As engineering leadership educators, we must lead by example, model inclusive leadership behavior, and have the courage to infuse these concepts into our curriculum. Come to this panel to:

- Learn about diversity, equity, and inclusion and why it is important to welcome DEI in our workplace and in our classroom
- Learn what we must do as educators to embrace DEI when designing and delivering our courses
- Learn strategies to teach students to celebrate and support DEI to prepare them for the workforce

W457 - Leading From the Middle During Times of Transition

1:45 P.M. - 3:15 P.M.
Sponsor: Faculty Development Division
Moderators: James Canino, Trine University; Karen High, Clemson University
Speakers: Dr. Noelle K. Comolli, Villanova University; Adam Smith, Villanova

Background:
Times of major transition can bring out bias and highlight good leadership versus poor leadership. We have seen this recently due to COVID-19 and the heightened awareness of racial injustice. Examples of good and bad leadership can be seen in the myriad of campus opening plans in their consulting constituencies, and communication of the plan outward. In this session, participants will engage in case study exercises that highlight the need and value of peer networks and collaboration. Following an in-depth discussion on the outcomes, the presenters will discuss how Villanova University has created a department chair peer network to help facilitate this kind of cross-disciplinary engagement. Participants will also engage in an exercise to better understand their leadership positionality and areas where they could benefit from peer support.

The facilitator team:
The team is all part of the NSF-ADVANCE-IT grant awarded to Villanova. The team is working on professional development and leadership training during transition to promote equity for faculty, especially in the STEM areas.

W463 - Campus Rep Business Meeting

1:45 P.M. - 3:15 P.M.
Sponsor: Campus Representatives
Moderator: Tim Manicom, American Society for Engineering Education

W466 - Modernizing Engineering Education to Meet Industry 4.0

1:45 P.M. - 3:15 P.M.
Sponsor: Corporate Member Council
Moderators: Dora Smith, Siemens Digital Industries Software; Shannon O’Donnell, Siemens Digital Industries Software
Speakers: Dr. John L. Irwin, Michigan Technological University; Prof. Timothy W. Simpson, Pennsylvania State University; Dr. Jenna P. Carpenter, Campbell University; Jennifer Culp; Dr. Irene J. Petrick, Pennsylvania State University; Jack Warning

Over the past year, ASEE’s Corporate Member Council (CMC) has engaged academia and industry in series of workforce summits to address engineering education reform. The summits addressed building an Industry
4.0-ready workforce by scaling industry-education collaboration in the digital domain, along with developing Education 4.0 perspectives and policies. In addition, ASEE CMC conducted research with new graduates for direct feedback from fresh hires over the past five years to determine the knowledge, skills, and abilities they felt prepared or not for. This research built on the NSF-funded Transforming Undergraduate Education in Engineering. This session will report out on key insights from the summits and research and provide actionable outcomes as a roadmap for the future of engineering education.

W470 - ETC Board Meeting
1:45 P.M. - 3:15 P.M.
Sponsor: Engineering Technology Council
Moderator: Christopher Leblanc, University of New Hampshire

W477 - Community Organizing for the Year of Impact on Racial Equity
1:45 P.M. - 3:15 P.M.
Sponsor: ASEE Committee on Diversity, Equity & Inclusion
Moderators: Susan Walden, University of Oklahoma; Rachelle Reisberg, Northeastern University
Speakers: Dr. Elizabeth Litzler, University of Washington; Dr. Jeremi S. London, Virginia Polytechnic Institute and State University; Dr. Homero Murzi, Virginia Polytechnic Institute and State University

The ASEE Commission on Diversity, Equity, and Inclusion is leading an ASEE Year of Impact on Racial Equity (YIRE) for the 2021-2022 Society year. Join CDEI leaders and members to develop action plans for the coming year.

The YIRE is organized around three impact areas: increasing participation among Black and brown children in engineering activities; empowering post-secondary student organizations to work toward greater inclusion in higher ed; implementing organizational policies and practices in colleges of engineering to disrupt the status quo and increase racial equity for students and faculty.

All ASEE members are invited to participate in these or other ways in your division, section, or school.

1:45 P.M. - 3:15 P.M.
Sponsor: ABET Sponsored Sessions
Moderator: Christine Kalambary, American Society for Engineering Education
Speakers: Scott Murray, Procore; Lisa Sachs; Rebecca "Becki" Popeck

ABET accreditation has long been the global standard for programs in applied science, computing, engineering, and engineering technology. Recently programs in disciplines outside of these four main areas have shown interest in becoming accredited. This presentation will explore accrediting natural science and mathematics programs under ANSAC General Criteria as well as programs under CAC General Criteria and the value accreditation brings to these programs.

W501 - Aerospace Division Technical Session 5
3:30 P.M. - 5:00 P.M.
Sponsor: Aerospace Division
Moderators: Michael Hatfield, University of Alaska Fairbanks; Tracy Yother, Purdue University at West Lafayette; Sharan Asundi, Old Dominion University; Nadir Yilmaz, Howard University

Learning in a Socially Distanced Environment
Gaining Industry Experience Exposure During a Pandemic
Dr. Wm. Michael Butler, Virginia Polytechnic Institute and State University
Dr. Kenneth Reid, University of Indianapolis

Challenges and Successes of the Transition to Online Format of a Lower Division Aerospace Engineering Class during COVID-19
Dr. Lucia Rut Capdevila, San Jose State University

Pedagogy Improvement in Aerospace Structures Education Using Virtual Labs: Before, During, and After the COVID-19 School Closures and Remote Learning
W504 - Biomedical Engineering Business Meeting

3:30 P.M. - 5:00 P.M.

_Sponsor: Biomedical Engineering Division_

_Moderators: Aileen Huang-Saad, Northeastern University; Renata Ramos, Rice University_

We will discuss the content of the current and future annual meetings, elect officers, and discuss other matters of importance to the biomedical engineering community. This meeting is open to all BED members. A link to the business meeting will be e-mailed to the BED listserv 15 minutes before the meeting.

W505 - Business and Professional Literacy Within Chemical Engineering

3:30 P.M. - 5:00 P.M.

_Sponsor: Chemical Engineering Division_

_Moderators: VJ Tocco; Ashlee Ford Versypt, University at Buffalo, The State University of New York; Anthony Butterfield, University of Utah_

Chemical Engineers’ Experiences of Ethics in the Health Products Industry

Ms. Dayoung Kim, Purdue University at West Lafayette
Dr. Alison J. Kerr, University of Illinois Urbana Champaign

Engineering Students’ Perceptions of Their Role in the University Organization

Benjamin Goldschneider, Virginia Polytechnic Institute
Dr. Nicole P. Pitterson, Virginia Polytechnic Institute

Organizational Citizenship Behavior and Care in Chemical Engineering

Mrs. Kristen Ferris, University of New Mexico
Dr. Pil Kang, University of New Mexico
Ms. Madalyn Wilson-Fetrow, University of New Mexico
Dr. Vanessa Svihla, University of New Mexico
Prof. Eva Chi, University of New Mexico
Dr. Jamie Gomez, University of New Mexico
Dr. Yan Chen, University of New Mexico
Dr. Susannah C. Davis, University of New Mexico
Prof. Sang M. Han, University of New Mexico
Dr. Abhaya K. Datye, University of New Mexico

Partnerships Between Preprofessional Student Groups and Your Unit

Dr. Joseph H. Holles, University of Wyoming

W506 - Reassessing Your Teaching Through Turmoil

3:30 P.M. - 5:00 P.M.

_Sponsor: Civil Engineering Division_

_Moderators: Decker Hains, Western Michigan University; Kyle Kershaw, Rose-Hulman Institute of Technology; Matthew Lovell, Rose-Hulman Institute of Technology; Steven Burian, University of Utah_

In this session, authors will discuss lessons learned during the sudden change to online teaching and how it might impact the in-person return.

Co-creating a Teaching Module on the Impacts of COVID-19 on Various Transportation Systems and Stakeholders

Dr. Claudia Mara Dias Wilson, New Mexico Institute of Mining and Technology
Ms. Janille A. Smith-Colin, Southern Methodist University
Dr. Baris Salman, Syracuse University
Dr. Rodolfo Valdes-Vasquez, Colorado State University

Evolution of a Traditional Classroom Teaching Workshop to Support Remote Delivery

Dr. Charles Riley P.E., Oregon Institute of Technology
Dr. Sharon L. Beaudry, Oregon Institute of Technology
Dr. Jesse M. Kinder, Oregon Institute of Technology

Impact of Remote Instructional Format on Student Perception of a Supportive Learning Environment for Expertise Development

Dr. Vikash Gayah
Dr. Sarah E. Zappe, Pennsylvania State University
Dr. Stephanie Cutler, Pennsylvania State University

**Lessons Learned in a Mixed-mode Teaching Experience**
- Dr. Jennifer Retherford P.E., University of Tennessee at Knoxville
- Dr. Kristen N. Wyckoff, University of Tennessee at Knoxville
- Dr. Sarah J. Mobley, University of Tennessee at Knoxville

**Teaching Structures in an (Almost) Empty Room: An Assessment of Strategies for Student Engagement in Mixed-mode and Remote Classes**
- Dr. Ryan Solnosky P.E., Pennsylvania State University
- Dr. Nathan C. Brown, Pennsylvania State University
- Prof. Rebecca Napolitano, Pennsylvania State University

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**W508 - Computers in Education (CoED) Business Meeting**

**3:30 P.M. - 5:00 P.M.**

**Sponsor:** Computers in Education Division

**Moderators:** Steven Barrett, University of Wyoming; Afrin Naz, West Virginia University Institute of Technology

The Computers in Education (CoED) business meeting provides a planning session for next year's division offerings, reviews current CoED business and practice, and provides for the election of new officers. All with similar interests are invited to attend.

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**W509 - Construction Division Business Meeting**

**3:30 P.M. - 5:00 P.M.**

**Sponsor:** Construction Engineering Division

**Moderators:** Rachel Mosier, Oklahoma State University; Norman Philipp, Pittsburg State University; Nicholas Tymvios, Bucknell University

Meeting to discuss Construction Division business items. We will review bylaws and budget and vote for new officers.

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**W510 - Continuing Professional Development Division Technical Session 2**

**3:30 P.M. - 5:00 P.M.**

**Sponsor:** Continuing Professional Development Division

**Moderator:** Keith Plemmons

**An After-action Review: Creating a Matrix Organizational Design Model for Online Education at a Tier-1 Research University**
- Dr. Mitchell L. Springer, Purdue University at West Lafayette
- Dr. Keith Plemmons, MBAS, Inc.

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**W511 - Cooperative and Experiential Education Division Technical Session 3**

**3:30 P.M. - 5:00 P.M.**

**Sponsor:** Cooperative and Experiential Education Division

**Moderators:** Katherine McConnell, University of Colorado Boulder; Robin Hammond, Arizona State University

This session focuses on programs designed to encourage international engagement and/or broaden participation among diverse groups in STEM and engineering education. Following the paper presentations, participants will have an opportunity to both ask questions and join the presenters in breakout rooms to discuss their work.

**Post-secondary Work Integrated Learning Through STEM Outreach**
- Ms. Tracy L. Ross, Actua
- Lisa Romkey, University of Toronto

**Value of Experiential Experiences for Diverse Student Populations Within Engineering Disciplines**
- Dr. Carol S. Stwalley, Purdue University at West Lafayette
- Dr. Robert Merton Stwalley III P.E., Purdue University at West Lafayette
- Ms. Grace Lynn Baldwin
- Ms. Virginia Lynn Booth-Womack, Purdue University at West Lafayette
- Sarah LaRose

**Virtual Globalization: An Experience for Engineering**
Students in the Education 4.0 Framework
Dr. Patricia Caratozzolo P.E., Tecnológico de Monterrey
Prof. Anna Friesel, Technical University of Denmark
Dr. Peter Jan Randewijk, Technical University of Denmark
Dr. David Navarro-Duran, Tecnológico de Monterrey

Virtual International Innovative Program on Sustainable Engineering: Lessons Learned from a Successful U.S.-Perú Collaborative Effort
Dr. Carlos Martin Chang, Florida International University
Dr. Adeeba Abdul Raheem, University of Texas at El Paso

A Co-curricular Framework for a Multinational, Vertically Integrated Engineering Design Project
Dr. Lelanie Smith, University of Pretoria
Dr. Nadia Millis Trent P.E., University of Waikato

W513 - DEED Business Meeting
3:30 P.M. - 5:00 P.M.
Sponsor: Design in Engineering Education Division
Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, The Ohio State University

Annual business meeting for the Design Engineering Education Division. Meeting will provide division updates, discuss future activities/plans, and offer an opportunity for members to serve in leadership positions.

W514 - ERM Business Meeting
3:30 P.M. - 5:00 P.M.
Sponsor: Educational Research and Methods Division
Moderators: Kerrie Douglas, Purdue University at West Lafayette; Sarah Zappe, Pennsylvania State University

This is the annual business meeting of the Educational Research and Methods (ERM) Division. The meeting is an opportunity to hear reports, contribute to decisions by the ERM board, learn about future events of the division, and get involved in ERM activities.

W514B - Preparing Engineering Students for Their Professional Practice
3:30 P.M. - 5:00 P.M.
Sponsor: Educational Research and Methods Division

W514B - Preparing Engineering Students for Their Professional Practice
3:30 P.M. - 5:00 P.M.
Sponsor: Educational Research and Methods Division

Moderators: Saryn Goldberg, Hofstra University; Amanda Johnston, Purdue University at West Lafayette

Rethinking Engineering Education: Lessons from the Learning Experiences of Early-career Engineers
Miss Yike Li, Shanghai Jiao Tong University
Jiabin Zhu, Shanghai Jiao Tong University
Dr. Zhinan Zhang, Shanghai Jiao Tong University

Revolutionize Ph.D. Training in Academia-industry Collaboration
Shiuhan Huey Yen, Institute of Engineering Education Taiwan
Jessica Fan, Institute of Engineering Education Taiwan
Dr. Mandy Liu, Institute of Engineering Education Taiwan
Prof. Liang-Jenq Leu, Institute of Engineering Education Taiwan

“I Wish I Would Have Known...”: Characterizing Engineering Students’ Reflections on Their Graduate Experiences
Mr. Kanembe Shanachilubwa, Pennsylvania State University
Miss Megan Ellery
Gabriella M. Sallai, Pennsylvania State University
Dr. Catherine G.P. Berdanier, Pennsylvania State University

The Stated and Hidden Expectations: Applying Natural Language Processing Techniques to Understand Postdoctoral Job Postings
Jia Zhu, Florida International University
Ellen Zerbe, Pennsylvania State University
Dr. Monique S. Ross, Florida International University
Catherine G.P. Berdanier, Pennsylvania State University

Practicing Engineers’ Definition of Their Expertise: Emergent Themes and Frequency by Gender Identity and Role Change into Management
Caroline Bolton, Bucknell University
Dr. Elif Miskioglu, Bucknell University
Dr. Kaela M. Martin, Embry-Riddle Aeronautical University
Caitlyn Aaron
Dr. Adam R. Carberry, Arizona State University

Studying the Formation of Engineers: A Case Study of a
**Higher-education Learning Ecology**  
Russell Korte, George Washington University  
Prof. Saniya LeBlanc, George Washington University

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**W515 - Electrical and Computer Engineering Division Technical Session 8**

**3:30 P.M. - 5:00 P.M.**

**Sponsor:** Electrical and Computer Engineering Division  

**Moderators:** Huihui Wang, St. Bonaventure University; Nader Rafia, Boise State University; Jennifer Bonniwell, Milwaukee School of Engineering; Jian Wang

**Having it All: Infusing Parallel Computational Thinking in the Lower-level Computer Engineering Curriculum Using Extended Learning Modules**  
Mr. Zeran Zhu, University of Illinois at Urbana Champaign  
Dr. Ujjal K. Bhownik, University of Illinois at Urbana Champaign  
Ms. Yue Wang, University of Illinois at Urbana Champaign  
Dr. Zuofu Cheng, University of Illinois at Urbana Champaign  
Prof. Yuting W. Chen, University of Illinois at Urbana Champaign

**Design and Outcome of a Course on Software-defined Radio Within the Computer Science Department**  
Dr. Marc Lichtman, University of Maryland College Park  
Dr. Travis Fredrick Collins, Analog Devices, Inc.  
Robin Getz, Analog Devices, Inc.

**Performance Prediction of Computer Science Students in Capstone Software Engineering Course Through Educational Data Mining**  
Dr. Saffeer Muhammad Khan, Arkansas Tech University  
Dr. Mohamed Ibrahim, Arkansas Tech University  
Dr. Syed Ali Haider, State University of New York at Fredonia

**An Introductory Course on the Design of IoT Edge Computing Devices**  
Mr. Matthew McConnell, Case Western Reserve University  
Dr. Kenneth A. Loparo, Case Western Reserve University  
Mr. Nicholas A. Barendt, Case Western Reserve University

**Work in Progress: Enhance Undergraduate Electrical Engineering Education with CPS/IoT Infusion**  
Dr. Liang Hong, Tennessee State University  
Prof. Lee Keel, Tennessee State University

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**W518 - Engineering Design Graphics Division Technical Session 3: Flipped Classroom**

**3:30 P.M. - 5:00 P.M.**

**Sponsor:** Engineering Design Graphics Division  

**Moderators:** Snehika Pandey, University of Maryland Baltimore County; Yang Shao, University of Illinois at Urbana - Champaign

This session features strategies to improve students' learning in the flipped classroom.

**Conducting a Blended GD&T Course During the COVID-19 Pandemic: Lessons Learned**  
Dr. Theodore J. Branoff, Illinois State University

**Doing the Backflip: Using Classroom Technology to Adapt a Flipped Class to the HyFlex Teaching Model**  
Dr. Nathan John Washuta P.E., The Citadel  
Dr. Patrick Bass, The Citadel  
Dr. Emily Kate Bierman, The Citadel

**Student Feedback on Best Practices for Flipped Classroom Courses in a First-year CAD Course**  
Dr. Angela Boronyak, University of Cincinnati

**Work in Progress: Gamified Learning in Graphical Communications During the COVID-19 Pandemic**  
Dr. Lulu Sun, Embry-Riddle Aeronautical University

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**W520 - Ethics Integration in Engineering Design**

**3:30 P.M. - 5:00 P.M.**

**Sponsor:** Engineering Ethics Division  

**Moderators:** Marie Stettler Kleine, Colorado School of Mines; John Duggan, Endicott College

**Collaborating to Integrate Ethics in an Introductory Engineering Computing Course**  
Dr. Brooke Odle, Hope College  
Dr. Greg Bassett, Hope College

**Integration of Ethics-focused Modules into the Steps of the Engineering Design Process**  
Ms. Jessica R. Edelson, Duke University
W521 - Preprints, Postprints, ePrints: The Case for Engineering Information

3:30 P.M. - 5:00 P.M.
**Sponsor:** Engineering Libraries Division

**Moderators:** Julia Gelfand, University of California, Irvine; Kari Kozak, The University of Iowa; David Hubbard, Texas A&M University; Aleshia Huber, State University of New York at Binghamton

**Speakers:** Mr. Jay J. Bhatt, Drexel University; Steven Heffner, IEEE; Kim Martin, SAE; Shirley Decker-Lucke, Elsevier

The COVID-19 pandemic has demonstrated how critical access to timely scientific information is and how public engagement has demanded reliance on such sources documenting the latest research findings at an unprecedented scale. The relationships between preprint authors and traditional commercial and society publishers have changed as a result of the pandemic. This caused publishing workflows to aggressively compete for acquiring future submissions from preprint authors with new publishing conditions and greater intensity. Preprint servers demonstrate far higher use (biorxiv reports 15x more) than from pre-COVID times, especially for content related to researching the virus and supporting patients and the understanding of their longtime medical, social and technical needs. This proposed panel will share how preprints published during the pandemic have influenced the course of engineering scholarly communication and speculate about the future of open access in engineering literature and more generally on the scientific publishing landscape and new roles for Open Science. Panelists will include librarians, pioneers of engrXiv (https://engrxiv.org/), publishers from the engineering societies, such as IEEE that powers TechRxiv (https://www.techrxiv.org/), commercial publishers such as Elsevier and SSRN (https://www.ssrn.com/index.cfm/en/), and/or Cambridge Open Engage (https://www.cambridge.org/engage/coe/public-dashboard) who have also entered the preprint space and continue to explore next steps in OA content. Attendees will gain insights into what new roles engineering preprints will have on the roles of future scholarship, training and publishing in the discipline.

W523 - Focus on ETAC Accreditation

3:30 P.M. - 5:00 P.M.
**Sponsor:** Engineering Technology Division

**Moderators:** Karen Wosczyna-Birch, CT College of Technology; Christopher Leblanc, University of New Hampshire; Clay Gloster, North Carolina Agricultural and Technical State University

**Assessing Intuition Used Among Undergraduate Engineering Technology and Engineering Students**

Melissa Cai Shi, Purdue University at West Lafayette
Therese M. Azevedo, Sonoma State University
Dr. Anne M. Lucietto, Purdue University at West Lafayette
Dr. Anne M. Lucietto, Purdue University at West Lafayette

**Comparing the Effects of COVID-19 on ETAC and EAC Programs at a Regional Comprehensive University**

Dr. Andrew Ritenour, Western Carolina University
Dr. Wesley L. Stone, Western Carolina University
Dr. Chip W. Ferguson, Western Carolina University
Dr. Hayri Sezer, Western Carolina University
Dr. Yang Zhang, Western Carolina University
Dr. AMM Nazmul Ahsan, Western Carolina University

**Building an Effective ABET ETAC Assessment Program from the Ground Up**

Dr. Qudsia Tahmina, Ohio State University
Ms. Kathryn Kelley, Ohio State University
Aimee T. Ulststad, Ohio State University

**Development and Implementation of an Assessment Model in a Sophomore Electromechanical Systems Design Laboratory for the ETAC-ABET Accreditation**

Dr. Lili Ma, New York City College of Technology
Dr. Benito Mendoza, New York City College of Technology
Prof. Lorrington A. Hamilton, New York City College of Technology

Prof. Luis Alberto Aponte, New York City College of Technology
Prof. Mauricio Cardenas, New York City College of Technology

**ETAC-ABET and EvaluateUR-CURE: Findings from Combining**
Two Assessment Approaches as Indicators of Student-Learning Outcomes

Dr. Ilya Y. Grinberg, Buffalo State College, The State University of New York
Dr. Jill Singer, Buffalo State College, The State University of New York

W524 - Entrepreneurship and Engineering Innovation Division Technical Session 5

3:30 P.M. - 5:00 P.M.
Sponsor: Entrepreneurship & Engineering Innovation Division
Moderators: Prateek Shekhar, New Jersey Institute of Technology; Nassif Rayess, University of Detroit Mercy

Work in Progress: Comparison of the Entrepreneurial Mindset of Engineering Faculty and Undergraduate Students
Dr. Maria-Isabel Carnasciali, University of New Haven
Dr. Cheryl Q. Li, University of New Haven
Dr. Nadiye O. Erdil, University of New Haven
Dr. Ronald S. Harichandran, University of New Haven

Work in Progress: Transforming Undergraduate Learning in the Pursuit of Innovation: Transdisciplinary Coursework and Its Influence on Entrepreneurial Thinking
Jackson Otto, Purdue University, West Lafayette
Dr. Greg J. Strimel, Purdue University, West Lafayette

Work in Progress: Entrepreneurship and Senior Design Program Collaboration Towards Multidisciplinary Design
Dr. Rachana Ashok Gupta, North Carolina State University at Raleigh
Mr. Marshall Brain, North Carolina State University at Raleigh

Work in Progress: A Conceptual Design Project for Civil Engineering Freshmen to Enhance Their Entrepreneurial Mindset
Dr. J. Chris Carroll, Saint Louis University
Ms. Kelsey Z. Musa, Saint Louis University
Dr. Shannon M. Sipes, Indiana University, Bloomington
Dr. Scott A. Sell, Saint Louis University
Dr. Michelle B. Sabick, Saint Louis University

Using the Engineering Unleashed Competition Teams’ Skillset to Cultivate Entrepreneurial Mindset in Cocurricular Contexts
Dr. Julia M. Williams, Rose-Hulman Institute of Technology

Qualitative Investigation on the Failure Experiences of Entrepreneurial Engineering Students
Dr. Thomas M. Katona, California Polytechnic State University, San Luis Obispo
Dr. Sarah E. Zappe, Pennsylvania State University
Noa Dunevich, California Polytechnic State University, San Luis Obispo
Dr. Lauren Gase, VentureWell

W525 - Environmental Engineering Technical Session 4: Environmental Issues and the Impacts of Intersectionality

3:30 P.M. - 5:00 P.M.
Sponsors: Environmental Engineering Division; Women in Engineering Division
Moderators: Roman Taraban, Texas Tech University; David Sanchez, University of Pittsburgh; Fethiye Ozis, Northern Arizona University; Michelle Marincel Payne, Rose-Hulman Institute of Technology

Who will Lead Us Out of Climate Crisis? Gender, Race, and Early Career Pathways in Environmental Engineering
Dr. Shannon Katherine Gilmartin, Stanford University
Dr. Angela Harris, North Carolina State University
Ms. Christina Martin-Ebosele, Stanford University
Dr. Sheri Sheppard, Stanford University

Environmental Justice and Equity Issues: In Our Backyards and Beyond
Dr. Angela R. Bielefeldt, University of Colorado Boulder
Prof. JoAnn Silverstein P.E., University of Colorado Boulder

Workshop Result: Teaching Structured Reviews to Environmental Engineering Researchers
Dr. Daniel B. Oerther, Missouri University of Science and Technology

W527 - First-Year Programs: Focus on Student Success I

3:30 P.M. - 5:00 P.M.
Sponsor: First-Year Programs Division
Moderators: Ashish Borgaonkar, New Jersey Institute of Technology; Rui Li, New York University; Kaitlin Mallouk,
Rowan University; Timothy Hinds, Michigan State University

Meaning to Succeed: Learning Strategies of First-Year Engineering Transfer Students
Mrs. Natalie C.T. Van Tyne P.E., Virginia Polytechnic Institute and State University
Dr. Lisa D. McNair, Virginia Polytechnic Institute and State University
Dr. David Reeping, University of Michigan

How Certainty in Selecting an Engineering Major Is Influenced by First-Year Course Offerings
Dr. Andrew Charles Bartolini, University of Notre Dame
Dr. Victoria E. Goodrich, University of Notre Dame
Dr. Kerry Meyers, University of Notre Dame

Measuring First-Year Engineering Majors’ Interest in Engineering
Dr. Brian Scott Robinson, University of Louisville
Dr. Tom Trettet, University of Louisville
Dr. James E. Lewis, University of Louisville
Dr. Nicholas Hawkins, University of Louisville

Advanced Placement Programs and Engineering Undergraduate First-Year GPA
Mr. Hossein Ebrahiminejad, Purdue University at West Lafayette
Mr. David Ray Waller, Purdue University at West Lafayette
Dr. Matthew W. Ohland, Purdue University at West Lafayette
Hayaam Osman, Purdue University at West Lafayette

Self-Efficacy, Mathematical Mindset, and Self-Direction in First-Year Engineering Students
Dr. Matthew Cavalli, Western Michigan University
Ms. Anetra Grice, Western Michigan University

W528 - Graduate Studies Division Business Meeting
3:30 P.M. - 5:00 P.M.
Sponsor: Graduate Studies Division
Moderators: Diane Peters, Kettering University; Jeffrey Fergus, Auburn University

This is the annual business meeting for the Graduate Studies Division. At this meeting, we'll discuss the division's past year and plans for the upcoming year.

W527B - First-Year Programs: Design in the First Year
3:30 P.M. - 5:00 P.M.
Sponsor: First-Year Programs Division
Moderators: Robin Hensel, West Virginia University; Scott Streiner, Rowan University; Kaitlin Malouk, Rowan University; Timothy Hinds, Michigan State University

Toy Story: Improvements to a First-Year Engineering Design Project Based on Student Feedback
Mrs. Ariana Gabrielle Smies, Michigan Technological University
Erin Vandenbusch

W530 - Computing and Information Technology Division Technical Session 7
3:30 P.M. - 5:00 P.M.
Sponsor: Computing and Information Technology Division
Moderators: Ida Ngambeki, Purdue University at West Lafayette; Reza Sanati-Mehrizy, Utah Valley University; Afsaneh Minaie, Utah Valley University

This session presents papers on a variety of topics pertaining to computing and information technology.
A Hands-on Learning Approach to Introducing Computer Organization and Architecture to Early-college Students

Dr. D. Cenk Erdil, Sacred Heart University
Dr. Kevin N. Bowlyn, Sacred Heart University
Mr. Joshua Randall, Sacred Heart University

Computing Ethics for the Ethics of Computing

Dr. Robin K. Hill, University of Wyoming

Creation of a Class to Teach Software Entrepreneurship

Dr. Jeremy Straub, North Dakota State University

Writing Triggers to Implement Business Rules in a Relational Database

Dr. Reza Sanati-Mehrizy, Utah Valley University
Dr. Afsaneh Minaie, Utah Valley University

Haptics in Aviation

Dr. Afsaneh Minaie, Utah Valley University
Mr. Joshua D. Neeley, Utah Valley University
Nile Edward Brewer
Dr. Reza Sanati-Mehrizy, Utah Valley University

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W532 - International Division Technical Session 4

3:30 P.M. - 5:00 P.M.

W534 - Sociotechnical Thinking II: Interpretation, Curricular Practices, and Structural Change

3:30 P.M. - 5:00 P.M.
Developing Engineering Formation Systems for Sustainability
Dr. Donna M. Riley, Purdue University at West Lafayette
Rosalee A. Clawson, Purdue University
Dragan Maksimovic, University of Colorado Boulder
Dr. Beth A. Myers, University of Colorado Boulder
Dr. Ivonne Santiago P.E., University of Texas at El Paso
Mr. Nick A. Stites, University of Colorado Boulder
Jennifer L. Taylor, University of Colorado Boulder

"Asking ‘Why’ Instead of ‘How’”: Outcomes of an Interdisciplinary Degree Program in Engineering Studies
Dr. Jenn Stroud Rossmann, Lafayette College
Dr. Kristen L. Sanford P.E., Lafayette College
Benjamin Cohen, Lafayette College

W538 - Mechanics & Mechanics Related
3:30 P.M. - 5:00 P.M.
Sponsor: Mechanical Engineering Division
Moderators: Anna Howard, North Carolina State University at Raleigh; Rungun Nathan, Pennsylvania State University, Berks Campus; Thomas DeNucci, United States Coast Guard Academy

Papers related to statics, dynamics and closely related topics.

Evaluating the Effectiveness of a Statics Recitation Course
Mr. Brian Lani, Pennsylvania State University, Erie Campus
Dr. Charlotte Marr de Vries, Pennsylvania State University, Behrend College

Fostering Entrepreneurial Mindset through a Hands-on Design Project in a Mechanism Design Course
Dr. Haolin Zhu, Arizona State University

Incorporating a Mid-semester Project to Evaluate Communication, and Leadership Skills for Undergraduate Engineering Students in the Statics/Strength of Materials Course: A Comparative Assessment Before and During COVID-19
Dr. Eleazar Marquez, Rice University
Dr. Samuel Garcia Jr., NASA EPDC

Open-ended Modeling Group Projects in Introductory Statics and Dynamics Courses
Dr. Emma Treadway, Trinity University
Dr. Jessica E.S. Swenson, University at Buffalo, The State University of New York

Work in Progress: Project-based Homework: An Ongoing Study on Engineering Analysis-Dynamics
Dr. Sudeshna Pal, University of Central Florida
Dr. Ricardo Zaurin P.E., University of Central Florida

W541 - Design in Multidisciplinary Learning Environment
3:30 P.M. - 5:00 P.M.
Sponsor: Multidisciplinary Engineering Division
Moderators: Cynthia Barnicki, Milwaukee School of Engineering; AJ Hamlin, Michigan Technological University; Amit Jariwala, Georgia Institute of Technology; Muruganantham Ponnusamy, Saintgits College of Engineering

A Systematic Review of Multidisciplinary Engineering Education: Accredited Programs, Educational Approaches, and Capstone Design
Dr. Lina Zheng, Tsinghua University
Prof. Dexin Hu, Tianjin University
Prof. Brent K. Jesiek, Purdue University at West Lafayette

Authentic Engineering Design Assessment
Miss Joanna Ambrosio
Dr. M. David Burghardt, Hofstra University
Dr. Deborah Hecht, Center for Advanced Study in Education

Engineering Capstone Senior Design Project as a Story-Building Platform
Dr. Hoo Kim P.E., LeTourneau University
Dr. Paul R. Leiffer P.E., LeTourneau University
Dr. Laura Kathryn Neal, LeTourneau University
Dr. Kathleen Mays, LeTourneau University
Dr. Joon Wan Kim, LeTourneau University

Investigating Team Roles Within Long-Term Project-Based Learning Experiences
Ms. Amy Dunford, New York University Tandon School of Engineering
Dr. Edwing A. Medina, New York University Tandon School of Engineering
Dr. Jack Bringardner, New York University Tandon School of Engineering
**W542 - Working Together: Approaches to Inclusivity and Interdisciplinarity**

3:30 P.M. - 5:00 P.M.

**Sponsor:** New Engineering Educators Division

**Moderators:** Derek Breid, Saint Vincent College; Kerry Widder, Milwaukee School of Engineering; Katie Basinger, University of Florida; Ashish Borgaonkar, New Jersey Institute of Technology

**Inclusivity Meter: Tracing How It Worked and What Was Learned**
Kenya Z. Mejia, University of Washington  
Prof. Yen-Lin Han, Seattle University  
Dr. Jennifer A. Turns, University of Washington

**A UDL-Based Large-Scale Study on the Needs of Students with Disabilities in Engineering Courses**
Dr. Jennifer R. Amos, University of Illinois at Urbana - Champaign  
Mr. Zhilin Zhang, University of Illinois at Urbana - Champaign  
Prof. Lawrence Angrave, University of Illinois at Urbana - Champaign  
Dr. Hongye Liu, University of Illinois at Urbana - Champaign  
Ms. Kusum Vanwani  
Ms. Yiyin Shen

**Visual Teaching Philosophy Empowering Inclusive Learning and Managing Expectations**
Dr. Tawfik Elshehabi, University of Wyoming

**Bringing Together Engineering and Management Students for a Project-Based Global Idea-thon: Towards Next-Gen Design Thinking Methodology**
Valeriya Yudina, Higher School of Economics  
Yulia Skrupskaya, National Research University Higher School of Economics  
Prof. Victor Taratukhin, SAP Silicon Valley and University of Muenster  
Elvira Kozlova  
Dr. Natalia Pulyavina, Plekhanov Russian University of Economics

Dr. Pedro E. Arce, Tennessee Technological University  
Dr. Andrea Arce-Trigatti  
Dr. Stephanie Jorgensen  
Dr. Robby Sanders, Tennessee Technological University

**W547 - Student Division Business Meeting**

3:30 P.M. - 5:00 P.M.

**Sponsor:** Student Division

**Moderators:** Adrianne Wheeler, Project SYNCERE; Cassandra Woodcock, University of Michigan

**W547B - Student Division Technical Session 3**

3:30 P.M. - 5:00 P.M.

**Sponsor:** Student Division

**Moderators:** Louis Christensen, The Ohio State University; Mercy Fash, North Carolina A&T State University

**Student-Led Summer Diversity Workshops for Built-Environment Majors**
Dolores Herrera  
Claire Marie Leader, California Polytechnic State University, San Luis Obispo  
Mr. Soham Patel  
Dr. Anahid Behrouzi, California Polytechnic State University, San Luis Obispo

**Integrating Public Health Topics in Drug Delivery System Education**
Mr. Jorge Jimenez, University of Pittsburgh  
Dr. April A. Dukes, University of Pittsburgh  
Morgan V. Fedorchak

**A Contextual Innovation and Process Investigation of an International Student Entrepreneurial Organization**
Mr. Ryan Edward Lake  
Ms. Jessica Brooke Altenberg, University of Illinois at Urbana - Champaign  
Arin Rzonca, University of Illinois at Urbana-Champaign  
Mr. Kariem Hashem, University of Illinois  
Dr. Ann-Perry Witmer P.E., University of Illinois at Urbana - Champaign
Work In Progress: Examining the Impacts of a Sociotechnical Approach to Energy Education on Engineering Students’ Sense of Belonging and Attitudes Toward Engineering
Felicity Bilow, Clarkson University
Dr. Jan DeWaters P.E., Clarkson University
Prof. Gordon D. Hoople, University of San Diego

Work in Progress: Contextualizing Engineering Service Learning by Applying the Practices of Community Organizing
Jessica Marie Mingee, University of Illinois at Urbana-Champaign
Dr. Ann-Perry Witmer P.E., University of Illinois at Urbana-Champaign

W551A - Women in Engineering Division Technical Session 6
3:30 P.M. - 5:00 P.M.
Sponsor: Women in Engineering Division
Moderators: Catherine Didion, Liaison International; Shawna Vican, University of Delaware

“This is a Very Male Job”: Challenges Encountered by Females During Recruitment and Hiring for Engineering Jobs in Qatar
Sara Amani, Texas A&M University
Ebtihal Mohamed Youssef, Texas A&M University at Qatar
Rand Yehia Alagha, Texas A&M University at Qatar
Sara Hillman, Texas A&M University at Qatar
Dr. Ann-Ruimi, Texas A&M University at Qatar

Benefits of Utilizing Counseling Services Among Doctoral Women of Color in STEM
Ms. Kairys Grasty, University of Massachusetts, Boston
Ms. Shivani Sakri, Arizona State University
Amanda C. Arnold, Idaho State University
Dr. Jennifer M. Bekki, Arizona State University
Dr. Kerrie G. Wilkins-Yel, University of Massachusetts, Boston
Madison Natarajan, University of Massachusetts, Boston
Prof. Bianca L. Bernstein, Arizona State University
Roxanna Francies
Dr. Ashley K. Randall, Counseling and Counseling Psychology, Arizona State University

COVID-19 Pandemic Response and Faculty Career Equity
Dr. Shawna Vican, University of Delaware
Dr. Robin Andreasen, University of Delaware

Dr. Heather Doty, University of Delaware
Dr. L. Pamela Cook, University of Delaware

A Collegiate External Women’s Advisory Committee: Origins and the Development of a Strategic Plan
Dr. Kathleen Buse, Advancing Women in the Workforce
Dr. Lyndsey McMillon-Brown, NASA Glenn Research Center
L. Nicole Smith, NASA Glenn Research Center
Dr. Brian P. Kirkmeyer, Miami University

Women Electrical Engineering Faculty: How Do They Experience EE Department Climate and Promotion and Tenure?
Dr. Dawn M. Maynen, Pennsylvania State University

W552 - Community Engagement Division Business Meeting
3:30 P.M. - 5:00 P.M.
Sponsor: Community Engagement Division
Moderators: Joan Schuman, Missouri University of Science and Technology; Marybeth Lima, Louisiana State University and A&M College
This annual business meeting is open to all CED members and invited guests.

W555 - LEAD Division Business Meeting
3:30 P.M. - 5:00 P.M.
Sponsor: Engineering Leadership Development Division
Moderators: Meagan Kendall, University of Texas at El Paso; David Nino, Massachusetts Institute of Technology
Business meeting of the Engineering Leadership Development Division

W556 - Military & Veteran Division Social
3:30 P.M. - 5:00 P.M.
Sponsor: Military and Veterans Division
Moderators: David Stringer, Kent State University, Kent; Patrick Bass, The Citadel
Annual MVD social function

**W557 - Faculty Development Lightning Talk Session 2**

**3:30 P.M. - 5:00 P.M.**  
*Sponsor: Faculty Development Division*  
*Moderators: John Morelock, University of Georgia; Grenmarie Agresar, University of Michigan; Karen High, Clemson University*

This session is lightning talks discussing faculty development in general. Each presenter will give a five-minute presentation followed by two minutes of clarifying questions. The final 20 minutes will be for the group to synthesize major lessons learned, feedback for presenters, and future directions for faculty development. The audience will be engaged through polls, chats, and other features to make the session enjoyable for all.

**Work in Progress: The Facultly Development Canvas**  
Dr. Joe Tranquillo, Bucknell University  
Dr. Brian David Gockley, Bucknell University

**Initial Faculty Perceptions of Scrum for Departmental Change**  
Dr. James J. Pembridge, Embry-Riddle Aeronautical University, Daytona Beach  
Dr. Erin E. Bowen, Purdue University, West Lafayette  
Dr. Timothy A. Wilson, Embry-Riddle Aeronautical University, Daytona Beach  
Dr. Massood Towhidnejad, Embry-Riddle Aeronautical University, Daytona Beach  
Dr. Omar Ochoa  
Olivia Elizabeth Roa, Embry Riddle Aeronautical University, Daytona Beach  
Mr. Carlos Alberto Castro, Embry-Riddle Aeronautical University, Daytona Beach

**From Student Organization Leadership to Excelling at Tenure-service Requirement**  
Stephanie Laughton, The Citadel  
Dr. Daniel Gingerich, Ohio State University  
Dr. Sneha Prabha Narra, Worcester Polytechnic Institute  
Casey I. Canfield, Missouri University of Science & Technology

**Framework for Engineering Faculty Competencies: The Case of an Engineering School in Latin America**  
Dr. Angélica Burbano, Universidad Icesi  
Ing. Ana Judith Ledesma, Universidad Icesi

**Work in Progress: The Challenges of Evaluating ADVANCE Initiative's Effectiveness in the Progress of Women Faculty in Engineering**  
Matilde Luz Sanchez-Pena, University at Buffalo  
Mr. Syed Ali Kamal, Independent Researcher

**Increasing Faculty Participation in Pedagogical Diversity and Inclusion Activities**  
Dr. Adithya Jayakumar, Ohio State University  
Dr. Lisa Abrams, Ohio State University  
Ms. Lucille Sheppard, Ohio State University  
Dr. Shadia Siliman, Ohio State University  
Dr. Toni M. Calbert, Ohio State University

**Work in Progress: Using Systems Thinking to Advance Faculty Development: A Student Success in Engineering Example**  
Dr. Amy B. Chan Hilton, University of Southern Indiana

**Lessons Learned: College Student Surveys as a Professional Development Tool**  
Dr. Dick Apronti, Angelo State University

**Lessons Learned: Designing for Complexity and Ambiguity in Total Course Development from Conception to Delivery**  
Mr. Richard J. Aleong, Purdue University, West Lafayette

**Benefits of Codesigning with Educators as Faculty Development**  
Kenya Z. Mejia, University of Washington  
Dr. Jennifer A. Turns, University of Washington  
Miss Yuliana Flores  
Dr. Hadas Ritz, Cornell University  
Dr. Jiehong Liao, Florida Gulf Coast University  
Dr. John Chen, California Polytechnic State University, San Luis Obispo  
Ms. Boni Frances Yraguen, Georgia Institute of Technology

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**W559 - Equity in Engineering Education: Perspectives From Different Engineering Disciplines**

**3:30 P.M. - 5:00 P.M.**  
*Sponsor: Equity, Culture & Social Justice in Education Division*  
*Moderators: Joel Mejia, University of San Diego; Stephen Secules, Florida International University; James Holly, Jr., Wayne State University*
Recent events in the United States and around the world have prompted many engineering education scholars to question how equity is conceptualized in engineering. The current COVID-19 pandemic has exacerbated the inequities that have existed for many years. The pandemic, along with recent events such as the Black Lives Matter protests, have increased the visible systemic exclusion of women and Black, Indigenous, and People of Color (BIPOC) in general, but in particular in engineering. These events have become a reminder of how after years of conversations about diversity and inclusion we still have not been able to create fundamental change towards equity. Issues of inequity were true in the United States before the pandemic, and they continue to be true today.

Moving forward, it would be important to consider what equity means in the context of engineering in order to create collective impact. The conceptualization of equity in engineering education research has been framed as providing access to engineering to minoritized communities or countering deficit notions about individuals and communities. Equity has been described as minoritized groups achieving access, although there has been some disagreement in regards to what they should have access to (e.g., engineering pathways, opportunities, participation, knowledge, or engagement in design processes) and whether access is sufficient to increase their success. Others have argued that equity cannot be achieved unless deficit models are challenged and a diversity-as-resource or asset-based model for learning is adopted. However, our conversations are sometimes devoid of actions that address equity from a structural perspective. Inequities are present, not only in technologies and physical systems, but in interrelated educational systems as well. De facto segregation continues to exist, economic inequality is part of the social fabric, and yet these conversations seem to be tangential to engineering education.

We acknowledge that framing equity in engineering education may take more deeper and critical conversations to engage as a community in collective impact. This panel of speakers seeks to take a critical look at how equity is being conceptualized in different engineering disciplines, and the possibilities to create collective impact to transform the ways in which equity is approached by engineering education scholars, instructors, institutions, and industry.

The goal of this panel is to (1) engage in conversations that address the nuances of doing equity work, (2) discuss the everyday and systemic levels of equity work in engineering education, (3) (re)imagine how we can become agents of change in the engineering disciplines, and (4) provide a call to action to make equity work the new norm in engineering education. The panel will include individuals who are members of six divisions.

W566 - Crisis-Driven Collaboration for Both Academia and Industry

3:30 P.M. - 5:00 P.M.
Sponsor: Corporate Member Council
Moderators: Howard Appelman, The Boeing Company; Dora Smith, Siemens Digital Industries Software
Speakers: David E. Lee, The Boeing Company; Dr. Michel A. Kornegay, Morgan State University; Mr. Jeffrey Alderson, MathWorks; Felicia Boyd, Siemens; Mr. Mark T. Schuver, Purdue University at West Lafayette

The COVID-19 pandemic impacted team collaboration both in the academic classroom and in industry, the office, and factories. Schools and companies drove innovative solutions to address the situation—for example, virtual internships and labs. Through it all many lessons were learned that will shape the foreseeable future. This session will bring various stakeholder experiences and recommendations together for discussion.

W569 - ERC Business Meeting

3:30 P.M. - 5:00 P.M.
Sponsor: Engineering Research Council
Moderator: Charles Bunting, Oklahoma State University
W577 - Safe Zone Ally Training - Level 3

3:30 P.M. - 5:00 P.M.

Sponsor: ASEE Committee on Diversity, Equity & Inclusion

Moderators: Lynn Albers, Hofstra University; Rachelle Reisberg, Northeastern University

Speakers: Mr. Tiago R. Forin, Rowan University; Prof. Anthony Butterfield, University of Utah

Safe Zone Ally Training workshops are interactive, research-informed workshops that seek to foster a more inclusive environment for LGBTQ+ individuals in STEM, through building participant knowledge and skills and creating a visible network of allies. Faculty, students, administrators, staff, and other professionals are encouraged to participate in these workshops.

The Safe Zone Level 3 Trans Allyship workshop explores transgender-specific terms and concepts, the climate for trans individuals in society and in STEM and its broader implications, and action strategies for trans allies.

ASEE Safe Zone Ally Training workshops are supported by the National Science Foundation through grants EEC-1539140 and EEC-1748499. To learn more and access free ally resources, please visit https://lgbtq.asee.org.

W606 - Civil Engineering Annual Awards Banquet and RAP Session

5:30 P.M. - 8:30 P.M.

Sponsor: Civil Engineering Division

Moderators: Matthew Lovell, Rose-Hulman Institute of Technology; Steven Burian, University of Utah

The annual awards banquet of the Civil Engineering Division celebrates the achievements of members of the division. We will be using an external platform for this meeting. A link to the meeting will be distributed via email to the division.

W609 - Construction Division Social

5:15 P.M. - 6:15 P.M.

Sponsor: Construction Engineering Division

Moderators: Rachel Mosier, Oklahoma State University; Norman Philipp, Pittsburg State University; Nicholas Tymvios, Bucknell University

The social will be an extension of the business meeting and allow for future planning and additional conversations. Come to the Business Meeting or contact Rachel Mosier on the day of event for more information; cell 405-245-9870.

W599 - Faculty Focus Groups

3:30 P.M. - 5:00 P.M.

Sponsor: Sponsored Sessions

Moderator: Donald Visco, The University of Akron

W599B - Advances in Engineering Education Editorial Board Meeting

3:30 P.M. - 5:00 P.M.

Sponsor: Sponsored Sessions

Moderator: Holly Matusovich, Virginia Polytechnic Institute and State University

W614 - ERM Annual Community Celebration and Awards Reception

5:00 P.M. - 6:15 P.M.

Sponsor: Educational Research and Methods Division

Moderators: Stephanie Cutler, Pennsylvania State University; Kerrie Douglas, Purdue University at West Lafayette

Enjoy an evening meeting and reconnecting with your fellow Educational Research and Methods (ERM) Division members while celebrating the accomplishments of this year’s Apprentice Faculty Grant recipients and Best Paper award winners.
W622 - Joint Divisions Social Event
5:15 P.M. - 7:15 P.M.
Sponsors: Engineering Management Division; Systems Engineering Division; Engineering Economy Division; Industrial Engineering Division
Moderators: John Richards, US Army Corps of Engineers; Christopher Rowe, Vanderbilt University
Social hour of awards for the Industrial Engineering Division, Engineering Economy Division, Engineering Management Division, and Systems Engineering Division

W642 - New Engineering Educators Division Networking Social
5:30 P.M. - 6:30 P.M.
Sponsor: New Engineering Educators Division
Moderators: Derek Breid, Saint Vincent College; Kerry Widder, Milwaukee School of Engineering
An opportunity to network with other new engineering educators over (virtual) dinner and drinks! Come and meet new colleagues, swap stories, and build relationships with other new professionals who are part of the engineering education mission. All are welcome to attend, from fresh new faces to seasoned pros.
The winners of the NEE Best Paper and Best DEI Paper awards will be recognized, followed by some lighthearted discussion and fun virtual activities.

W699 - Department Chair Focus Group
1:45 P.M. - 3:15 P.M.
Sponsor: Sponsored Sessions
Moderator: Donald Visco, The University of Akron

W701 - Aerospace Division Social
7:00 P.M. - 9:00 P.M.
Sponsor: Aerospace Division
Moderators: Michael Hatfield, University of Alaska Fairbanks; Sharan Asundi, Old Dominion University

W713 - DEED Social
7:00 P.M. - 9:00 P.M.
Sponsor: Design in Engineering Education Division
Moderators: Beshoy Morkos, University of Georgia; Bob Rhoads, The Ohio State University

W715 - Electrical and Computer Engineering Division Social Event
7:00 P.M. - 9:00 P.M.
Sponsor: Electrical and Computer Engineering Division
Moderators: Huihui Wang, St. Bonaventure University; Nader Rafia, Boise State University

W716 - ECCD Tour and Dinner
6:00 P.M. - 8:00 P.M.
Sponsor: Energy Conversion and Conservation Division
Moderators: Robert Kerestes, University of Pittsburgh; Ted Song, John Brown University
An ECCD and OMED joint tour and dinner. This "dinner" session will be a virtual congregation of ECCD and OMED members who will get a chance to chat in breakout rooms. In addition there will be a "virtual" tour/demonstration of Eaton's Power Systems Experience Center.

W718 - EDGD Awards Banquet
6:00 P.M. - 9:00 P.M.
Sponsor: Engineering Design Graphics Division
EDGD recognizes outstanding professional contributions to the field with the following awards: the Distinguished Service Award, the Editor’s award, and the Chair’s Service Award.

**W724 - Entrepreneurship and Engineering Innovation Division Reception**
7:00 P.M. - 9:00 P.M.
Sponsor: Entrepreneurship & Engineering Innovation Division
Moderators: Prateek Shekhar, New Jersey Institute of Technology; Nassif Rayess, University of Detroit Mercy

**W725 - EED Social**
7:00 P.M. - 9:00 P.M.
Sponsor: Environmental Engineering Division
Moderators: Fethiye Ozis, Northern Arizona University; Michelle Marcinel Payne, Rose-Hulman Institute of Technology; David Sanchez, University of Pittsburgh; Shannon Parks, University of Pittsburgh at Johnstown

Social and awards

**W726 - ELOS Division Business Meeting**
7:00 P.M. - 9:00 P.M.
Sponsor: Experimentation and Laboratory-Oriented Studies Division
Moderators: Jacob Bishop, Southern Utah University; Sally Pardue, Tennessee Technological University

Annual business meeting for the Experimentation and Lab-Oriented Studies Division

**W727 - First-Year Programs Division Social**
7:00 P.M. - 9:00 P.M.
Sponsor: First-Year Programs Division
Moderators: Timothy Hinds, Michigan State University; Kaitlin Mallouk, Rowan University

**W734 - LEES Division Social**
7:00 P.M. - 9:00 P.M.
Sponsor: Liberal Education/Engineering & Society Division
Moderators: Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University

Liberal Education/Engineering and Society Division social

**W735 - Manufacturing Division Social**
7:00 P.M. - 9:00 P.M.
Sponsors: Manufacturing Division; Energy Conversion and Conservation Division
Moderators: Irina Ciobanescu Husanu, Drexel University; Yalcin Ertekin, Drexel University

**W736 - Materials Division Social**
7:00 P.M. - 9:00 P.M.
Sponsor: Materials Division
Moderators: Lessa Grunenfelder, University of Southern California; Alison Polasik, The Ohio State University

**W739A - Meals with Mechanicians**
3:30 P.M. - 6:30 P.M.
Sponsor: Mechanics Division
Moderators: Julian Davis, University of Southern Indiana; Masoud Rais-Rohani, University of Maine

Enjoy a meal with your mechanics colleagues, meet new fellow mechanics educators, and share in celebrating with award honorees for Best Paper from this year’s Conference and best presentation from last year’s Conference. All are welcome.

Join Zoom Meeting:
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Meeting ID: 932 4631 2214
Find your local number: https://usi.zoom.us/u/acndkuhkYn

W744 - Tour and Dinner Minus the Tour: Energy Conversion and Conservation Division
6:00 P.M. - 8:00 P.M.
Sponsor: Ocean and Marine Division
Moderators: Lynn Albers, Hofstra University; Robert Kerekes, University of Pittsburgh; Robert Kidd, State University of New York Maritime College; Vukica Jovanovic, Old Dominion University

This started out as a joint tour and dinner on the Queen Mary with the Energy Conversion and Conservation Division. Now that we are virtual, the time will be spent in fellowship with our colleagues as we share a meal and friendly conversation virtually.

W747 - Student Division Social
7:00 P.M. - 9:00 P.M.
Sponsor: Student Division
Moderators: Adrianne Wheeler, Project SYNCERE; Cassandra Woodcock, University of Michigan

W755 - LEAD Division Social
5:05 P.M. - 7:00 P.M.
Sponsor: Engineering Leadership Development Division
Moderators: Meagan Kendall, University of Texas at El Paso; David Nino, Massachusetts Institute of Technology

You can join our division social here: https://utep-edu.zoom.us/j/87815301130?pwd=U2NDakNNZEpES2IwZkJzNGJuZENVdz09

W766 - CMC Student Social
7:00 P.M. - 9:00 P.M.
Sponsor: Corporate Member Council
Moderator: Dora Smith, Siemens Digital Industries Software


W799 - ASEE Prayer Breakfast: Can an Engineer Believe in Miracles?
7:00 A.M. - 9:00 A.M.
Sponsor: Sponsored Sessions
Moderators: Lisa Bullard, North Carolina State University at Raleigh; Jason Keith, Mississippi State University; Herbert Hess, University of Idaho; Bernard Van Wie, Washington State University

Professor Charles E. Hunt
Electrical and Computer Engineering
University of California-Davis

If we accept the standard understanding that “engineering” is a discipline of problem solving using science as a foundation for our tools, it’s not unlikely that some people may consider engineering and faith to be almost incompatible. But if we look deeper at the aspects of design, form (as well as function), ingenuity, resourcefulness, sustainability, convenience, accessibility, and numerous...
other less-tangible aspects that permeate engineering, the connection between faith and engineering becomes clearer. In some cases, it becomes obvious.

This presentation will explore miracles, using the recent book *Miracles in My Life* (Kharis Publishers, 2020, miraclesinmylife.com) as a backdrop. The author will contend that there is a realistic, even necessary, harmony between our materialistic understanding and our supernatural experience of this universe. Awareness of the different types of miracles, as clearly depicted in the Bible, will be exemplified by some of the author’s experiences as detailed in the book. The goal is to encourage those who are believers to trust, and look for, the miracles in their own lives, and to see how that results in a greater sense of identity and purpose in this world.

Charles E. Hunt is Professor of Electrical and Computer Engineering at the University of California-Davis, Visiting Professor of Physics at the University of Barcelona, and Distinguished Member of Technical Staff and Founder of the Lighting Research Group of the EU’s Institute for Energy Research of Catalonia (IREC). He received a B.S.E.E. and M.S.E.E. at the University of Utah, and the Ph.D. at Cornell University in 1986. Since 1986, he has been at UC Davis, with appointments in the ECE and design departments. He works as lab faculty of the Lawrence Livermore National Laboratory. Professor Hunt teaches semiconductor device physics, electronic materials, and devices. His research emphasis is in the areas of sustainable, energy-efficient light sources, cathodoluminescent phosphor technology, field-emission vacuum microelectronics and high-speed hard-xray imaging arrays. Professor Hunt is a Senior Member of the Institute of Electrical and Electronics Engineers, and is author or co-author of over 160 refereed publications and 9 books, and holds 19 US patents. From 1997-2004 he served as Editor of the journal Solid-State Electronics. He co-founded multiple startup companies in lighting devices. He has chaired the International Vacuum Nanoelectronics Conference (IVNC-2001), and is Chair of the Northern California Chapter of the American Scientific Affiliation.
R101 - Aerospace Division Technical Session 6
8:00 A.M. - 9:30 A.M.
Sponsor: Aerospace Division
Moderators: Michael Hatfield, University of Alaska Fairbanks; Sharan Asundi, Old Dominion University; Nadir Yilmaz, Howard University; Masoud Rais-Rohani, University of Maine

Teaching Methodology and Assessment 2
Redefining Student Preparation for Engineering Leadership Using Model-Based Systems Engineering in an Undergraduate Curriculum

Prof. George Frederick Halow, University of Michigan
Ms. Maia E. Herrington, University of Michigan
Dr. Anthony M. Waas, University of Michigan
Melanie Spare, Siemens Digital Industries Software
Shannon O’Donnell, Siemens Digital Industries Software
Mr. Gilbert Morris, Retired (formerly Siemens)

Connecting Critical System Thinking Principles with Hands-On Discovery Activities
Mary E. Johnson, Purdue University at West Lafayette
Dr. Yilin Feng, California State University, Los Angeles

Using SAE Resources in FMEA in an Aeronautical Engineering Technology Junior-Level Logistics Course
Dr. Tracy L. Yother, Purdue University at West Lafayette
Dr. Mary E. Johnson, Purdue University at West Lafayette

R105 - Virtual Instruction of Chemical Engineering Courses
8:00 A.M. - 9:30 A.M.
Sponsor: Chemical Engineering Division
Moderators: VJ Tocco; Janie Brennan, Washington University

Operation and Student Perceptions of a Large-scale, In-person Unit Operations Laboratory Course During the COVID-19 Pandemic

Dr. Andrew Maxson, Ohio State University

Development of an At-home Metal Corrosion Laboratory Experiment for STEM Outreach in Biomaterials During the COVID-19 Pandemic

Mr. Christopher James Panebianco, Icahn School of Medicine at Mount Sinai
Prof. James C. Iatridis, Icahn School of Medicine at Mount Sinai
Prof. Jennifer Weiser, Cooper Union

Student Responses to Remote Teaching During the COVID-19 Pandemic: Implications for the Future of Online Learning

Dr. Milo Koretsky, Tufts University

Transition of an Interactive, Hands-on Learning Tool to a Virtual Format in the COVID-19 Era

Mrs. Olivia Reynolds, Washington State University
Kitana Kaiphanliam, Washington State University
Olufunso Oje
Aminul Islam Khan, Washington State University
Katelyn Dahlke, University of Wisconsin - Madison
Jacqueline Gartner Ph.D., Campbell University
Dr. Prashanta Dutta, Washington State University
Dr. Olusola Adesope, Washington State University
Prof. Bernard J. Van Wie, Washington State University
David B. Thiessen, Washington State University
Dr. Kristin Bryant, Washington State University

Innovative Use of Technologies to Teach Chemical Engineering Core Classes and Laboratories During the COVID-19 Pandemic at an HBCU

Dr. Rupak Dua, Hampton University

R106A - Industry and Practice Topics
8:00 A.M. - 9:30 A.M.
Sponsor: Civil Engineering Division
Moderators: Jakob Bruhl, United States Military Academy; Rodolfo Valdes-Vasquez, Colorado State University; Matthew Lovell, Rose-Hulman Institute of Technology; Steven Burian, University of Utah

This session includes scholarly works on the broad topics of “industry” and “professional practice,” and how programs use these partnerships to enhance their programs in supporting students.

Applying Army Doctrine to Engineering: Is That Complex?

Col. Brad Wambeke P.E., United States Military Academy
Col. Aaron T. Hill Jr., United States Military Academy
Comparison of Conceptual Knowledge of Shear Stress in Beams Between Civil Engineering Undergraduates and Practitioners

Dominga Sanchez, Oregon State University
Dr. Shane A. Brown P.E., Oregon State University
Dr. Matthew Stephen Barner, Mackenzie

Engineering Faculty’s Beliefs About Teaching and Solving Ill-structured Problems

Secil Akinci-Ceylan, Iowa State University of Science and Technology
Yiqi Liang, Iowa State University of Science and Technology
Dr. Kristen Sara Cetin P.E., Michigan State University
Dr. Benjamin Ahn, Iowa State University of Science and Technology
Dr. Bora Cetin

Infrastructure Education in Unprecedented Times: Strengthening a Community of Practice

Dr. Kristen L. Sanford P.E., Lafayette College
Dr. Philip J. Parker P.E., University of Wisconsin - Platteville
Dr. Matthew W. Roberts, Southern Utah University
Dr. Claudia Mara Dias Wilson, New Mexico Institute of Mining and Technology
Dr. Michael R. Penn, University of Wisconsin - Platteville
Dr. Rodolfo Valdes-Vasquez, Colorado State University
Dr. Frederick Paige, Virginia Polytechnic Institute and State University

Mapping the Future: Geomatics as an Essential Element of the Next Generation of Civil Engineering Curriculum

Mr. Max Teddy, Clemson University
Dr. Wayne Sarasua, Clemson University
Mr. Matthew Ryan Stanley, Clemson University

R106B - Civil Engineering Division Planning Meeting
7:00 A.M. - 8:00 A.M.
Sponsor: Civil Engineering Division
Moderators: Matthew Lovell, Rose-Hulman Institute of Technology; Steven Burian, University of Utah

Planning meeting to develop session ideas and draft the call for papers for the 2022 Annual Conference

R111 - Cooperative and Experiential Education Division Board Meeting - Part 1
8:00 A.M. - 9:30 A.M.
Sponsor: Cooperative and Experiential Education Division
Moderators: Katherine McConnell, University of Colorado Boulder; Robin Hammond, Arizona State University

Planning meeting for the CEED Board

R114 - Academic Success and Retention
8:00 A.M. - 9:30 A.M.
Sponsor: Educational Research and Methods Division
Moderators: Matilde Sanchez-Pena, University at Buffalo, the State University of New York; Kerrie Douglas, Purdue University at West Lafayette (COE)

Investigating Factors that Predict Academic Success in Engineering and Computer Science

Dr. Olusola Adesope, Washington State University
Oluwafemi J. Sunday, Washington State University
Mr. Ebenezer Rotimi Ewumi, Washington State University
Dr. Angela Minichiello P.E., Utah State University
Mr. Muhammad Asghar P.E., Utah State University
Dr. Candis S. Claiborn, Washington State University

Exploring the Relationship Between Matriculation Model and Time to Enrollment in Engineering Graduation Major

Baker A. Martin, Clemson University
Dr. Marisa K. Orr, Clemson University

A Data-driven Approach for Understanding and Predicting Engineering Student Dropout

Danika M. Dorris, North Carolina State University
Dr. Julie L. Swann, North Carolina State University
Julie Ivy, North Carolina State University

First-time Academically Suspended Engineering (FASE) Undergraduate Outcomes: Two Engineering Undergraduate Programs Examining Trends of Over and Underrepresentation at the Intersection of Ethnicity and Sex
Mrs. Lisa Lampe, University of Virginia
Ms. Megan Harris, University of Colorado Boulder
Kayla Brooks, University of Colorado Boulder

**Modeling Trajectories of Latent Classes to Understand the Academic Performance of Engineering Students**
Heather Lee Perkins, North Carolina State University
Dr. Edward J. Berger, Purdue University, West Lafayette
Mr. Justin Charles Major, Purdue University, West Lafayette
Ms. Julianna S. Ge, Purdue University, West Lafayette
Mr. Matthew Scheidt, Purdue University, West Lafayette
Dr. Allison Godwin, Purdue University, West Lafayette

**Common and Uncommon Characteristics of Engineering Student Retention After the First Year in University**
Prof. Nong Ye, Arizona State University
Nancy Dickson
Miss Ting Yan Fok, Arizona State University
Dr. James Collofello, Arizona State University
Dr. Tami Coronella, Arizona State University

**Work in Progress: Determining a Mathematical Model to Study the Relationship Between Pedagogical Strategies and the Attainment of Student-learning Outcomes**
Dr. Kuldeep S. Rawat, Elizabeth City State University
Dr. Chandra Bhushan Asthana P.E., Elizabeth City State University

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**R114B - Research on Diversity, Equity, and Inclusion**

8:00 A.M. - 9:30 A.M.

*Sponsor: Educational Research and Methods Division*

*Moderators: Terrell Strayhorn, Virginia Union University; Stephanie Cutler, Pennsylvania State University*

**The Impact of Department Diversity on Student Persistence and Success in Engineering**
Mr. David Ray Waller, Purdue University, West Lafayette
Dr. Yukiko Maeda, Purdue University, West Lafayette
Dr. Matthew W. Ohland, Purdue University, West Lafayette
Louis Tay, Purdue University, West Lafayette

**Negotiating Belongingness: A Longitudinal Narrative Inquiry of a Latina First-generation College Student’s Experience in the Engineering Culture**
Dr. Dina Verdín, Arizona State University

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**The Politics of Citation Practices in Engineering Education: A Citation Analysis of Intersectionality**
Dr. Kristen Moore, University at Buffalo
Dr. Nathan R. Johnson, University of South Florida
Dr. Fernando Sánchez, University of St. Thomas
Rev. Walter R. Hargrove

**Exploring the Excellence of HBCU Scientists and Engineers: The Development of an Alumni Success Instrument Linking Undergraduate Experiences to Graduate Pathways**
Dr. Trina L. Fletcher, Florida International University
Dr. Alexandra Coso Strong, Florida International University
Dr. Jay Phillip Jefferson, Florida International University
Jade Moten, Florida International University
Dr. Sung Eun Park, Florida International University
Mr. D’Aundray James Adams, Florida International University

**Toward an Understanding of the Relationship Between Race/Ethnicity, Gender, First-generation Student Status, and Engineering Identity at Hispanic-serving Institutions**
Dr. Stephanie M. Arnett, New Mexico State University
Dr. Sandra M. Way, New Mexico State University
Dr. David G. Ortiz, New Mexico State University
Lorissa B. B. Humble, New Mexico State University
Analysa D. Martinez, New Mexico State University

**Statistical Analysis of the CAR (Confront, Address, Replace) Strategy and Its Efficacy when Applied to Master-slave Terminology**
Mr. Amman Fasil Asfaw, California State Polytechnic University, San Luis Obispo
Ms. Storm Randolph
Ms. Victoria Siaumau
Yumi Rosa Aguilar, California Polytechnic State University, San Luis Obispo
Emily Flores
Dr. Jane L. Lehr, California Polytechnic State University, San Luis Obispo
Dr. Andrew Danowitz, California Polytechnic State University, San Luis Obispo
R115 - Electrical and Computer Engineering Division Technical Session 9

8:00 A.M. - 9:30 A.M.
Sponsor: Electrical and Computer Engineering Division

Moderators: Yuting Chen, University of Illinois at Urbana-Champaign; Huihui Wang, St. Bonaventure University; Nader Rafia, Boise State University; Daniel Dopp

Service Learning Through Robotics
Dr. Uma Balaji, Fairfield University

Infinite Resubmissions: Perspectives on Student Success and Faculty Workload
Prof. Aaron Carpenter, Wentworth Institute of Technology

Pinball Applications for Engineering Education
Dr. Zachariah E. Fuchs, University of Cincinnati

The Art of Product Engineering: Integrating IoT Systems and Human-centered Design Principles for Entrepreneurs of Tomorrow
Dr. Ramsin Khoshabeh, University of California, San Diego
Mr. Rick Gessner, University of California, San Diego

Robotics-based Engineering Approaches in the G4-12 Curriculum
Daniel Dopp, University of Missouri
Dr. David Bergin, University of Missouri
Prof. Satish S. Nair, University of Missouri, Columbia

Introducing Communications to High School Students by Leveraging Zoom as a Communications Platform
Prof. Curt Schurgers, University of California, San Diego
Yousol Bae, Scripps Ranch High School
Mr. Eugene Han Lee, Canyon Crest Academy High School
Mr. Che Nevarez, Sweetwater Union High School District
Dr. Pamela Cosman, University of California, San Diego

Moderators: Abayomi Ajayi-Majebi, Central State University; Rustin Webster, Purdue University, New Albany

A potpourri of ideas that will be of interest to design graphics instructors and others with an interest in design graphics instruction.

Abruptly Transitioning an In-Person, Hands-on Prototyping Course to Fully Online Instruction: The Creative Tension Between Maintaining a Positive Experience and Achieving Learning Outcomes
Mr. Adulfo Amador, Rice University
Dr. Matthew Wettergreen, Rice University

Designing the LMS Environment to Improve Solidworks Certification Exam Scores
Prof. Greg Murray, Pittsburg State University

Evaluating an Intelligent Sketching Feedback Tool for Scalable Spatial Visualization Skill Training
Ms. Tiffany Wenting Li, University of Illinois at Urbana-Champaign
Mr. Ziang Xiao, University of Illinois at Urbana-Champaign

Understanding Factors of Engineering Student Persistence Using Predictive Modeling
Dr. Daniel P. Kelly, Texas Tech University
Dr. Jeremy V. Ernst, Embry-Riddle Aeronautical University
Dr. Aaron C. Clark, North Carolina State University at Raleigh
Mr. Erik Schettig, North Carolina State University at Raleigh

R118 - Engineering Design Graphics Division Technical Session 4: A Potpourri of Ideas

8:00 A.M. - 9:30 A.M.
Sponsor: Engineering Design Graphics Division

Moderators: Rajani Muraleedharan, Saginaw Valley State University; Bahaa Ansaf, Colorado State University - Pueblo

Investigating On-Campus Engineering Student Organizations as Means of Promoting Ethical Development
Mr. Luan M. Nguyen, Iowa State University of Science and
Technology
Dr. Cristina Poleacovschi, Iowa State University of Science and Technology
Dr. Kasey M. Faust, University of Texas at Austin
Kate Padgett Walsh, Iowa State University of Science and Technology
Michaela Leigh LaPatin P.E., University of Texas at Austin
Dr. Scott Grant Feinstein
Dr. Cassandra Rutherford

Longitudinal Qualitative Case Study of One Engineering Student’s Perceptions of Ethics and Social Responsibility: Corvin’s Story
Dr. Stephanie Claussen, San Francisco State University
Ms. Shiloh James Howland, Brigham Young University
Dr. Swetha Nittala, Purdue University, West Lafayette
Prof. Brent K. Jesiek, Purdue University, West Lafayette
Dr. Carla B. Zoltowski, Purdue University, West Lafayette

Work in Progress: Let’s Talk About Ethics! A Qualitative Analysis of First-year Engineering Student Group Discussions Around Ethical Scenarios
Landon Bassett, University of Connecticut
Dr. Jennifer Pascal, University of Connecticut
Dr. Richard Tyler Cimino, New Jersey Institute of Technology
Dr. Kevin D. Dahm, Rowan University
Dr. Daniel D. Burkey, University of Connecticut
Dr. Scott Streiner, Rowan University

Undergraduate Engineering Students’ Exposure to, and Valuation of, Ethics Through the Lens of Socialization
Dr. Madeline Polmear, University of Florida
Dr. Angela R. Bielefeldt, University of Colorado Boulder
Dr. Chris Swan, Tufts University
Dr. Daniel Knight, University of Colorado Boulder

R121 - TS3: Working with Students
8:00 A.M. - 9:30 A.M.
Sponsor: Engineering Libraries Division
Moderators: Kari Kozak, University of Iowa; David Hubbard, Texas A&M University; Leena Lalwani, University of Michigan; William Baer, University of Notre Dame

A First Year Engineering Information Literacy Workshop: Redesigned for Remote Delivery
Jodi A. Bolognese, Northeastern University
Dr. Richard Whalen, Northeastern University
Evie Dee Cordell, Northeastern University
Alissa P. Link Cilfone, Northeastern University
Ms. Brooke D. Williams, Northeastern University

Accessing Engineering Standards: A Study in ARL Best Practices for Acquiring and Disseminating Standards
Ms. Denise Amanda Wetzel, Florida A&M University - Florida State University
Kelly Grove, Florida A&M University - Florida State University
Jake Adam Flaks, Florida State University

Desperately Seeking Standards: Using Text Processing to Save Your Time
Ms. Halle Burns, University of Nevada, Las Vegas
Ms. Susan B. Wainscott, University of Nevada, Las Vegas

Student to Scholar: A Professional Skills Focused Library Collaboration
Dr. Matthew Frenkel, New York University
Dr. Azure Janee Stewart

R122 - Engineering Management Division Technical Session 2
8:00 A.M. - 9:30 A.M.
Sponsor: Engineering Management Division
Moderators: John Richards, US Army Corps of Engineers; Christopher Rowe, Vanderbilt University

Incorporating a Unique Lean Six Sigma Learning Experience by Integrating Graduate and Undergraduate Students Across Two Lean Six Sigma Courses in the Engineering Technology and Engineering Management Curriculum
Dr. Yooneun Lee, University of Dayton
Dr. Sandra L. Furterer, University of Dayton

Managing Polarities: Perception of Value, Designer Roles, and Organizational Conditions that Influence Design Outcomes in Mechanical Engineering
Ms. Minha R. Ha, York University
Dr. Aleksander Czekanski, CEEA-ACEG

Transforming Curriculum to Improve STEM Learning and Advance Career Readiness
Dr. Ekaterina Koromyslova, South Dakota State University
Dr. Anna Sadovnikova, Monmouth University
R123 - Engineering Technology Pedagogy 1
8:00 A.M. - 9:30 A.M.
Sponsor: Engineering Technology Division
Moderators: Rebeca Book, Pittsburg State University; Christopher Leblanc, University of New Hampshire; Clay Gloster, North Carolina Agricultural and Technical State University

Computer Interfacing to Real-world: Low-cost Approach
Dr. Rungun Nathan, Pennsylvania State University

Design Improvement of a Polishing Machine Work Station in Industrial Environment to Minimize Health Risk
Dr. Samia Afrin, East Tennessee State University
Mr. Ty Reeves, East Tennessee State University
Levi Myers, East Tennessee State University
Mr. Kyle Davis, East Tennessee State University
Mr. Noah Benjamin Dowell

Developing an Equally Effective Alternate-access Plan for Vision-impaired and Blind Students Enrolled in Mechanical Engineering Technology Courses
Dr. Nancy E. Study, Pennsylvania State University
Dr. David Clippinger, Pennsylvania State University

Embedded Curriculum with Industry-recognized Certifications to Improve the Marketability of Engineering Technology Graduates
Dr. Immanuel Edinbarough P.E., University of Texas Rio Grande Valley
Dr. Jesus A. Gonzalez-Rodriguez, University of Texas Rio Grande Valley

Enhancing the Learning Experience of Engineering Students Through Digitized Interactive Tools
Keith S. Pate, Purdue University, West Lafayette
Dr. Jose M. Garcia, Purdue University, West Lafayette
Dr. Farid Breidi, Purdue University, West Lafayette

R124 - Entrepreneurship and Engineering Innovation Division Technical Session 6
8:00 A.M. - 9:30 A.M.
Sponsor: Entrepreneurship & Engineering

Innovation Division
Moderators: Prateek Shekhar, New Jersey Institute of Technology; Jason Forsyth, James Madison University

Entrepreneurial-minded Learning in an Introduction to Bioengineering Course
Dr. Shelly Gulati, University of the Pacific
Dr. Mehdi Khazaei, University of the Pacific
Mr. Jeremy S. Hanlon, University of the Pacific

Fostering Entrepreneurial Mindset in an Engineering Statistics Course
Dr. Nadiye O. Erdil, University of New Haven

Introducing the Entrepreneurial Mindset to Freshman Engineering Students Through an Agriculture Sector Project
Deana R. Delp Ph.D., Arizona State University

Student Perceptions of an Entrepreneurial Mindset and Its Relevance to Engineering Careers
Ms. Alexandra Mary Jackson, Rowan University
Samantha Resnick, Rowan University
Ms. Rebecca Hanssson, Rowan University
Dr. Cheryl A. Bodnar, Rowan University

Single-class Infusions to Integrate the Entrepreneurial Mindset into First-year Experiences
Dr. Stephanie M. Gillespie, University of New Haven

R127 - First-Year Programs: Diversity, Equity, and Inclusion in the First Year
8:00 A.M. - 9:30 A.M.
Sponsor: First-Year Programs Division
Moderators: Michelle Jarvie-Eggart, Michigan Technological University; Qudsia Tahmina, Ohio State University at Marion; Kaitlin Mallouk, Rowan University; Timothy Hinds, Michigan State University

Exploring the Evolution of Engineering Students’ Feelings of Inclusion in Their College and the Broader Scientific Community
Dr. Melissa Lynn Morris, University of Nevada - Las Vegas
Mr. Joseph Dygert, West Virginia University
Dr. Robin A.M Hensel, West Virginia University

Low-Income, High-Achieving Students and Their Engineering Identity Development After One Year of
Engineering School
Janet Aderemi Omitoyin, University of Illinois at Chicago
Dr. Renata A. Reveleo, University of Illinois at Chicago
Dr. Betul Bilgin, University of Illinois at Chicago
Prof. Houshang Darabi, University of Illinois at Chicago
Rezvan Nazempour, University of Illinois at Chicago

Learning Equity in First-Year Engineering Design
Dr. Emma Tevaarwerk, Northwestern University
Kathleen Carmichael, Northwestern University
Dr. Ordel Brown, Northwestern University
Dr. Lisa Davidson
Elise Gruneisen

R127B - First-Year Programs:
First-Year Experiences

8:00 A.M. - 9:30 A.M.
Sponsor: First-Year Programs Division
Moderators: Richard Goldberg, University of North Carolina at Chapel Hill; Jordan Wilson, Lipscomb University; Kaitlin Mallouk, Rowan University; Timothy Hinds, Michigan State University

Lessons Learned From Moving a Civil Engineering Fundamentals Course From Second Year to the First Year
Dr. Stephanie L. Walkup P.E., Villanova University
Dr. John Komlos, Villanova University
Dr. Kevin A. Waters P.E., Villanova University

Drivers and Impacts of a ‘Clean Slate’ Foundational Engineering Curriculum Redesign at a Large Southwestern University
Randy Hugh Brooks, Texas A&M University

Broadening Engineering Orientation for First-Year Students
Prof. Jill Davishahl, Western Washington University
Dr. Jeffrey L. Newcomer, Western Washington University

Comparing Student Outcomes From Four Iterations of an Engineering Learning Community
Miriam Howland Cummings, University of Colorado Denver
Dr. Maryam Darbehshiti, University of Colorado Denver
Mr. Gregory Edward Simon, University of Colorado Denver
William Taylor Schupbach, University of Colorado Denver
Dr. Michael S. Jacobson, University of Colorado Denver
Prof. Tom Altman, University of Colorado Denver

Prof. Katherine Goodman, University of Colorado Denver

A Comparative Study of the Impact of COVID-19 Pandemic on Student Participation and Performance in First-Year Engineering Courses
Dr. Ashish D. Borgaonkar, New Jersey Institute of Technology
Dr. Jaskirat Sodhi, New Jersey Institute of Technology
Ms. Roobini Vijayabalani
Ms. Athira Suresh Kumar Nair

R128 - Graduate Studies Division
Technical Session 5

8:00 A.M. - 9:30 A.M.
Sponsor: Graduate Studies Division
Moderators: Diane Peters, Kettering University; Jeffrey Fergus, Auburn University

How Small, Interdisciplinary Programs Are Contributing to Diversity and Inclusiveness in STEM University Departments in the U.S.
Mrs. Mirit Shamir, Kansas State University
Prof. Matthew R. Sanderson, Kansas State University
Dr. Rebecca Cors, Wisconsin Center for Education Research
Dr. Melanie Derby, Kansas State University

Engineering Graduate Education: An Overwhelming Journey of First-Generation Immigrants
Dr. Hoda Ehsan, Georgia Institute of Technology
Mrs. Shabnam Ghotbi, Purdue University at West Lafayette
Mr. Hossein Ebrahimejnad, Purdue University at West Lafayette
Dr. Seyedali Ghahari, Purdue University at West Lafayette

Graduate Student Perceptions of an Ideal Mentor in Engineering and Computing at a Minority-Serving Institution: Preliminary Results
Luis Enrique Guardia, Florida International University
Mais Kayyali, Florida International University
Dr. Alexandra Coso Strong, Florida International University

Minority Student Experiences in Engineering Graduate Programs: Socialization and Impact on Career Trajectories
Dr. Catherine T. Amelink, Virginia Polytechnic Institute and State University
Dr. Mayra S. Artiles, Arizona State University

ASEE online session locator can be found at www.asee.org/osl.
R133 - Pre-College Engineering Education Division Technical Session 12

8:00 A.M. - 9:30 A.M.

Sponsor: Pre-College Engineering Education Division

Moderators: Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University; Christina Crawford, Rice University

Elementary engineering teacher moves/pedagogy

Elementary Teachers’ Verbal Support of Engineering Integration in an Interdisciplinary Project
Miss Sarah Catherine Lilly, University of Virginia
Ms. Anne Marguerite McAlister, University of Virginia
Prof. Jennifer L. Chiu, University of Virginia

Middle School Engineering Teachers’ Enactment of Pedagogies Rooted in Funds of Knowledge and Translanguaging: A Comparative Case Study
Dr. Amy Wilson-Lopez, Utah State University
Jorge Americo Acosta Feliz

Students’ Perceptions of Engineering Educators: Building Relationships and Fostering Agency in Outreach
Dr. Kelli Paul, Indiana University-Bloomington
Ms. Karen Miel, Tufts University
Dr. Meredith D. Portsmore, Tufts University
Dr. Adam V. Maltese, Indiana University-Bloomington
Dr. Jungsun Kim, Indiana University Bloomington

R134A - Engineering Communication II: Curricular Practices, Integrations, and Collaborations

8:00 A.M. - 9:30 A.M.

Sponsor: Liberal Education/Engineering & Society Division

Moderators: Kathryn Neeley, University of Virginia; Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University

Embedding Technical Writing Into Mechanical Engineering Curriculum: Tools for Immediate Feedback on Student Performance
Mary M. McCall, University of Detroit Mercy
Dr. Nassif E. Rayess, University of Detroit Mercy

Instructors’ Experiences With the Miscibility of Math and Communication in a Probability and Statistics Course
Dr. Sheila Anne Gobes-Ryan, University of South Florida
Dr. Kingsley A. Reeves Jr., University of South Florida

Story-Driven Learning: A Pedagogical Approach for Promoting Students’ Self-Awareness and Empathy for Others
Dr. Kali Lynn Morgan, Georgia Institute of Technology
Dr. Cristi L. Bell-Huff, Georgia Institute of Technology
Ms. Janece Shaffer, StoryReady LLC
Prof. Joseph M. LeDoux, Georgia Institute of Technology

R134B - Critical Participation in Engineering/STEM Education: Extending Critique Through Practices of Knowledge Expression and Travel

8:00 A.M. - 9:30 A.M.

Sponsor: Liberal Education/Engineering & Society Division

Moderators: Gary Downey, Virginia Polytechnic Institute and State University; Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University

Speakers: Gary Downey, Virginia Tech; Dr. Jessica Mary Smith, Colorado School of Mines; Emily York, James Madison University

This session invites attendees into a conversation about issues that practices of critical participation encounter in engineering and STEM education. It begins with presentations by three speakers, followed by open discussion and critical reflection.

Critical participation is an approach to the scholarship of STS making and doing. It involves developing, expressing, and attaching sociotechnical practices to engage and inflect a dominant knowledge form in science and technology without necessarily dismantling or wholly replacing it. Its practices express STS knowledge through alternative techniques, devices, infrastructures, and selves, and then follow their travel into empirical settings. The
specificities of knowledge expression and travel often produce problems of personhood for the scholar while also providing opportunities for reflexive learning and further development of project practices. Critical participation cannot be done alone, and it can rarely be done quickly.

R138 - Mechanical Engineering Division Business Meeting

7:00 A.M. - 8:00 A.M.
Sponsor: Mechanical Engineering Division
Moderators: Rungun Nathan, Pennsylvania State University, Berks Campus; Thomas DeNucci, United States Coast Guard Academy

Annual Business Meeting of the ME Division. New officer selections, review of policies, and other critical functions are discussed. Welcome to members and non-members of the ME Division. This is your chance to get some leadership opportunities in the ME Division.

R139 - Bringing a Different Perspective

8:00 A.M. - 9:30 A.M.
Sponsor: Mechanics Division
Moderators: Anna Howard, North Carolina State University at Raleigh; Jonathan Aurand, Dunwoody College of Technology; Julian Davis, University of Southern Indiana; Masoud Rais-Rohani, University of Maine

Come hear some new perspectives on a variety of topics. And, as usual, stick around afterward, because this session will spawn very interesting discussions.

Building Comprehensive Open Educational Resources in Mechanics: Evaluating Approaches to Problem Development
Dr. Agnes Germaine d’Entremont P.Eng., University of British Columbia
Dr. Andrea S. Webb, University of British Columbia
Dr. Sean Maw P.Eng., University of Saskatchewan
Ms. Jennifer Kirkey, Douglas College

Dynamics in One Week
Dr. Andrew R. Sloboda, Bucknell University

Cheating and Chegg: a Retrospective
Mr. Eli Broemer, Michigan State University
Dr. Geoffrey Recktenwald, Michigan State University

The Effects of Penalties On Homework that is Submitted Late for Grading on Learning in a Statics Course
Dr. Josué Njock Libii, Purdue University Fort Wayne

R140A - Minorities in Engineering Division Technical Session 7

8:00 A.M. - 9:30 A.M.
Sponsor: Minorities in Engineering Division
Moderators: Henriette Burns, Southern Illinois University Edwardsville; Kristin Imhoff, Saint Joseph’s University; Trina Fletcher, Florida International University

Engaging Underrepresented Students in Cybersecurity using Capture-the-Flag(CTF) Competitions
Dr. Michel A. Kornegay, Morgan State University
Dr. Md Tanvir Arafin, Morgan State University
Prof. Kevin Kornegay, Morgan State University

Work in Progress: Evaluation of an EPIC Student Experience to Broaden Participation in Engineering Programs
Dr. Fethiye Ozis P.E., Northern Arizona University
Tina Zecher, Northern Arizona University
Dr. Nena E. Bloom, Northern Arizona University

Intersectional Complexities of Race/Ethnicity and Gender in Engineering Students’ Professional Social Responsibility Attitudes
Dr. Angela R. Bielefeldt, University of Colorado Boulder

Types of Stereotype Threats that Latinx Students Experience in Undergraduate Engineering Education
Ms. Elizabeth Turochy, Auburn University
Michael Alexander Perez, Auburn University
Dr. Cristina Poleacovschi, Iowa State University
Dr. Timothy Yuen, University of Texas at San Antonio
Dr. Erin Doran, Iowa State University of Science and Technology
**R140B - Minorities in Engineering Division Business Meeting**

**7:00 A.M. - 8:00 A.M.**

*Sponsor: Minorities in Engineering Division*

*Moderators: Kristin Imhoff, Saint Joseph’s University; Trina Fletcher, Florida International University*

7:00 a.m. - 8:00 a.m. Sponsor: Minorities in Engineering Division

Moderators: Kristin Imhoff, Saint Joseph’s University; Trina Fletcher, Florida International University

Mr. Evan Yang, University of Kentucky

Dr. Sarah A. Wilson, University of Kentucky

**Work in Progress: The Design and Implementation of EFRI-Research Experience in Mentoring Catalyst Initiative**

Dr. Olgha Bassam Qaqish, North Carolina State University at Raleigh

Dr. Andrew Greenberg, University of Wisconsin-Madison

Dr. Christine S. Grant, North Carolina State University at Raleigh

Ashley Brown

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**R141 - Multidisciplinary Endeavors: Engineering, Art and Society**

**8:00 A.M. - 9:30 A.M.**

*Sponsor: Multidisciplinary Engineering Division*

*Moderators: Cynthia Barnicki, Milwaukee School of Engineering; AJ Hamlin, Michigan Technological University; Aschalew Kassu, Alabama A&M University; Zhaoshuo Jiang, San Francisco State University*

Building STEAM: Creating a Culture of Art in an Engineering Education

Dr. Katherine Hennessey Wikoff, Milwaukee School of Engineering

Mr. James R. Kieselburg, Milwaukee School of Engineering

Margaret T. Dwyer, Milwaukee School of Engineering

Dr. Candela Marini, Milwaukee School of Engineering

Integrating Art and Engineering: What do faculty think?

Mr. Cristián Eduardo Vargas Ordóñez P.E., Purdue University at West Lafayette (COE)

Dr. Morgan M. Hynes, Purdue University at West Lafayette (COE)

“Blessing in Disguise”: Understanding the Racialized and Gendered Experience of a Black Woman’s Pathway in Engineering

Ms. Brianna Shani Benedict, Purdue University

**Work in Progress: Development and Evaluation of Self-Contained, Shippable Outreach Experiments for Online Implementation in K-12 Classrooms**

Mr. Joseph Churchill Tapia II, University of Kentucky

Ms. Danielle Nicole Dutton, University of Kentucky

Mr. Ronald Justin Vogler, University of Kentucky

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**R142 - New Engineering Educators Division Business Meeting**

**8:00 A.M. - 9:30 A.M.**

*Sponsor: New Engineering Educators Division*

*Moderators: Derek Breid, Saint Vincent College; Kerry Widder, Milwaukee School of Engineering*

Please join us as we decide on the future and direction of our New Engineering Educators Division. Elections and appointments for leadership positions within NEE will be held during this meeting.

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**R143 - 2021/2022 ASEE Board of Directors Meeting - Held Outside the Virtual Meeting**

**8:00 A.M. - 9:30 A.M.**

*Sponsor: ASEE Board of Directors*

PLEASE NOTE: Details to join this meeting will be sent directly to Board Members

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**R144 - Best Paper, Best Diversity Paper**

**8:00 A.M. - 9:30 A.M.**

*Sponsor: Ocean and Marine Engineering Division*

*Moderators: Lynn Albers, Hofstra University; Robert Kidd, State University of New York Maritime College*

This technical session will feature the Ocean and Marine
Engineering Division's best paper and best diversity paper.

Using a Serious Game to Teach Maritime Economics and Technology to Students from Mixed Backgrounds
Dr. Jeroen Pruyn, Delft University of Technology
Dr. Edwin van Hassel, University of Antwerp

Teaching in the Era of COVID-19: A Reinvented Course Project for an Ocean Engineering Course
Dr. Maija A Benitz, Roger Williams University

Mentoring Prospective Engineering Students Through the After School Program “Girls in Engineering” Focused on Building an Underwater Remotely Operated Vehicle
Dr. Vukica M. Jovanovic, Old Dominion University
Ms. Deborah Marshall, Norfolk Public Schools Career & Technical Education Dept.
Mr. Jeff Warren Larson Jr.
Mr. Abdul Rahman Badawi, Old Dominion University
Mr. Neil R. StClair, Old Dominion University
Dr. Otilia Popescu, Old Dominion University
Dr. Murat Kuzlu, Old Dominion University
Dr. Petros J. Katsioloudis, Old Dominion University
Dr. Linda Vahala, Old Dominion University
Mr. Michael Anthony Crespo, Granby High School, Norfolk (Virginia) Public Schools

A Curriculum on Naval Science & Technology for a Midwestern University
Dr. James Buchholz, University of Iowa
Dr. Jae-Eun Russell, University of Iowa
Venanzio Cichella, University of Iowa
Prof. Casey Harwood, University of Iowa
Dr. Shaoping Xiao, University of Iowa
Dr. Pablo M. Carrica, University of Iowa

R146 - Software Engineering Division Technical Session 2
8:00 A.M. - 9:30 A.M.
Sponsor: Software Engineering Division
Moderators: Robert Hasker, Milwaukee School of Engineering; Fernando Gonzalez, Florida Gulf Coast University

Experiences of Teaching Software Testing in an Undergraduate Class Using Different Approaches for the Group Projects
Dr. Ingrid Buckley, Florida Gulf Coast University

Dr. Peter J. Clarke, Florida International University

Reverse Software Engineering as a Project-Based Learning Tool
Ms. Cynthia C. Fry, Baylor University
Mr. Zachary Michael Steudel
Mr. Joshua Craig Hunter, Baylor University

Teaching Software Quality Assurance (SQA) During COVID-19 Using the HyFlex Approach—Course Design, Results, and Experiences
Dr. Tamaike Brown, State University of New York at Oswego
Dr. Bastian Tenbergen, State University of New York at Oswego

R150 - The Curriculum at Two-year College's Engineering Technology and Engineering Transfer Programs
8:00 A.M. - 9:30 A.M.
Sponsor: Two-Year College Division
Moderators: Philip Regalbuto, Trident Technical College; Ismail Fidan, Tennessee Technological University

A look at the content of the curriculum at two-year college engineering technology and engineering transfer programs.

Do Engineers Need A Code of Ethics?
Dr. Raymond Edward Floyd, Northwest College

Students Talk: The Experience of Advanced Technology Students at Two-Year Colleges during COVID-19
Dr. Marilyn Barger P.E., FLATE, Florida Advanced Technological Education Center
Dr. Lakshmi Jayaram, Inquiry Research Group LLC

The Wild World of Wireless in the 2020s – What Do We Need to be Teaching?
Prof. Gary J. Mullett, Springfield Technical Community College

Developing Two-Year College Student Engineering Technology Career Profiles
Dr. Kristin Kelly Frady, Clemson University
Dr. Christy Brown, Clemson University
Dr. Karen A. High, Clemson University
Prof. Claretha Hughes Ph.D., University of Arkansas, Fayetteville
Mr. Robert M. O’Hara, Clemson University
Mr. Shuyu Huang

ASEE online session locator can be found at www.asee.org/osl.
R151 - Women in Engineering Division Technical Session 5

8:00 A.M. - 9:30 A.M.

Sponsor: Women in Engineering Division

Moderators: Liesl Folks, University of Arizona; Kathrine Ehrlich-Scheffer, Rochester Institute of Technology (COE)

Understanding Gen Z’s Declining Engagement with WE@RIT, a Woman in Engineering Program

Ms. Kathrine Ehrlich-Scheffer, Rochester Institute of Technology (COE)

“She’s More Like a Guy”: The Legacy of Gender Inequity Passed on to Undergraduate Engineering Students

Dr. Jeanne Christman, Rochester Institute of Technology (CET)
Dr. Randy Yerrick, Fresno State University

Women and BIPOC in Aerospace: Where Did They Come From and How Did They Get Here?

Dr. Tracy L. Yother, Purdue University at West Lafayette (PPI)
Dr. Anne M. Lucietto, Purdue University at West Lafayette (PPI)
Dr. Geanie Umberger, Purdue University at West Lafayette (PPI)
Prof. Mary E. Johnson Ph.D., Purdue University at West Lafayette

Gender and Human Imagery in the Halls of a BME Department

Dr. Kali Lynn Morgan, Georgia Institute of Technology
Adrianna Bernardo
Todd M. Fernandez, Georgia Institute of Technology

Ada Lovelace: First Computer Programmer and Hacker?

Dr. Erica Haugtvedt, South Dakota School of Mines & Technology
Dr. Duane Lewis Abata, South Dakota School of Mines and Technology

"Community engagement" is an umbrella term for service learning in engineering, humanitarian engineering, learning through service, community-based research, civically engaged learners, technology-based social entrepreneurship, and more. Community organizations (either local or from abroad) partner with institutions of engineering education for the mutual benefit of communities and engineering students. Ideally, student teams and citizens work together via reciprocal partnerships for the shared purpose of completing community-identified projects aimed at increasing community assets.

STEM Program for Female Students

Dr. Jiahui Song, Wentworth Institute of Technology
Dr. Gloria Guohua Ma, Wentworth Institute of Technology
Dr. Douglas Eric Dow, Wentworth Institute of Technology

Understanding Self-efficacy and Persistence for STEM Education in Underrepresented Middle School Students

Dr. Rajani Muraleedharan, Saginaw Valley State University
Dr. Male Cassar, Saginaw Valley State University

Engagement in Practice: Social Performance and Harm in Civic Hackathons

Angela L. Chan, University of Illinois at Urbana–Champaign
Dr. Molly H. Goldstein, University of Illinois at Urbana–Champaign

Engage in Practice: Hosting Math Competitions in College of Engineering

Dr. Ziliang Zhou, California Baptist University

COVID-19 Community Relief Project: Design and Development of Disinfection Booth with AR/VR Companion App

Dr. Ulan Dakeev, Sam Houston State University
Dr. Reg Recayi Pecen, Sam Houston State University
Dr. Faruk Yildiz, Sam Houston State University
Ms. Y. Luong, Sam Houston State University

R152 - Community Engagement Division Technical Session 4

8:00 A.M. - 9:30 A.M.

Sponsor: Community Engagement Division

Moderators: Joan Schuman, Missouri University of Science and Technology; Marybeth Lima, Louisiana State University and A&M College; Jiahui Song, Wentworth Institute of Technology

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Dr. Faruk Yildiz, Sam Houston State University
Ms. Y. Luong, Sam Houston State University

R155 - Career Advancement Through Engineering Leadership Development

8:00 A.M. - 9:30 A.M.

Sponsor: Engineering Leadership Development Division

Moderators: Cindy Rottmann, University of Toronto;
Meagan Kendall, University of Texas at El Paso; David Niño, Massachusetts Institute of Technology

The Engineering Leadership Development Division: A Journey of Becoming and Belonging
Dr. David Niño, Massachusetts Institute of Technology

Adapting an NSF-Funded Professional Skills Curriculum to Train Engineers in Industry: A Case Study
Mr. Mark Jason Luchini, Jackson
Mr. David J. Cribs, Jackson
Dr. Dirk Joel-Luchini Colbry, Michigan State University
Dr. Katy Luchini-Colbry, Michigan State University

Exploring the Role of Ambiguity Tolerance in an Engineering Professional's Identity as a Leader
Dr. Michele Norton, Texas A&M University
Dr. Ben Behbood Zoghi, Texas A&M University

Faculty Members’ Perceptions of Engineering Students’ Preparedness for Leadership Competencies
Mr. Hwangbo Bae, University of Florida
Dr. Madeline Polmear, University of Florida
Dr. Denise Rutledge Simmons P.E., University of Florida

Overview and Challenges in Developing a Comprehensive Leadership Development Program in a Fortune 500 Company
Dr. Gregg Morris Warnick, Micron Technology Inc.
Major Blandon Prowse, Micron Technology Inc.
Mr. Wai-Leong Mook, Micron Technology Inc.
Mr. Arthur Beng Chuan Lam, Micron Semiconductor Asia

An Integrated Vision of Management and Leadership for Delivering 21st-century Civil Infrastructure
Mr. Michael B. O’Connor, New York University
Mrs. Elizabeth Zofia Bialek P.E., American Society of Civil Engineers; East Bay Municipal Utility District
Ms. Susan Davis, American Society of Civil Engineers

Engineering colleges are strategically recruiting diverse student cohorts to increase participation from underrepresented minorities (URMs) and first-generation college students. To ensure their success, colleges must provide ongoing support to the faculty who teach them. This 90-minute special session will engage attendees in an interactive discussion and brainstorming about research on inclusion in higher education using case studies of teaching best practices. The goal is to provide participants with strategies they can implement at their institution or to encourage them to lead similar workshops on their campuses.

By the end of this session, participants will be able to:
1) identify different kinds of diversity in the classroom.
2) discuss the importance and challenges of engendering an inclusive classroom.
3) compile a working list of tools, strategies, and resources for fostering an inclusive classroom through both subject matter and teaching methods.

R177 - Expanding the Accessibility of Mathematics Using PDFs: A Process-Driven Math Demo All Teachers Can Apply
8:00 A.M. - 9:30 A.M.
Sponsor: ASEE Committee on Diversity, Equity & Inclusion
Moderators: Jeanne Sanders, University of Nevada, Reno; Rachelle Reisberg, Northeastern University
Speakers: Dr. Canek Moises Luna Phillips, Rice University; Dr. Yvette E. Pearson P.E., Rice University; Ms. Ann Patrice Gulley; Logan C. Prickett

Process-Driven Math (PDM) is a method of math instruction and assessment designed to reduce barriers for students with visual and print disabilities. We demonstrate how to use PDM to chunk mathematical content into component substructures using color and shape. Downloadable PowerPoint slides with shape templates will be made available to participants so they can practice chunking mathematical expressions using PDM. Participants will also learn how the “speak screen”
feature in PowerPoint can be used to give students with dyslexia or dyscalculia confidence that they are accurately interpreting the mathematical content they are seeing.

R199 - SPONSORED SESSION: Presented by Edibon USA

8:00 A.M. - 8:40 A.M.

R233 - Pre-College Engineering Education Division Resource Exchange

9:45 A.M. - 11:15 A.M.

Sponsor: Pre-College Engineering Education Division

Moderators: Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University; Manuel Figueroa, the College of New Jersey; Diane Golding, University of Texas at El Paso

Accessible Playground Design: A Community-Connected Elementary Engineering Unit Focused on Designing Accessible Playground Equipment

Dr. Tejaswini S. Dalvi, University of Massachusetts, Boston
Dr. Kristen B. Wendell, Tufts University
Dr. Chelsea Andrews, Tufts University
Nicole Alexandra Batrouny, Tufts University

An Adaptable Interactive Activity on Optics and Resolution

Mel White, Cornell University

Applying Engineering Principles in an Interdisciplinary Virtual Summer Camp for Underrepresented 9th - 12th Graders in Rural Louisiana

Dr. Ahmad Fayed, Southeastern Louisiana University
Dr. Deborah Athas Dardis, Southeastern Louisiana University
Dr. Bonnie Achee, Southeastern Louisiana University
Dr. Wendy J. Conarro, Southeastern Louisiana University
Dr. Mehmet Emre Bahadir, Southeastern Louisiana University
Dr. Troy Williams, Southeastern Louisiana University
Dr. Mohammad Saadeh, Southeastern Louisiana University
Tireka Cobb Ph.D., Louisiana Office of Student Financial Assistance

Curriculum Resources for Incorporating Cutting-edge Neurotechnologies into Secondary STEM Classrooms

Dr. Kristen Clapper Bergsman, University of Washington
Dr. Eric H. Chudler, University of Washington

A P-12 Engineering Learning Framework: Expectations and Resources Toward Achieving Engineering Literacy for All

Dr. Greg J. Strimel, Purdue University at West Lafayette (PPI)

I Am STEM, an Engineering Lesson Library for PK-5 Educators

Dr. Katherine C. Chen, Worcester Polytechnic Institute
Dr. Mia Dubosarsky, Worcester Polytechnic Institute
Mrs. Donna Taylor, Worcester Polytechnic Institute

Introducing Chaos in Elementary School; a Precursor for Multibody Dynamics

Miss Joselyn Elisabeth Busato, Bucknell University
Dr. Elif Miskioglu, Bucknell University
Dr. Kaela M. Martin, Embry-Riddle Aeronautical University - Prescott
Prof. Davide Guzzetti, Auburn University

An Instructional Approach to Engage Children with Autism to Engineering Design

Dr. Hoda Ehsan, Georgia Institute of Technology

What Is 6 Feet? Estimation Activities for Elementary School

Dr. Stephany Coffman-Wolph, Ohio Northern University
Dr. Kimberly Gray, West Virginia University Institute of Technology

Water Purification and Ocean Salinity: The Colligative Properties and Engineering Naval Solutions

Dr. Joni M. Lakin, University of Alabama
Prof. Virginia A. Davis, Auburn University
Dr. Edward W. Davis, Auburn University
Chere’ DeLayne Smith, Smiths Station High School

A Model for Conducting K-12 STEM Summer Outreach Programs During the COVID-19 Pandemic

Dr. William A. Kitch, Angelo State University
Ms. Andrea L. Robledo, Angelo State University
Mrs. Wanda James Green

Teacher-led Reflection Activity

Mrs. Tawni Paradise, Virginia Polytechnic Institute and State University
Malle R. Schilling, Virginia Polytechnic Institute and State University

Schedule subject to change. Please go to https://2021asee.pathable.co/ for up-to-date information.
Systems Biology Education Modules to Promote Computational Thinking in High School Students
Kelsey Watts, Clemson University
Dr. Will Richardson, Clemson University

Olympics on the Moon: A Challenge for Engineering Design
Mr. Cristián Eduardo Vargas Ordóñez P.E., Purdue University at West Lafayette (COE)
Mr. Andrew James Gray, Purdue University at West Lafayette (COE)
Dr. Morgan M. Hynes, Purdue University at West Lafayette (COE)

A Student Groupwork Spectrum for Engineering Design Collaboration
Dr. Katherine Levenick Shirey, EduKatey

R271 - NSF Grantees Poster Session
9:45 A.M. - 11:15 A.M.
Sponsor: NSF Grantees Poster Session
Moderator: Amber Genau, University of Alabama at Birmingham
Authors with currently funded NSF projects dealing with engineering education and related topics will be presenting their work in a poster-style format. Authors will be available to discuss their work live during the scheduled time slot.

A Comprehensive Professional Development Program for K-8 Teachers to Teach Computer Science
Prof. Leen-Kiat Soh, University of Nebraska - Lincoln
Dr. Gwen Nugent, University of Nebraska - Lincoln
Prof. Gary Trainin, University of Nebraska - Lincoln
Dr. John T. Sutton, ResultED LLC
Dr. Kent Steen, Lincoln Public Schools

An NSF-LSAMP Model for the Successful Transition of Underrepresented Students into STEM Majors and Beyond
Mrs. Lauren J. Donovan, Stony Brook University
Dr. Monica Bugallo, Stony Brook University
Prof. Thomas Woodson, Stony Brook University
Dr. Candice June Foley, Suffolk County Community College
Dr. Shanise N. Kent, University at Albany, State University of New York
Dr. Bonita London, Stony Brook University
Prof. Stacie Swingle Nunes, SUNY New Paltz
Dr. Maurie McInnis, Stony Brook University

Academic Success and Retention of Underprepared Students
Dr. Robin A. M. Hensel, West Virginia University
Mr. Joseph Dygert, West Virginia University
Dr. Melissa Lynn Morris, University of Nevada - Las Vegas

An Initial Exploration of Engineering Student Perceptions of COVID's Impact on Connectedness, Learning, and STEM Identity
Dr. Craig O. Stewart, University of Memphis
Dr. Maryam Darbeheshti, University of Colorado Denver
Dr. Stephanie S. Ivey, University of Memphis

R234 - Socially Responsible Engineering II: Pedagogy, Teamwork, and Student Experiences
9:45 A.M. - 11:15 A.M.
Sponsor: Liberal Education/Engineering & Society Division
Moderators: Jessica Smith, Colorado School of Mines; Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University

Reclassifying Teaching Methods Based on a Comparison of Student and Faculty Experiences of Corporate Social Responsibility in the Classroom
Ms. Larkin Martini, Colorado School of Mines
Ms. Jordyn MacKenzie Helfrich, Colorado School of Mines

The Virtues of Teamwork: A Course Module to Cultivate the Virtuous Team Worker
Dr. Michael D. Gross, Wake Forest University
Dr. Joseph Wiinikka-Lydon, Wake Forest University
Dr. Michael Lamb, Wake Forest University
Dr. Olga Pierrakos, Wake Forest University
Dr. Adetoun Yeaman, Wake Forest University

Developing a Framework for Civic Responsibility in Engineering Education
Ms. Athena Lin, Purdue University at West Lafayette
Dr. Justin L. Hess, Purdue University at West Lafayette
2021 ASEE VIRTUAL CONFERENCE
THURSDAY, JULY 29th SESSIONS

Dr. David J. Russomanno, Indiana University - Purdue
University Indianapolis
Miriam Howland Cummings, University of Colorado Denver
Mr. Gregory Edward Simon, University of Colorado Denver
William Taylor Schupbach, University of Colorado Denver
Dr. Mike S. Jacobson, University of Colorado Denver
Prof. Tom Altman, University of Colorado Denver
Dr. Karen D. Alfrey, Indiana University - Purdue University
Indianapolis
Prof. Katherine Goodman, University of Colorado Denver

Applying Deliberate Practice to Facilitate Schema
Acquisition in Learning Introductory Mechanics
Dr. Yan Tang, Embry-Riddle Aeronautical University - Daytona Beach
Dr. Haiyan Bai, University of Central Florida
Dr. Richard Catrambone, Georgia Institute of Technology

Applying Research on Reducing Student Resistance to
Active Learning Through Faculty Development: Project Update
Laura J. Carroll, University of Michigan
Ms. Lea K. Marlor, University of Michigan
Dr. Cynthia J. Finelli, University of Michigan
Dr. Matthew Charles Graham
Madison E. Andrews, University of Texas at Austin
Dr. Jenefer Husman, University of Oregon
Dr. Michael J. Prince, Bucknell University
Dr. Maura Borrego, University of Texas at Austin

Assessing Educational Pathways for Manufacturing in
Rural Communities: Research Findings and Implications
from an Investigation of New and Existing Programs in
Northwest Florida
Dr. Marcia A. Mardis, Florida State University
Dr. Faye R. Jones, Florida State University

Assessing Emphasized Engineering Practices and Their
Alignment with Engineers’ Personal Values
Dr. Erika A. Mosjowiski, University of Michigan
Dr. Shanna R. Daly, University of Michigan
Dr. Lisa R. Lattuca, University of Michigan

Assessing Metacognition Awareness of Freshmen
Engineering Students
Muhammad Dawood, New Mexico State University
Mr. Ehtesham Shareef, New Mexico State University
Rachel Boren, New Mexico State University
Mr. Germain Degardin, New Mexico State University

Dr. Melissa J. Guynn, New Mexico State University
Dr. Patti Wojahn, New Mexico State University

Assessing the Academic and Social Growth of STEM
Transfer Students
Prof. Thomas Woodson, Stony Brook University
Ms. Rachel Faye Perlman, Stony Brook University
Dr. Marianna Savoca, Stony Brook University
Mrs. Lauren J. Donovan, Stony Brook University

Barriers and Supports Needed to Improve ET Career
Development: A Two-Year View of D.E.E.P. Engineering
Technology Career Formation Progress and Impacts
Dr. Kristin Kelly Frady, Clemson University
Prof. Claretha Hughes Ph.D., University of Arkansas, Fayetteville
Dr. Karen A. High, Clemson University

Bipartite Network Analysis Utilizing Survey Data to
Determine Student and Tool Interactions in a Makerspace
Mr. Samuel Enrique Blair, Texas A&M University
Dr. Julie S. Linsey, Georgia Institute of Technology
Dr. Astrid Layton, Texas A&M University
Henry David Banks, Georgia Institute of Technology

Black Males in Pursuit of Advanced Engineering Degrees
Dr. Jerrod A. Henderson, University of Houston
Dr. Erik M. Hines, Florida State University
Dr. Ayesha Boyce, University of North Carolina - Greensboro
Jared Larenz Davis, University of Houston
Waldemiro Muanha Junqueira, University of Houston
Mr. Tyron Slack, Florida State University

Broadening the Participation of Underrepresented
Minorities in the Mathematical Sciences
Prof. Tuncay Aktosun, University of Texas at Arlington
Dr. Yolanda Parker, Tarrant County College
Prof. Jianzhong Su, University of Texas at Arlington

Building Social Capital for First Generation Students
through Intentional Multilayered Mentoring
Prof. Tiffany Antionette Butler, Worcester Polytechnic Institute
Dr. Katherine C. Chen, Worcester Polytechnic Institute
Dr. Kimberly LeChasseur, Worcester Polytechnic Institute

CAREER: Learning from Students’ Identity Trajectories to
Actualize Latent Diversity
Dr. Allison Godwin, Purdue University at West Lafayette (COE)
Ms. Brianna Shani Benedict, Purdue University
Ms. Jacqueline Rohde, Purdue University at West Lafayette
CAREER: Ready for Change: Fostering Adaptability along the Engineering Pathway
Dr. Samantha Ruth Brunhaver, Arizona State University, Polytechnic School
Susan Sajadi, Arizona State University
CAREER: Supporting Undergraduate Mental Health by Building a Culture of Wellness in Engineering
Dr. Karin Jensen, University of Illinois at Urbana - Champaign
Ms. Sara Rose Vohra, University of Illinois at Urbana-Champaign
Mr. Joseph Francis Mirabelli, University of Illinois at Urbana - Champaign
Andrea J. Kunze, University of Illinois at Urbana - Champaign
Isabel Miller, University of Illinois at Urbana - Champaign
Mr. Thomas Edward Romanchek, University of Illinois at Urbana - Champaign
COVID-19’s Impact on on ECE Communities Served by Minority Serving Institutions
Dr. Kenneth A. Connor, Rensselaer Polytechnic Institute
Dr. Kathy Ann Gullie, Gullie Consultant Services LLC
Dr. Barry J. Sullivan, Inclusive Engineering Consortium
Megan Bekolay
Claire Seifert
Michelle Klein, Electrical and Computer Engineering Dept. Heads Assoc. (ECEDHA)
Dr. Dena T. Spaulding
Dr. Mandoye Ndoye, Tuskegee University
Dr. Otsebele E. Nare, Hampton University
Dr. Abdelnasser A. Eldek, Jackson State University
COVID-19 Pandemic Reveals a Major Challenge in Engineering Ethics Education
Mr. Luan M. Nguyen, Iowa State University of Science and Technology
Dr. Cristina Poleacovschi, Iowa State University
Dr. Kasey M. Faust, University of Texas at Austin
Michaela Leigh LaPatin P.E., University of Texas at Austin
Kate Padgett Walsh, Iowa State University of Science and Technology
Dr. Scott Grant Feinstein
Dr. Cassandra Rutherford, Iowa State University
CS@Mines: PATH Ambassadors to High Success, A Successful S-STEM Scholarship Program
Dr. Tracy Camp, Colorado School of Mines
Dr. Heather Thiry
Career Progression of CISTAR Participants
Dr. Joana Marques Melo, Purdue University
Maeve Drummond Oakes, Purdue University
Dr. Allison Godwin, Purdue University
Championing Hispanic Student Success following Natural Disasters in Puerto Rico
Dr. Carla López del Puerto, University of Puerto Rico, Mayagüez Campus
Dr. Carmen M. Bellido, University of Puerto Rico, Mayagüez Campus
Prof. Oscar Marcelo Suarez, University of Puerto Rico, Mayagüez Campus
Prof. Mónica Alfaro, University of Puerto Rico, Mayagüez Campus
Dr. Manuel A. Jimenez, University of Puerto Rico, Mayagüez Campus
Community Building for the NSF PFE: RIEF Program: Year 2
Dr. Karin Jensen, University of Illinois at Urbana - Champaign
Dr. Kelly J. Cross, University of Nevada, Reno
Mr. Joseph Francis Mirabelli, University of Illinois at Urbana - Champaign
Ms. Mia Ko, University of Illinois at Urbana - Champaign
Dr. Jeanne L. Sanders, University of Nevada, Reno
Computational Thinking Frameworks used in Computational Thinking Assessment in Higher Education. A Systematized Literature Review.
Ms. Laura Melissa Cruz Castro, Purdue University at West Lafayette (PPI)
Ms. Huma Shoaib, Purdue University
Dr. Kerrie A Douglas, Purdue University at West Lafayette (COE)
Computational Thinking in the Formation of Engineers (Year 1)
Dr. Noemi V. Mendoza Diaz, Texas A&M University
Dr. Russ Meier, Milwaukee School of Engineering
Dr. Deborah A. Trytten, University of Oklahoma
Dr. So Yoon Yoon, University of Cincinnati
Dr. Janie M. Moore, Texas A&M University
Dr. Andrea M. Ogilvie P.E., Texas A&M University
2021 ASEE VIRTUAL CONFERENCE
THURSDAY, JULY 29th SESSIONS

Dr. Mark Weichold, Texas A&M University

Confidence of Graduate Students in Engineering Masters’ Programs: A Comparison of Returners and Direct-Pathway Students
Dr. Diane L. Peters, Kettering University
Dr. Elizabeth Gross, Sam Houston State University

Connected Learning and Integrated Course Knowledge (CLICK) Approach
Dr. Omar Ashour, Pennsylvania State University, Behrend College
Mr. James Devin Cunningham, Carnegie Mellon University
Christian Enmanuel Lopez, Lafayette College
Dr. Conrad Tucker, Carnegie Mellon University

Creating Opportunities to Help Students Be Prepared for Careers in a STEM Field
Dr. Edel Reilly, Indiana University of Pennsylvania

Creating the Skillful Learning Institute: A Virtual Short Course for Building Engineering Educators’ Capacity to Promote Student Metacognitive Growth
Dr. Patrick Cunningham, Rose-Hulman Institute of Technology
Dr. Rachel McCord Ellestad, University of Tennessee at Knoxville
Dr. Holly M. Matusovich, Virginia Polytechnic Institute and State University
Dr. Cheryl Carrico P.E., E4S, LLC

Design and Development: NSF Engineering Research Centers Unite: Developing and Testing a Suite of Instruments to Enhance Overall Education Program Evaluation
Mr. Zhen Zhao, Arizona State University, Polytechnic campus
Dr. Adam R. Carberry, Arizona State University
Dr. Jean S. Larson, Arizona State University
Dr. Michelle Jordan, Arizona State University
Dr. Wilhelmina C. Savenye, Arizona State University
Kristi L. Eustice, Arizona State University
Wendy M. Barnard, Arizona State University
Dr. Megan O’Donnell, Arizona State University
Dr. Allison Godwin, Purdue University at West Lafayette
Dr. Gillian Roehrig, University of Minnesota - Twin Cities
Dr. Christopher Barr, Rice University
Kimberly Farmsworth, Arizona State University
Ms. Courtney Argenti, Arizona State University

Natural Disaster
Dr. Luis G. Daza, University of Puerto Rico, Rio Piedras
Prof. Humberto Eduardo Cavallin, University of Puerto Rico, Rio Piedras
Dr. Carla Lopez del Puerto, University of Puerto Rico, Mayaguez

Developing Diversity and Inclusion Initiatives and Measuring the Effects of a Pandemic in a Civil and Environmental Engineering Department
Mr. Tiago R. Forin, Rowan University
Dr. Stephanie Farrell, Rowan University
Prof. Harriet Hartman, Rowan University
Dr. Kauser Jahan P.E., Rowan University
Dr. Ralph Alan Dusseau P.E., Rowan University
Dr. Sarah K. Bauer, Rowan University
Dr. Stephanie Lezotte, Rowan University

Developing an Engineering Design Course for Rural Middle School Students: Implementation Strategies and Lessons Learned
Dr. Tameshia Ballard Baldwin, North Carolina State University at Raleigh
Dr. LaTricia Walker Townsend, North Carolina State University at Raleigh

Developing and Popularizing STEM Online Tools: The Case of ‘Listening to Waves’ Tools for the Science of Music
Dr. Victor Hugo Minces, University of California, San Diego

Differential Effects of Bridge Program Participation on Perceived Belonging and Peer Support for STEM Degree Seekers during the COVID-19 Pandemic
Ms. Megan McSpedon, Rice University
Dr. Margaret E. Beier, Rice University
Dr. Brittany Bradford, Rice University
Prof. Michael Wolf, Rice University

Digital Technology and Engineering: Teachers’ Understandings, Beliefs, and Practices
Dr. Amanda Gonczi, Michigan Technological University
Dr. Whitney Nicole McCoy, University of Virginia
Dr. Robert M. Handler
Dr. Jennifer L. Maeng, University of Virginia

Diversity and Inclusion within the Context of the Professional Formation of Engineers: Impact of the COVID-19 Pandemic and Increased Attention on Racial Disparities
Memoria Matters, Purdue University at West Lafayette (COE)

Developing Case Studies for a Repository for Resilient Infrastructure and Sustainability Education following a Natural Disaster
Dr. Luis G. Daza, University of Puerto Rico, Rio Piedras
Prof. Humberto Eduardo Cavallin, University of Puerto Rico, Rio Piedras
Dr. Carla Lopez del Puerto, University of Puerto Rico, Mayaguez

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DuSTEM: A Comprehensive Approach to Student Success
Dr. Kristen Ann Thompson, Loras College
Dr. Danial J. Neebel PE, Loras College
Dr. Robert S. Keller, Loras College

Early Career Engineers' Views of Ethics and Social Responsibility: Study Overview
Dr. Stephanie Claussen, San Francisco State University
Prof. Brent K. Jesiek, Purdue University at West Lafayette (COE)
Dr. Carla B. Zoltowski, Purdue University at West Lafayette (COE)
Ms. Shiloh James Howland, Brigham Young University

Educating the Next Generation of Cybersecurity Experts
Dr. Katerina Goseva-Popstojanova, West Virginia University
Dr. Robin A. M. Hensel, West Virginia University

Effect of Evolving Design Requirements on Students' Motivation
Dr. Karinna M. Vernaza, Gannon University
Dr. Saeed Tiarri, Gannon University
Dr. Scott Steinbrink, Gannon University
Dr. Lin Zhao, Gannon University
Dr. Varun K. Kasaraneni, Gannon University

Effects of High Impact Educational Practices on Engineering and Computer Science Student Participation, Persistence, and Success at Land Grant Universities
Dr. Candise S. Claiborn, Washington State University
Dr. Angela Minichielo P.E., Utah State University
Dr. Olusola Adesope, Washington State University
Mr. Ebenezer Rotimi Ewumi, Washington State University
Mr. Muhammad Asghar P.E., Utah State University

Empowering Students to be Adaptive Decision Makers:
Finalizing a Multi-dimensional Inventory of Decision-Making Competency
Dr. Marisa K. Orr, Clemson University
Baker A. Martin, Clemson University
Dr. Katherine M. Ehler, Clemson University

Haleh Barmaki Brotherton, Clemson University
Jessica Allison Manning, Clemson University

Engineering Education Guilds: Understanding Their Vision for Innovation
Dr. Kaitlin Mallouk, Rowan University
Dr. Alexandra Coso Strong, Florida International University
Dr. Courtney June Faber, University of Tennessee at Knoxville
Darby Rose Riley, Rowan University

Engineering Ethics Through High-Impact Collaborative/Competitive Scenarios (E-ETHICCS)
Dr. Scott Streiner, Rowan University
Dr. Daniel D. Burkey, University of Connecticut
Prof. Michael F. Young, University of Connecticut
Dr. Richard Tyler Cimino, New Jersey Institute of Technology
Dr. Jennifer Pascal, University of Connecticut

Engineering Explorations: Connecting K-12 Classroom Learning and Field Trip Experiences through Engineering Design
Danielle Harlow, University of California, Santa Barbara
Ron Skinner, MOXI, The Wolf Museum of Exploration + Innovation
Alexandria Muller, University of California, Santa Barbara

Engineering Teacher Education: Exploring Elementary Teacher Learning in an Online Certificate Program for In-Service Educators in Engineering
Dr. Merredith D. Portsmore, Tufts University
Jessica Watkins, Vanderbilt University
Dr. Rebecca D. Swanson, Tufts Center for Engineering Education and Outreach
Miss Natalie Annabelle De Lucca, Vanderbilt University

Ethical Development in Undergraduate Engineering:
Results from a Multi-University Survey
Michaela Leigh LaPatin P.E., University of Texas at Austin
Dr. Cristina Poleacovschi, Iowa State University
Kate Padgett Walsh, Iowa State University of Science and Technology
Dr. Scott Grant Feinstein, Iowa State University
THURSDAY, JULY 29th SESSIONS

Evaluation of a Game-Based Personalized Learning System
Mr. Ryan Hare, Rowan University
Dr. Ying Tang, Rowan University

Evolution of STEM Leadership Self-Efficacy within an NSF S-STEM Program
Dr. Bruce D. DeRuntz, Southern Illinois University - Carbondale
Dr. Harvey Henson, Southern Illinois University - Carbondale
Mr. Tom Withee, Goshen Education Consulting Inc.
Ms. Olivia Hood, Leadership Development Program

Examining the Components of an Engineering Leadership Identity
Dr. William J. Schell IV P.E., Montana State University - Bozeman
Dr. Bryce E. Hughes, Montana State University - Bozeman
Mr. Brett Tallman P.E., Montana State University - Bozeman
Monika Kwapisz, Montana State University - Bozeman
Miss Tessa Sybesma, Montana State University

Expanding Access to and Participation in MIDFIELD (Year 5)
Dr. Susan M. Lord, University of San Diego
Dr. Matthew W. Ohland, Purdue University at West Lafayette (COE)
Dr. Marisa K. Orr, Clemson University
Dr. Catherine E. Brawner, Research Triangle Educational Consultants
Mr. Russell Andrew Long
Dr. Richard A. Layton, Layton Data Display
Hayaam Osman, Purdue University at West Lafayette (PPI)
Mr. Hossein Ebrahiminejad, Purdue University at West Lafayette (COE)

Experiencing Learning during COVID-19: A Systemic Approach for Increasing Diversity in Engineering & Engineering Technology
Dr. Rose-Margaret Ekeng-Itua, Ohlone College
Mr. Gabe Hanzel-Sello, Growth Sector
Mr. David Gruber, Growth Sector

Explaining Choice, Persistence, and Attrition of Black Students in Electrical, Computer, and Mechanical Engineering: Year 3
Dr. Catherine Mobley, Clemson University
Dr. Marisa K. Orr, Clemson University
Dr. Catherine E. Brawner, Research Triangle Educational Consultants
Dr. Rebecca Brent, Education Designs Inc.

Exploring the Success of HBCU’s Development of Black Students Earning Engineering and Computing Graduate Degrees
Dr. Jay Phillip Jefferson, Florida International University
Dr. Alexandra Coso Strong, Florida International University
Dr. Trina L. Fletcher, Florida International University
Ms. Jade R. Moten, Florida International University

FOUNDATIONS – Integrating Evidence-based Teaching and Learning Practices into the Core Engineering Curriculum: Retrospective on the Progress of Teaching-Track Faculty Participants
Dr. Gail P. Baxter, Stevens Institute of Technology
Dr. Keith G. Sheppard, Stevens Institute of Technology
Dr. Susan Lowes, Teachers College, Columbia University

Framing Engineering as Community Activism for Values-Driven Engineering (RFE Design and Development - Year 2)
Dr. Joni M. Lakin, University of Alabama
Dr. Daniela Marghitu, Auburn University
Dr. Edward W. Davis, Auburn University
Prof. Virginia A. Davis, Auburn University

Gamification of Chemical Engineering Pathways: Evidence from Introductory Courses
Dr. Michael Geoffrey Brown, Iowa State University of Science and Technology
Dr. Monica H. Lamm, Iowa State University of Science and Technology
Dr. Larysa Nadolny, Iowa State University of Science and Technology

Gendered Elective Track Choice in Engineering Undergraduate Education: Antecedents and Career Path Implications
Dr. Teresa Cardador, University of Illinois at Urbana - Champaign
Dr. Karin Jensen, University of Illinois at Urbana - Champaign
Dr. Kelly J. Cross, University of Nevada, Reno
Ms. Grisel Lopez-Alvarez, University of Illinois at Urbana - Champaign
Andrea J. Kunze, University of Illinois at Urbana - Champaign

Getting Things Done in Data-Intensive Inter-campus Research Initiatives: A Social Network Analysis Approach to Understanding and Building Effective Relationships between Researchers and Other University Employees
Global Impact of Experiment-centric Pedagogy and Home-based, Hands-on Learning Workshop at a Historically Black University

Dr. Oludare Adedgbona Owolabi P.E., Morgan State University
Dr. Jumoke ‘Kemi’ Ladje-Osias, Morgan State University
Mr. Oludayo Samuel Alamu, Morgan State University
Dr. Kenneth A. Connor, Rensselaer Polytechnic Institute
Dr. Aldo A. Ferri, Georgia Institute of Technology
Dr. Kathy Ann Gullie, Gullie Consultant Services LLC
Dr. Dean T. Spaulding, Gullie Consultant Services LLC
Dr. James William Brown Ph.D., School of Professional Studies, City University of New York
Dr. Krishna Bista, Morgan State University
Dr. Mulugeta T. Dugda, Morgan State University

Going Virtual: Reflections from Research and School Educators on Navigating Professional Development and STEM Club Opportunities

Mr. Amari Simpson, University of Illinois at Urbana - Champaign
Lara Hebert Ph.D., University of Illinois at Urbana - Champaign
Dr. Luisa-Maria Rosu, University of Illinois at Urbana-Champaign
Dr. Irfan S. Ahmad, University of Illinois at Urbana - Champaign
Dr. Meagan C. Pollock, Engineer Inclusion
Dr. Lynford Goddard, University of Illinois at Urbana - Champaign

Hands on STEM Learning at Home with 3D-Printed Manipulatives

Eric Davishahl, Whatcom Community College
Dr. Lee Singleton, Whatcom Community College
Todd Haskell, Western Washington University
Mr. Liam G. O’Bannon, Whatcom Community College

Impact of COVID-19 Transition to Remote Learning on Engineering Self-efficacy and Outcome Expectations

Johanna Milord, University of Missouri - Columbia
Fan Yu, University of Missouri - Columbia
Dr. Sarah Lynn Orton P.E., University of Missouri - Columbia
Dr. Lisa Y. Flores, University of Missouri - Columbia
Rose M. Marra, University of Missouri - Columbia

Impact of Makerspaces on Student Idea Generation, Self-

Efficacy, and More: Results of a Five-year Longitudinal Study

Ms. Aliya Mahmud, Georgia Institute of Technology: IDREEM Lab
Timothy Sawchuk
Dr. Ethan Hilton, Louisiana Tech University
Dr. Robert L. Nagel, James Madison University
Dr. Julie S. Linsey, Georgia Institute of Technology

Impact of an I-Corps Site Program on Engineering Students at a Large Southwestern University: Year 4

Ms. Magdalini Z. Lagoudas, Texas A&M University
Dr. So Yoon Yoon, University of Cincinnati
Mr. Rodney Boehm, Texas A&M University
Ms. Hannah Wehlmann

Insights from Engineering a Community-Family Partnership Project

Dr. Amber Simpson, State University of New York at Binghamton
Dr. Adam V. Maltese, Indiana University Bloomington
Dr. Jing Yang, Indiana University Bloomington
Dr. Jungsun Kim, Indiana University Bloomington
Peter N. Knox, Binghamton University (State University of New York)
Dr. Soo Hyeon Kim, Indiana University-Purdue University Indianapolis
Dr. Nikeetha Farfan D’Souza, Indiana University Bloomington

Instruments Used to Capture Instructors’ Experiences During a Forced Move to Remote Instruction

Dr. Grace Panther, University of Nebraska - Lincoln
Prof. Heidi A. Diefes-Dux, University of Nebraska - Lincoln

Integrating Professional Mentorship with a 3D-Printing Curriculum to Help Rural Youth Forge STEM Career Connections

Miss Srinjita Bhaduri, University of Colorado Boulder
Dr. L. Lee Biddy, University of Colorado Boulder
Melissa Rummel, University Corporation for Atmospheric Research
Dr. Jeffrey B. Bush, University of Colorado
Jennifer Jacobs, University of Colorado Boulder
Mimi Recker, Utah State University
Mr. John Daniel Ristvey Jr., University Corporation for Atmospheric Research
Dr. Alexandra Gendreau Chakarov, University of Colorado Boulder
Prof. Tamara Sumner Sumner, University of Colorado Boulder
2021 ASEE VIRTUAL CONFERENCE
THURSDAY, JULY 29th SESSIONS

Integration of Research-based Strategies and Instructional Design: Creating Significant Learning Experiences in a Chemistry Bridge Course
Dr. Adrian Villalta-Cerdas, Sam Houston State University
David E. Thompson Ph.D., Sam Houston State University
Mr. Steven L. Hegwood, Sam Houston State University

Internet of Things Education Project (IoTEP)
Prof. Gary J. Mullett, Springfield Technical Community College

Internship Prevalence and Factors Related to Participation
Dr. Sara A. Atwood, Elizabethtown College
Dr. Shannon Katherine Gilmartin, Stanford University
Ms. Anna M. Mostoller, Elizabethtown College
Dr. Helen L. Chen, Stanford University
Dr. Sheri Sheppard, Stanford University

Introducing Desirable Difficulty in Engineering Mathematics with Spaced Retrieval Practice
Dr. Campbell R. Bego, University of Louisville
Dr. Patricia A. Ralston, University of Louisville
Dr. Keith B. Lyle, University of Louisville
Dr. Jason Immekus, University of Louisville

Investigating Professional Shame as Experienced by Engineering Students Who are Minoritized in their Programs
Mrs. Mackenzie Claire Sharbine, Harding University
Dr. James L. Huff, Harding University
Dr. Nicola W. Sochacka, University of Georgia
Dr. Joachim Walther, University of Georgia

Is it Rocket Science or Brain Science? Developing an Approach to Measure Engineering Intuition
Dr. Elif Miskioglu, Bucknell University
Dr. Kaela M. Martin, Embry-Riddle Aeronautical University - Prescott
Dr. Adam R. Carberry, Arizona State University
Caroline Bolton, Bucknell University
Caitlyn Aaron

It’s a Context Gap, Not a Competency Gap: Understanding the Transition from Capstone Design to Industry
Dr. Marie C. Paretti, Virginia Polytechnic Institute and State University
Prof. Julie Dyke Ford, New Mexico Institute of Mining and Technology
Prof. Susannah Howe, Smith College
Dr. Daria A. Kotys-Schwartz, University of Colorado Boulder
Prof. Robin Ott, Virginia Polytechnic Institute and State University

Learning Experiences of Social Science Students in an Interdisciplinary Computing Minor
Dr. Valerie A. Carr, San Jose State University
Dr. Maureen C. Smith, San Jose State University
Dr. Belle Wei, San Jose State University
Mr. Morris E. Jones Jr., San Jose State University

Learning Trajectories Through Learning Making and Engineering, and Implications
Dr. Micah Lande, South Dakota School of Mines and Technology

Lessons Learned in an S-STEM Program: How to Improve Recruitment and Cohort Building
Jacqueline Gartner Ph.D., Campbell University
Dr. Michele Miller, Campbell University
Dr. Anastasia Marie Rynearson, Campbell University

Let’s Write About Impact!: Creating Persuasive Impact Statements to Disseminate and Propagate RED Research
Dr. Julia M. Williams, Rose-Hulman Institute of Technology
Dr. Cara Margherio, University of Washington
Dr. Eva Andrijcic, Rose-Hulman Institute of Technology
Dr. Elizabeth Litzler, University of Washington
Dr. Sriram Mohan, Rose-Hulman Institute of Technology
Dr. Edward J. Berger, Purdue University at West Lafayette (COE)
Kerice Doten-Snitker, University of Washington

Leveraging the U.S. Army JROTC Program to Increase the STEM Workforce Pipeline
Melissa Dean, STEMWorks, LLC
Dr. James Van Haneghan, STEMWorks, LLC
Dr. Susan Pruet, STEMWorks, LLC
Mr. James Duke, STEMWorks, LLC.

Lifting an LI, FG, and/or UR Support Program Off the Ground during COVID-19: Successes and Lessons Learned
Mr. Lenz Kaspar Bayas, Boise State University
Dr. Lisa A. Giacumo, Boise State University
Chantal Early, Boise State University
Kendra Rishell Peterson, Boise State University
Dr. Arvin Farid, Boise State University
Ms. Brieland McLaughlin, Boise State University
Dr. Donald Plumlee P.E., Boise State University
Dr. Mojtaba Sadegh, Boise State University
Dr. Tammi Vacha-Haase, Boise State University

**Making Teaching Matter More - The Making of a T1 University**

- Dr. Tara E. Prestholdt, University of Portland
- Dr. Heather Dillon, University of Washington Tacoma
- Dr. Eric Anctil, University of Portland
- Dr. Carolyn McCaffrey James, University of Portland
- Prof. Stephanie Anne Salomone, University of Portland
- Dr. Valerie J. Peterson, University of Portland

Dr. Carolyn McCaffrey James, University of Portland

**Mapping Trajectories of Researcher Development with Qualitative Longitudinal Analysis: An Executive Summary**

- Mrs. Renee Rigrish Pelan, Ohio State University
- Dr. Renee Desing, Ohio State University
- Dr. Rachel Louis Kajfez, Ohio State University
- Amber Dyche, Ohio State University

Dr. Elise Barrella P.E., DfX Consulting LLC

**Measuring Connections: Novel Methods and Findings**

- Dr. Mary Katherine Watson, The Citadel
- Dr. Robin Dawn Anderson, James Madison University

Dr. Elise Barrella P.E., DfX Consulting LLC

**Mentor-focused Professional Development for Investigators Initiating Discipline-based Educational Research (DBER) in Biomedical Engineering**

- Dr. Sharon Miller, Indiana University - Purdue University Indianapolis
- Dr. Steven Higbee, Indiana University - Purdue University Indianapolis

Dr. Elise Barrella P.E., DfX Consulting LLC

**Mentoring and Advising Students in an S-STEM Project: Strengths Training from a Social Justice Perspective in Engineering & Computer Science as Context – Initial Implementation**

- Dr. Jane L. Lehr, California Polytechnic State University, San Luis Obispo
- Dr. Daniel Almeida, California Polytechnic State University, San Luis Obispo
- Prof. Dominic J. Dal Bello, Allan Hancock College
- Mr. Jeff Jones P.E., Cuesta College
- Dr. Lizabeth L. Thompson, California Polytechnic State University, San Luis Obispo
- Eva Schiorring, StemEval
- Mr. Jamie Bettencourt, California Polytechnic State University, San Luis Obispo
- Dr. Fred W. DePiero, California Polytechnic State University, San Luis Obispo
- Montana Epps, California Polytechnic State University, San Luis Obispo

Dr. Elise Barrella P.E., DfX Consulting LLC

**Mobile, Hands-on Experiments Designed to Enhance Student Comprehension, Engagement, and Collaborative Learning**

- Dr. Aldo A. Ferri, Georgia Institute of Technology
- Dr. James I. Craig, Georgia Institute of Technology
- Dr. Bonnie H. Ferri, Georgia Institute of Technology

Dr. Elise Barrella P.E., DfX Consulting LLC

**Leveraging Changes in Engineering and Computer Science Curricula to Engender Inclusive Professional Identities in Students**

- Mr. Blaine Austin Pedersen, Texas A&M University
- Dr. Robin A.M. Hensel, West Virginia University
- Ms. Ssuma Ali Raisa, West Virginia University
- Dr. Rebecca A. Atadero, Colorado State University
Dr. A.M. Aramati Casper, Colorado State University
Dr. Ronald R. DeLyser, University of Denver
Dr. Christopher D. Griffin, West Virginia University
Dr. Scott T. Leutenegger, University of Denver
Dr. Melissa Lynn Morris, University of Nevada - Las Vegas
Dr. Christina Paguyo, University of Denver
Dr. Jody Paul, Metropolitan State University of Denver
Ms. Seoyeon Park, Texas A&M University
Dr. Karen E. Rambo-Hernandez, Texas A&M University
Dr. Breigh Nonte Roszelle, University of Denver

Multidimensional Linguistic Analysis of Multiple Undergraduate Writing Samples Collected from Engineering Students in Entry-level Laboratory Courses at Three Universities
Dr. Dave Kim, Washington State University-Vancouver
Dr. Matt Frye, Oregon Institute of Technology
Wendy Michelle Olson, Washington State University-Vancouver

NSF BEATS – Creating an Academic Innovation Ecosystem to Drive Student Success
Ms. Catherine E. Douglas, University of California, Los Angeles
Dr. Richard Wesel, University of California, Los Angeles
Scott Brandenberg, University of California, Los Angeles
Anabella Gonzalez

NSF Data Science Program with Career Support and Connections to Industry
Dr. Carol Shubin, California State University Northridge

NSF: Integrative Manufacturing and Production Engineering Education Leveraging Data Science Program (IMPEL)
Prof. Mohsen Moghaddam, Northeastern University
Dr. Jacqueline A. Isaacs, Northeastern University
Dr. Sagar Kamarthi, Northeastern University
Prof. Martin Storksdieck, Oregon State University
Dr. Kemi Jona, Northeastern University
Prof. Xiaoning Jin, Northeastern University

Near-Peer Mentoring and Early Exposure to Computer Science – Quantitative and Qualitative Results
David Hartenstine, Western Washington University
Perry Fizzano, Western Washington University
Dr. Joseph Arthur Brobst, Old Dominion University
Dr. Joanna K. Garner, Old Dominion University

Optimizing Design Experiences for Future Engineers in a Chemistry Laboratory
Lorelie Imperial, University of Florida
Mr. Corey Payne
Dr. Kent J. Crippen, University of Florida
Dr. Maria Korolev, University of Florida
Prof. Philip J. Brucat, University of Florida
Prof. Chang-Yu Wu, University of Florida

Pandemic Pivots: The Successful Transition of an NSF Research Internship to an Online Format
Nicole Evans McIntyre, University of California, Berkeley
Dr. Catherine T. Amelink, Virginia Polytechnic Institute and State University

Partnering Middle School Teachers, Industry, and Academia to Bring Engineering to the Science Classroom
Dr. Cheryl Carrico P.E., E4S, LLC
Dr. Jacob R. Grohs, Virginia Polytechnic Institute and State University
Dr. Holly M. Matusovich, Virginia Polytechnic Institute and State University
Dr. Gary R. Kirk, Virginia Polytechnic Institute and State University
Ms. Holly Larson Lesko, Virginia Polytechnic Institute and State University
Ms. Justine E. Brantley, Virginia Polytechnic Institute and State University
Malle R. Schilling, Virginia Polytechnic Institute and State University

Peer Mentoring in an Interdisciplinary Computer Science Training Program: Mentor and Student Perspectives and Lessons Learned
Prof. Anagha Kulkarni, San Francisco State University
Prof. Shasta Ihorn, San Francisco State University
Carol E. Tate, SRI International
Dr. Jennifer Nelson, San Francisco State University
Dr. Nina Narayan Hosmane, San Francisco State University
Prof. Nicole Adelstein, San Francisco State University
Dr. Pleuni S. Pennings, San Francisco State University
Mr. Torey D. Jacques, San Francisco State University
Prof. Ilmi Yoon, San Francisco State University

Peer-Led Team Learning in Introductory Engineering Courses: An Analysis of an Interventional Method of Support for Underrepresented Students at a Two-year, Hispanic-serving Public Institution
Dr. Kimberly A. Luthi, Embry-Riddle Aeronautical University - Worldwide
Dr. Lisa Macon, Valencia College
Dr. Mohua Kar, Valencia College

**Powerful Change Attends to Power Relations**
Dr. Susannah C. Davis, University of New Mexico
Dr. Nadia N. Kellam, Arizona State University
Dr. Vanessa Svhila, University of New Mexico
Mr. Bala vignesh Sundaram, Arizona State University, Polytechnic campus
Mr. Jemal Bedane Halkiyo, Arizona State University
Jasmine Desiderio, University of New Mexico

**Preliminary Themes about Engineering Identity and Community Developed from Longitudinal Interviews**
Shaylin Williams, Mississippi State University
Abigail M. Clark, Ohio State University
Anastasia Nicole Doty, Ohio State University
Dr. Rachel Louis Kajfez, Ohio State University
Dr. Mahnas Jean Mohammadi-Aragh, Mississippi State University

**Preparing Future Engineers Through Project-Based Learning**
Prof. Mark Wong, Contra Costa College
Sergio Alexander Alvarez, Contra Costa College
Mr. Jonathan Alexander Canel, Contra Costa College
Mr. Phiroze Jhalman Duggal
Ms. Yesenia Rodriguez Moreno
Daven Ng
Miss Nathalie Zaldivar
Dr. Chao Liu, Contra Costa College
Mr. Jeff Kamalian, Contra Costa College
Dr. Seti Sidharta, Contra Costa College

**Progress in the Nationwide Dissemination and Assessment of Low-Cost Desktop Learning Modules and Adaptation of Pedagogy to a Virtual Era**
Prof. Bernard J. Van Wie, Washington State University
Dr. Kristin Nicole Bryant, Washington State University
Mrs. Olivia Reynolds, Washington State University
Kitana Kaiphanliam, Washington State University
Aminul Islam Khan, Washington State University
Olufunso Oje, Washington State University
Dr. Prashanta Dutta, Washington State University
Dr. Olusola Adesope, Washington State University
Jacqueline Gartner Ph.D., Campbell University
David B. Thiessen, Washington State University

**Students Through Curricular Improvements in First-year Mathematics Courses**
Dr. Darlene M. Olsen, Norwich University
Dr. Alicia Dawn Beth, Landmark College
Dr. Michelle Batchelder Burd
Dr. Christine Latulippe, Norwich University
Joe Latulippe, Norwich University

**Real Data and Application-based Interactive Modules for Data Science Education in Engineering**
Mr. Kerul Suthar, Auburn University
Mr. Thomas Mitchell
Anna Claire Hartwig, Auburn University
Dr. Jin Wang, Auburn University
Prof. Shiwen Mao, Auburn University
Laura Parson, North Dakota State University
Dr. Peng Zeng, Auburn University
Dr. Bo Liu
Dr. Peter He, Auburn University

**Redesigning Engineering Education for Neurodiversity: New Standards for Inclusive Courses**
Dr. Maria Chrysochoou, University of Connecticut
Dr. Arash E. Zagh, University of Connecticut
Ms. Connie Mosher Syharat, University of Connecticut
Dr. Sarira Motaref P.E., University of Connecticut
Prof. Shaana Jang P.E., University of Connecticut
Prof. Amvrossios Bagtzoglou, University of Connecticut
Ms. Caressa Adalia Wakeman, University of Connecticut

**Reimagining Energy Year 3: Reflections on a Course**
2021 ASEE VIRTUAL CONFERENCE
THURSDAY, JULY 29th SESSIONS

Offering
Prof. Gordon D. Hoople, University of San Diego
Dr. Diana Chen, University of San Diego
Dr. Joel Alejandro Mejia, University of San Diego
Dr. Laura Ann Gelles, University of Texas at Dallas
Dr. Susan M. Lord, University of San Diego

Reporting the Progress and Latest Status of an Ongoing S-STEM Project
Prof. Houshang Darabi, University of Illinois at Chicago
Rezvan Nazempour, University of Illinois at Chicago
Dr. Peter C. Nelson, University of Illinois at Chicago
Dr. Anthony E. Felder, University of Illinois at Chicago
Dr. Shanon Marie Reckinger, University of Illinois at Chicago
Prof. Didem Ozevin P.E., University of Illinois at Chicago
Dr. Renata A Revelo, University of Illinois at Chicago
Prof. Jeremiah Abiade, University of Illinois at Chicago
Dr. Betul Bilgin, University of Illinois at Chicago

Research Engineer Network: A Network Analysis of Graduate Student Relationships
Dr. Chrysafis Vogiatzis, University of Illinois at Urbana-Champaign
Dr. Stephanie Marie Teixeira-Poit, North Carolina A&T State University
Dr. Tobin N. Walton, North Carolina A&T State University
Dr. Grace Gowdy, North Carolina A&T State University
Dr. Bala Ram P.E., North Carolina A&T State University

Research Experience for Teachers: Teachers as Learners and Facilitators
Dr. Stephanie Philipp, University of Tennessee at Chattanooga
Dr. Olfa Nasraoui, University of Louisville
Dr. Jason Immekus, University of Louisville
Ms. Jody Zhong, University of Louisville

Revolution in CBEE: Connecting the Dots between Inclusivity and Learning
Dr. Milo Koretsky, Tufts University
Dr. Susan Bobbitt Nolen, University of Washington
Michelle Kay Bothwell, Oregon State University
Dr. Christine Kelly, Oregon State University
Dr. Susannah C. Davis, University of New Mexico
Dr. Devlin Montfort, Oregon State University

Successes and Lessons in Year 4 of an S-STEM Summer Sophomore Bridge during the COVID-19 Pandemic
Dr. Katie Evans, Louisiana Tech University
Dr. Mitzi Desselles, Louisiana Tech University
Dr. Marisa K. Orr, Clemson University

S-STEM: Creating Retention and Engagement for Academically Talented Engineers
Dr. Indira Chatterjee, University of Nevada, Reno
Miss Kelsey Scalaro, University of Nevada, Reno
Dr. Ann-Marie Vollstedt, University of Nevada, Reno
Dr. Jeffrey C. LaCombe, University of Nevada, Reno
Dr. Julia M. Williams, Rose-Hulman Institute of Technology
Dr. Adam Kirn, University of Nevada, Reno

Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) Engineering Scholars Program at a Two-Year College: Preliminary Interventions and Outcomes
Dr. Elizabeth A. Adams, Fresno City College
Dr. Carol Haden, Magnolia Consulting, LLC
Dr. Claire L. A. Danez, Clemson University
Dr. Yushin Ahn, California State University at Fresno
Karen Willis, Fresno City College

STEM Learning & Resource Center (STELAR): Supporting Engineering Education within the NSF ITEST Program
Ms. Sarah M. MacGillivray, Education Development Center
Mrs. Clara McCurdy-Kirlis, Education Development Center

Streamlining the Path from Community College to Engineering Degree Completion
Dr. Christy Wheeler West, University of South Alabama
Dr. Eric J. Steward, University of South Alabama
Dr. Tom G. Thomas, University of South Alabama
Dr. Joseph D. Richardson, University of South Alabama

Student Impressions of Elements of a S-STEM Program
Dr. John R. Reisel P.E., University of Wisconsin - Milwaukee
Dr. Wilkistar Otieno, University of Wisconsin - Milwaukee
Christine Beimborn, University of Wisconsin - Milwaukee

Students' Transfer of First Law Concepts Across Engineering and Science Discipline-Specific Contexts
Dr. Alexander P. Parobek, Purdue University at West Lafayette (COS)
Mr. Patrick M. Chaffin, Purdue University at West Lafayette (COS)
Dr. Marcy H. Towns, Purdue University at West Lafayette (COS)

Summative Performance Evaluation of a 3-Year NSF-REU Site on Metrology & Inspection
Dr. Mathew Kuttolamadom, Texas A&M University
Dr. Jyhwen Wang, Texas A&M University
Dr. Marian S. Kennedy, Clemson University

Supporting Teachers to Implement Engineering Design Challenges using Sensor Technologies in a Remote Classroom Environment
Dr. Alexandra Gendreau Chakarov, University of Colorado Boulder
Dr. Jeffrey Bush, University of Colorado Boulder
Dr. Quentin Lee Biddy, University of Colorado Boulder
Ms. Jennifer Jacobs, University of Colorado Boulder
Mimi Recker, Utah State University
Prof. Tamara Summer, University of Colorado Boulder

Sustainable Bridges from Campus to Campus: The Creation and Conduct of Online Synchronous Summer Bridge Programs in 2020
Dr. Catherine L. Cohan, Pennsylvania State University
Dr. Lauren A. Griggs, University of Colorado Boulder
Dr. Ryan Scott Hassler, Pennsylvania State University
Mark William Johnson, Pennsylvania State University, Altoona Campus
Dr. Michael Kagan, Pennsylvania State University, Ogontz Campus
Dr. Peter J. Butler, Pennsylvania State University
Dr. Tonya L. Peeples, Pennsylvania State University

Systemic Transformation of Education Through Evidence-based Reform (STEER): Results and Lessons Learned
Dr. Robert L. Potter, University of South Florida
Dr. Gerry G. Meisels, University of South Florida
Prof. Peter Stiling, University of South Florida
Dr. Kevin Yee, University of South Florida
Dr. Ruth Mae Sears, University of South Florida
Dr. Catherine A. Beneteau, University of South Florida
Kelley G. Schuler, University of South Florida
Mr. Alberto Danny Camacho, Hillsborough Community College
Prof. Scott W. Campbell, University of South Florida

The AGEP Engineering Alliance: A Model to Advance Historically URM Postdoctoral Scholars and Early-Career Faculty in Engineering
Dr. Tammy Michelle McCoy, Georgia Institute of Technology
Dr. Comas Lamar Haynes, Georgia Tech Research Institute
C. Fred Higgs III, Rice University
Prof. Illya V. Hicks, Rice University
Dr. Clayton J. Clark II, Florida A&M University
Dr. Natalie Yolanda Arnett, FAMU-FSU College of Engineering
Dr. Sylvia L. Mendez, University of Colorado at Colorado Springs
Dr. Valerie Martin Conley, University of Colorado at Colorado Springs
Molly Stuhlsatz, BSCS Science Learning

The Agile Academic Enterprise
Dr. Timothy A. Wilson, Embry-Riddle Aeronautical University - Daytona Beach
Dr. Massood Towhidnejad, Embry-Riddle Aeronautical University - Daytona Beach
Dr. James J. Pembridge, Embry-Riddle Aeronautical University - Daytona Beach
Dr. Erin Elizabeth Bowen, Embry-Riddle Aeronautical University - Prescott
Dr. Omar Ochoa, Embry-Riddle Aeronautical University
Mr. Carlos Alberto Castro, Embry-Riddle Aeronautical University - Daytona Beach

The Early Research Scholars Program
Christine Alvarado, University of California, San Diego
Joe Hummel, University of Illinois at Chicago
Diba Mirza, University of California, Santa Barbara
Dr. Renata A. Revelo, University of Illinois at Chicago

The Endeavour S-STEM Program: A Multi-College Collaboration to Increase Engagement and Retention in STEM
Dr. Diana G. de la Rosa-Pohl, University of Houston
Dr. Catherine Horn, University of Houston

The Laboratory Practice of K-5 Teachers in an Engineering RET: Triangulating Perceptions and Experience
Dr. Kent J. Crippen, University of Florida
Ms. Gayle Nelson Evans, University of Florida
Prof. Chelsey Simmons, University of Florida

The SEECRS Scholar Academy at Whatcom Community College: Three Cohorts of S-STEM Scholarships Later
Eric Davishahl, Whatcom Community College
Prof. Tommaso Alessandro Vannelli, Whatcom Community College
Dr. Michael Jason Babcock, Whatcom Community College
Dr. Dan Hanley, Western Washington University

The SUMMIT-P Project: Transforming Undergraduate Mathematics Education to Support Partner Disciplines
Dr. Rosalyn Hobson Hargraves, Virginia Commonwealth University
Dr. Afroditia Vennie Filippas, Virginia Commonwealth University

Tinkering with Theoretical Objects: Designing Theories in...
2021 ASEE VIRTUAL CONFERENCE
THURSDAY, JULY 29th SESSIONS

All sessions are Pacific Daylight Time.

Schedule subject to change. Please go to https://2021asee.pathable.co/ for up-to-date information.

Scientific Inquiry
ShaKayla Moran, Boise State University
Dr. Leslie Atkins Elliott, Boise State University

Toward a Quantitative Engagement Monitor for STEM Education
Dr. Aly A. Farag, University of Louisville
Dr. Asem Ali, University of Louisville
Mr. Islam Alkabbany, University of Louisville
Dr. James Christopher Foreman, University of Louisville
Dr. Tom Trettter, University of Louisville
Dr. Marci S. DeCaro, University of Louisville
Dr. Nicholas Carl Hindy, University of Louisville

Uncovering Strategies to Improve Student Engagement and Enhance the Engineering Education Curriculum
Dr. Ekundayo Shittu, George Washington University
Mr. Dor Hirsh Bar Gai, George Washington University
Prof. Saniya LeBlanc, George Washington University
Dr. Erica Cuswortham, George Washington University
Annamaria Konya Tannon, George Washington University

Undergraduate Student Learning of Market-Driven Design Topics in a Third-Year Design Course
Dr. Steven Hoffenson, Stevens Institute of Technology (School of Systems & Enterprises)
Dr. Nicole P. Pitterson, Virginia Polytechnic Institute & State University
Jessica Rose Driscoll, Stevens Institute of Technology (School of Systems & Enterprises)

Undergraduates’ Perspectives on Readiness, Writing Transfer, and Effectiveness of Writing Instructions in Engineering Lab Report Writing
Dr. Sean St. Clair, Oregon Institute of Technology
Dr. Dave Kim, Washington State University-Vancouver
Dr. Charles Riley P.E., Oregon Institute of Technology

WySLICE - Integrating Computer Science throughout Existing K-12 Core Disciplinary Areas
Dr. Mike Borowczak, University of Wyoming
Dr. Andrea Carneal Burrows, University of Wyoming
Mr. Mason Johnson, University of Wyoming

Understanding Data Science Instruction in Multiple STEM Disciplines
Caitlin Snyder, Vanderbilt University
Mr. Dawit M. Asamen, North Carolina Agricultural and Technical State University
Mr. Mohammad Yunus Naseri, Virginia Polytechnic Institute and State University
Dr. Niroj Aryal, North Carolina Agricultural and Technical State University
Dr. Gautam Biswas, Vanderbilt University
Prof. Abhishek Dubey, Vanderbilt University
Dr. Erin Henrick, Vanderbilt University
Dr. Erin R. Hotchkiss, Virginia Polytechnic Institute and State University
Dr. Manoj K. Jha, North Carolina Agricultural and Technical State University
Dr. Steven X. Jiang, North Carolina Agricultural and Technical State University
Dr. Emily C. Kern
Dr. Vinod K. Lohani, Virginia Polytechnic Institute and State University
Dr. Landon Todd Marston, Virginia Polytechnic Institute and State University
Dr. Christopher P. Vanags, Vanderbilt University
Dr. Kang Xia, Virginia Polytechnic Institute and State University

Understanding the Impact of Institutional Supports on the Motivation, Belonging, Identity Development, and Persistence of Engineering Students
Dr. S. Patrick Walton, Michigan State University
Dr. Lisa Linnenbrink-Garcia, Michigan State University

Understanding the Potential of a Holistic Engineering Project Experience in the Advancement of the Professional Formation of Engineers
Dr. Kakan C. Dey, West Virginia University
Mr. Md Tawhidur Rahman, West Virginia University
Dr. V. Dimitra Pyrialakou, West Virginia University
Dr. David Martinelli, West Virginia University
Dr. Julia Daisy Fraustino, West Virginia University
John Deskins, West Virginia University
Dr. L. Christopher Plein, West Virginia University
Dr. Abhik Roy, West Virginia University
Dr. Karen E. Rambo-Hernandez, Texas A&M University

A University-designed Middle School Remote Summer Engineering Academy
Mrs. Zahraa Krayem Stuart, Stony Brook University
Dr. Monica Bugallo, Stony Brook University
Mrs. Kathleen Dinota, Stony Brook University
Mr. Hechuan Wang, Stony Brook University
Amanda Esposito, Stony Brook University

Update on the Role of Non-Cognitive and Affective (NCA)
Factors in Engineering and Computing Student Academic Performance

Christina Grigorian, California Polytechnic State University, San Luis Obispo
Michelle Kerfs, California Polytechnic State University, San Luis Obispo
Jocelyn Paula Gee, California Polytechnic State University, San Luis Obispo
Dr. James M. Widmann, California Polytechnic State University, San Luis Obispo
Dr. John Chen P.E., California Polytechnic State University, San Luis Obispo
Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo

Upskilling to Meet Cloud Talent Needs

Prof. Lawrence Eric Meyer Jr., Miami Dade College
Dr. Elodie Billionniere, Miami Dade College

Using Enhanced Professional Networks to Increase Overall Student Retention

Dr. Robert Merton Stwalley III P.E., Purdue University at West Lafayette (COE)
Dr. Carol S. Stwalley, Purdue University at West Lafayette (COE)
Ms. Virginia Lynn Booth-Womack, Purdue University at West Lafayette (COE)
Ms. Grace Lynn Baldwin, Purdue University at West Lafayette
Sarah LaRose, Purdue University at West Lafayette

Using Ethnography to Enhance Elementary Teachers’ Readiness to Teach Engineering

Dr. Rebekah J. Hammack, Montana State University
Dr. Nick Lux, Montana State University
Dr. Paul Gannon, Montana State University
Dr. Brock J. LaMeres, Montana State University

Virtual International Collaboration for Community College STEM Programs

Prof. Karen Wosczyna-Birch, CT College of Technology

When Am I (N)ever Going to Use This? How Engineers Use Algebra (NSF DRL)

Prof. Brooke Istas, Southern Methodist University
Dr. Candace Walkington, Southern Methodist University
Dr. Elizabeth Levy, Texas A&M University San Antonio
Dr. Matthew L. Bernacki, University of North Carolina - Chapel Hill
Min Wang, Southern Methodist University

Who’s Smarter? Beliefs about Smartness and Self-Identities Across Institutionalized Educational Pathways into Engineering

Amy Kramer P.E., Ohio State University
Mrs. Bailey Braaten, Ohio State University
Dr. Rachel Louis Kajfez, Ohio State University
Dr. Emily Dringenberg, Ohio State University

Work-focused Experiential Learning to Increase STEM Student Retention and Graduation at Two-year Hispanic-serving Institutions

Cynthia Kay Pickering, Arizona State University
Caroline VanIngen-Dunn, Arizona State University
Miss Maria A. Reyes, Phoenix College

Work in Progress: Social and Cultural Activities Integrated into an REU Site in the U.S. South

Dr. Todd Freeborn, University of Alabama
Dr. Memorie M. Gosa, University of Alabama

Understanding Context: Propagation and Effectiveness of the Concept Warehouse in Mechanical Engineering at Five Diverse Institutions and Beyond – Results from Year 2

Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo
Dr. Milo Koretsky, Tufts University
Prof. Dominic J. Dal Bello, Allan Hancock College
Dr. Susan Bobbitt Nolen, Oregon State University
Dr. Michael J. Prince, Bucknell University
Dr. Christopher Papadopoulos, University of Puerto Rico, Mayaguez Campus
Mr. Thomas W. Ekstedt, Oregon State University

R299A - SPONSORED SESSION: Advance your Research Agenda with Keysight - Presented by Keysight Technologies

9:45 A.M. - 10:25 A.M.

Speakers: Noah Schmitz, Keysight Technologies; Mr. Roger Benjamin Stancliff, Keysight Technologies

Most of the world’s top technology R&D companies utilize next generation hardware and software tools from Keysight. As a global leader in quantum computing, 6G wireless, e-mobility, cybersecurity, and AI, Keysight enables...
university researchers to push the frontiers of science and innovation. If you want to compete for new federal research grant funding from the NSF, DoD, and DoE, you need to have access to high performance instrumentation and metrology. Attend this session to learn about:

• New Keysight measurement solutions in quantum, mmWave, cyber, machine learning, and electric/autonomous vehicles
• Favorable pricing for higher education institutions
• Free application-focused training, tutorials, and educational resources
• How to promote your research centers through collaborative faculty spotlights and case studies on Keysight’s global marketing platform
• How to gain access to technical specialists in emerging fields of research who can help with selection and cost estimation of equipment for new grant proposals

R299B - SPONSORED SESSION: How to Write an Incredible LinkedIn Profile as an Engineering Student - Presented by Rubin

9:45 A.M. - 10:20 A.M.
Speaker: Mr. Danny Rubin, Rubin

Do you want to help your students create LinkedIn profiles that turn heads and lead to instant opportunities?

Don't miss this fast-paced virtual workshop led by Danny Rubin, founder of Rubin (leader in online curriculum for business communication skills—rubineducation.com). Danny will walk you through exercises that cover the LinkedIn professional headline (the title under your name), profile summary, experience section, LinkedIn invitation best practices, and more.

The Rubin company has provided LinkedIn profile lessons to top engineering students at Texas A&M, Michigan State, NYU, and other schools. Give your students an edge on LinkedIn and in the professional world with this can’t-miss session.

R299C - SPONSORED SESSION: Engineering zyVersions: Bringing Interactivity to Engineering Textbooks - Presented by zyBooks

9:45 A.M. - 10:25 A.M.
Speakers: Dr. Ryan Barlow, zyBooks, A Wiley Brand; Oscar Rios, zyBooks, A Wiley Brand; Yasaman Adibi, zyBooks

The increase in online delivery of engineering courses necessitates increased interactivity in engineering textbooks. Rather than creating new online textbooks from scratch, interactivity has been added to traditional print textbooks in the form of animations and learning questions. The purpose of the animations and learning questions is to clarify, add to, or replace the existing text, figures, or examples from the print textbook to promote student learning.


10:35 A.M. - 11:15 A.M.
Speakers: Mr. Dan Banach, Autodesk Inc.; Gaby Waldman-Fried, Autodesk Inc.

Autodesk’s Fusion 360 is the world’s first cloud-based 3D CAD, CAM, and CAE platform. This session will explore how to use Fusion 360 to teach design in a hybrid learning environment. Fusion 360 allows students to work virtually anywhere, with anyone.
R299E - SPONSORED SESSION: Low-Code Development: Turning Learners Into Makers - Presented by Siemens Digital Industries Software

10:35 A.M. - 11:15 A.M.

Speakers: Emma DiPrizio, Mendix; Dr. Carrie Saarinen, Mendix

Today’s students are looking for a hands-on Agile experience needed for successful technology and technology-adjacent careers. Join this session to hear how an enterprise Low-Code development platform empowers all learners to build web and mobile apps without coding skills.

R299F - SPONSORED SESSION: Improving Persistence in Spatial Visualization Training Through Automatic Grading of Student Sketches with the Spatial Vis Software - Presented by eGrove Education Inc.

10:35 A.M. - 11:15 A.M.

Speakers: Dr. Lelli Van Den Einde, University of California, San Diego; Dr. Nathan Delson, University of California, San Diego

Spatial visualization (SV) refers to the ability to manipulate geometric shapes in one’s mind. Studies have shown that SV skills are learnable and are key for success in STEM. Additionally, CAD/Design requires students to think in 3D, and freehand sketching of orthographics and isometrics is fundamental to improving SV skills and becoming proficient in CAD. SV skill training has been shown to be especially beneficial for women and other underrepresented minorities in STEM. The Spatial Vis software has been developed by eGrove Education to make SV training easier to teach and more engaging to learn through automatic grading and personalized feedback of students’ sketches.

A critical attribute of effective learning is persistence, where a student is challenged but continues to work on an assignment until achieving the correct solution. Classroom trials with the Spatial Vis™ software have shown that students who retry sketches on their own have increased gains on a standardized SV test (PSVT:R). Moreover, when the Spatial Vis™ software was modified to reward persistence, further student gains were achieved. The current software version allows instructors to identify students who would benefit from increased persistence. In addition, the latest feedback provides very small, personalized hints to elicit the productive struggle that is also tied to effective learning.

The Spatial Vis software has been used in the classroom since 2017. Over 3 million student sketches have been automatically graded and used to identify common student mistakes. This knowledge is incorporated into the Spatial Vis grading algorithm so that specific feedback is provided when a common mistake is made to further increase student engagement and persistence.

Participants in this technical session will learn about the benefits and best practices of using the Spatial Vis software in Intro to Engineering, Engineering Graphics, and summer bridge courses. The software now runs on any computer web browser as well as mobile iOS and Android devices. We will demo the software, discuss implementation of best practices, and introduce the Teacher Interface, whereby instructors specify assignments and track student performance. Participants will be given a free teacher license to use the software on their own phone, tablet, or computer.

R299G - SPONSORED SESSION: Simplifying Hands-on Learning of New Engineering Skills - Presented by Coursera

9:45 A.M. - 10:25 A.M.

Speakers: Akansha Singh, Coursera; Ayman Kotob, Coursera

Why does it remain a challenge for many engineering graduates to find a suitable job? COVID-19 accelerated the already rapid pace of technological disruption, driving the creation of new digital jobs, and changes in the skills required for success. How do you ensure your next graduating class of engineers will be equipped with the skills they need so that they are indeed workplace-ready
upon graduation? How can students get practical industry-level experience virtually? Join us to explore research on in-demand engineering skills and see how engineering departments are finding success in bringing those job-relevant skills to life online.

**R299H - SPONSORED SESSION:** Preparing Students for the FE Exam - Presented by Kaplan  
**10:35 A.M. - 11:15 A.M.**

**Speaker:** Jenny Sligh, PPI

Are your students prepared to pass the FE exam? In this session, you will learn how to implement a low-cost, highly effective FE exam training program with PPI's FE Prep University. Give your students the tools they need to pass their FE exam the first time!

**R299I - SPONSORED SESSION:** Presented by the Ohio State University  
**10:35 A.M. - 11:15 A.M.**

**Speaker:** Dr. Julie P. Martin, Ohio State University

Why do most first year students think BME is prosthetics? In this moderated open-mic discussion, we will examine the role that universities have in defining the discipline of biomedical engineering and projecting that definition to the scientific and general communities. We will also examine the impact of these existing perceptions on undergraduate BME recruitment and education.

**R301 - Aerospace Division Business Meeting**  
**11:30 A.M. - 1:00 P.M.**

**Sponsor:** Aerospace Division

**Moderators:** Michael Hatfield, University of Alaska Fairbanks; Sharan Asundi, Old Dominion University

Aerospace Division Business Meeting

**R304 - The Public Image of BME – Universities’ Role in Defining Perceptions and the Resulting Educational Impact**  
**11:30 A.M. - 1:00 P.M.**

**Sponsor:** Biomedical Engineering Division

**Moderators:** Aileen Huang-Saad, Northeastern University; Renata Ramos, Rice University

**Speakers:** Dr. Mary Staehle, Rowan University; Dr. Yanfen Li, University of Massachusetts Lowell; Dr. Yah-el Har-el, Temple University

The Donald Woods Lectureship Award for Lifetime Achievement in Chemical Engineering Pedagogy recognizes the outstanding achievement of an individual through improvements of lasting influence to chemical engineering education.
R306 - Best in 5 Minutes: Demonstrating Interactive Teaching Activities

11:30 A.M. - 1:00 P.M.

**Sponsor:** Civil Engineering Division

**Moderators:** Mary Watson, The Citadel; Charles Riley, Oregon Institute of Technology; Matthew Lovell, Rose-Hulman Institute of Technology; Steven Burian, University of Utah

Educators get five minutes to present their most effective classroom demonstrations and hands-on activities.

- **3D Printed Composite Body Illustrating Composite Body Centroid and Center of Gravity**
  - Dr. Timothy Aaron Wood, The Citadel

- **Five-minute Demo: Developing an Intuitive Understanding of Support Reactions Using an Interactive Teaching Activity**
  - Dr. Tonya Lynn Nilsson P.E., Santa Clara University

- **A Mechanics Race! An Exam Review Activity**
  - Dr. Anthony Battistini, Angelo State University

- **Home-based Cantilever Beam Experiment for Civil Engineering Undergraduate Students**
  - Ms. Sotonye Ikiriko, Morgan State University
  - Ayodeji B. Wemida
  - Dr. Steve Efe, Morgan State University
  - Dr. Mehdi Shokouhian, Morgan State University
  - Dr. Oludare Adegbola Owolabi P.E., Morgan State University
  - Dr. Jumoke ‘Kemi’ Ladeji-Osias, Morgan State University

- **Interactive Online Figures for the Core Concepts in Structural Steel Design**
  - Dr. Joel Lanning P.E., University of California, Irvine
  - Julia Badrya, University of California, Irvine

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R311 - Cooperative and Experiential Education Division Board Meeting - Part 2

11:30 A.M. - 1:00 P.M.

**Sponsor:** Cooperative and Experiential Education Division

**Moderators:** Katherine McConnell, University of Colorado Boulder; Robin Hammond, Arizona State University

Planning meeting for the Cooperative & Experiential Education Division Board

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R314A - “I Don’t Think I Like Your Tone…” Thinking About and Evaluating Tone During Peer Review

11:30 A.M. - 1:00 P.M.

**Sponsor:** Educational Research and Methods Division

**Moderators:** Stephanie Cutler, Pennsylvania State University; Kacey Beddoes, San Jose State University; Yu Xia, Pennsylvania State University

**Speakers:** Dr. Stephanie Cutler, Pennsylvania State University; Dr. Kacey Beddoes, San Jose State University; Ms. Yu Xia, Pennsylvania State University

Everyone in academia knows what it is like to feel the joy of FINALLY submitting that journal article you have been working on for months or even years. Many of us also know the soul-crushing defeat of receiving what feel like malicious reviews of that work. While few of us set out to write malicious reviews, a challenge arises when the author and reviewer perceive the tone of reviews differently.

As part of an NSF-funded project, Drs. Cutler and Beddoes have been exploring the peer-review experience of submitting to the Journal of Engineering Education (JEE). As part of this project, they collected documentation for multiple rounds of peer review. When analyzing this documentation, one of the challenges in evaluating the “tone” of the review was that members of the research team interpreted it differently. This highlighted an opportunity to facilitate a discussion within our field about what the “appropriate” tone for a review is. Many of the interview participants highlighted wanting to establish a constructive tone when writing a review but not feeling the same tone when receiving reviews. The aim for this session aimed at engineering education researchers (authors and reviewers) is to help create alignment between intentions and perceptions and to generate community standards for tone in reviews. Participants in this highly interactive session will review, evaluate, and rewrite actual review documentation to meet expectations relating to tone.
R314B - Undergraduate Students' Development of Computational and Programming Skills

11:30 A.M. - 1:00 P.M.

Sponsor: Educational Research and Methods Division

Moderators: Ashish Aggarwal, University of Florida; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

A Comparison of Novice Coders' Approaches to Reading Code: An Eye-tracking Study

Dr. Geoffrey L. Herman, University of Illinois at Urbana-Champaign
Sofia Meyers, University of Illinois at Urbana-Champaign
Miss Sarah-Elizabeth Deshaies

What's in a Linked List? A Phenomenographic Study of Data Structure Diagrams

Morgan M. Fong, University of Illinois, Urbana-Champaign
Seth Poulsen, University of Illinois at Urbana-Champaign
Dr. Geoffrey L. Herman, University of Illinois at Urbana-Champaign

Enhancing Engineering Students' Troubleshooting Skills

Dr. Bill M. Diong, Kennesaw State University
Dr. Craig A. Chin, Kennesaw State University
Dr. Sandip Das, Kennesaw State University
Dr. Ayse Tekes, Kennesaw State University
Dr. Walter Thain, Kennesaw State University

A Characterization of Engineering and Computer Science Undergraduate Participation in High-impact Educational Practices at Two Western Land-grant Institutions

Dr. Angela Minichiello P.E., Utah State University
Mr. Muhammad Asghar P.E., Utah State University
Ebenezer Ewumi, Washington State University
Dr. Candis S. Claiborn, Washington State University
Dr. Oluwaseun Adekunle, Washington State University

A Two-step Model for the Interpretation of Meaningful Recognition

Miss Kelsey Scalaro, University of Nevada, Reno
Ms. Indira Chatterjee, University of Nevada, Reno
Dr. Ann-Marie Vollstedt, University of Nevada, Reno
Dr. Jeffrey C. LaCombe, University of Nevada, Reno
Dr. Adam Kirn, University of Nevada, Reno


Dr. Tajmilur Rahman, Gannon University
Dr. Stephen T. Frezza, Gannon University

R314C - Undergraduate Students' Professional Skills and Reflection

11:30 A.M. - 1:00 P.M.

Sponsor: Educational Research and Methods Division

Moderators: Patrick Cunningham, Rose-Hulman Institute of Technology; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Use of Scrum in a Virtual Environment to Enhance Collaboration and Systemic Reasoning of Engineering Students

Dr. Gibrán Sayeg-Sánchez, Tecnologico de Monterrey
Prof. E. G. Avilés-Rabanales, Tecnologico de Monterrey
Prof. Miguel X. Rodríguez-Paz, Tecnologico de Monterrey

Writing-enriched Engineering Courses

Prof. Abolfazl Amin, Utah Valley University
Dr. Abdennour C. Seibi, Utah Valley University
Dr. Israd Hakim Jaafar, Utah Valley University

Building Computational, Social, Emotional Learning Skills into Undergraduate Computing Education Through Student-led Coding Camps

Dr. Gloria Washington, Howard University
Dr. Marlon Mejias, University of North Carolina, Charlotte
Dr. Legand L. Burge III, Howard University

Engineering Student Perceptions of Their Generic Skills Competency: An Analysis of Differences Amongst Demographics

Dr. Virginia Charter, Oklahoma State University

Development and Implementation of Professional Communication Activities for Undergraduate Engineering Curricula Based upon Industry Expectations

Dr. Jacob Allen Cress P.E., University of Dayton
Dr. Patrick W. Thomas, University of Dayton

Engineering Problem Typology-based Reflection and Communication of Undergraduate Engineering Experiences: Professional Engineers’ Evaluation of Students’ Mock Interview Responses

Dr. Andrew Olewnik, University at Buffalo
Ms. Hala Alfadhli, University at Buffalo  
Mr. Lucas Wickham, University at Buffalo  
Ms. Ashley Cummings, University at Buffalo  
Dr. Randy Yerrick, Fresno State University  

“‘You Could Take ‘Social’ Out of Engineering and Be Just Fine”: An Exploration of Engineering Students’ Beliefs About the Social Aspects of Engineering Work  
Mr. Robert P. Loweth, University of Michigan  
Dr. Shanna R. Daly, University of Michigan  
Ms. Leah Paborsky, University of Michigan  
Dr. Sara L. Hoffman, University of Michigan  
Dr. Steve J. Skerlos, University of Michigan  

R314D - Engineering Education During the COVID-19 Pandemic  
11:30 A.M. - 1:00 P.M.  
Sponsor: Educational Research and Methods Division  
Moderators: Joni Lakin, University of Alabama; Kerrie Douglas, Purdue University at West Lafayette (COE)  

Strategies for Effective Engagement and Learning in the COVID-19 Environment  
Dr. Chadia A. Aji, Tuskegee University  
Dr. M. Javed Khan, Tuskegee University  

Guided Learning Sequences as an e-Learning Enhancer During COVID-19 Emergency Conditions  
Dr. Gibrán Sayeg-Sánchez, Tecnologico de Monterrey  
Prof. Miguel X. Rodriguez-Paz, Tecnologico de Monterrey  
Mr. Darinel Valencia-Marquez, Tecnologico de Monterrey  

The Effects of COVID-19 on Faculty in the College of Engineering at San Jose State University  
Dr. Patricia R. Backer, San Jose State University  
Dr. Laura E. Sullivan-Green, San Jose State University  
Dr. Maria Chierichetti, San Jose State University  
Prof. Liat Rosenfeld, San Jose State University  

Assessing the Impact of Transition from Face-to-Face to Online Instruction on Team Cooperation  
Ms. Aparajita Jaiswal, Purdue University, West Lafayette  
Dr. Paul J. Thomas, Purdue University, West Lafayette  
Dr. Tugba Karabiyik, Purdue University, West Lafayette  
Dr. Viranga Perera, Purdue University, West Lafayette  
Dr. Alejandra J. Magana, Purdue University, West Lafayette  

Impact of Course Modality on Student Course Evaluations  
Dr. Matthew Aldeman, Illinois State University  
Dr. Theodore J. Branoff, Illinois State University  

COVID-19 Effects on Higher Education: A Case Study  
Dr. Boshra Karimi, Northern Kentucky University  
Dr. Mahdi Yazdanpour, Northern Kentucky University  
Dr. Phil Lewis, Texas A&M University  

Strategies to Address Changes in Social Supports During the COVID-19 Pandemic  
Dr. Amanda Johnston, Purdue University, West Lafayette  
Dr. Kerrie A. Douglas, Purdue University, West Lafayette  
Dr. Julie P. Martin, Ohio State University  
Taylor Short, Ohio State University  

R316 - Energy and Environmental Education in the Midst of Misfortunes  
11:30 A.M. - 1:00 P.M.  
Sponsor: Energy Conversion and Conservation Division  
Moderator: Robert Kerestes, University of Pittsburgh  
Speakers: Dr. Veera Gnaneswar Gude P.E., Mississippi State University; Dr. Bala Maheswaran, Northeastern University; Dr. Tooran Emami, United States Coast Guard Academy; Dr. Ramanitharan Kandiah P.E., Central State University  

Panelists in this session will discuss the challenges and opportunities to advance energy and environmental engineering education, especially in the midst of outbreaks, natural disasters, and other social and economic injustices. This session will cover the following aspects:  
- Energy system innovation and education during epidemics and pandemics  
- Impact of energy system innovation and education in the midst of other misfortunes  
- Impact of the Internet of Things (IoT) and big data in energy and environmental systems  
- Environmental issues in implementing innovative energy systems  
- Envisioning resilient and sustainable energy systems for underrepresented communities
R318 - Teaching Engineering Graphics During COVID-19 and Beyond: Best Practices and Lessons Learned

11:30 A.M. - 1:00 P.M.

Sponsors: Engineering Design Graphics Division; Construction Engineering Division

Moderators: Lulu Sun, Embry-Riddle Aeronautical University - Daytona Beach; Magesh Chandramouli, Purdue University Northwest

Speakers: Dr. Theodore J. Branoff, Illinois State University; Dr. Molly H. Goldstein, University of Illinois at Urbana - Champaign; Ellyn Lester, Stevens Institute of Technology (School of Engineering and Science); Ms. Sahithya Reddivari, Georgia State University; Dr. Jaskirat Sodhi, New Jersey Institute of Technology; Dr. Heidi M. Steinhauer, Embry-Riddle Aeronautical University - Daytona Beach; Dr. Matthew Wettergreen, Rice University

The COVID-19 pandemic has challenged engineering educators to teach in a non-traditional teaching environment. This panel session will share the best practices and lessons learned during COVID-19 and how these can be used to advance engineering graphics education in the post-COVID scenario.

R320 - Engineers’ Experiences of Ethics in Practice: An Interactive Exploration With Six Personas

11:30 A.M. - 1:00 P.M.

Sponsors: Engineering Ethics Division; Liberal Education/Engineering & Society Division

Moderator: Alison Kerr, Purdue University at West Lafayette (PPI)

Speakers: Dr. Alison J. Kerr, Purdue University at West Lafayette (PPI); Dr. Andrew O. Brightman, Purdue University at West Lafayette (COE); Dr. Justin L. Hess, Purdue University at West Lafayette (COE); Dr. Nicholas D. Fila, Iowa State University of Science and Technology; Dr. Carla B. Zoltowski, Purdue University at West Lafayette (COE); Dr. Michael C. Loui, University of Illinois at Urbana - Champaign; Ms. Dayoung Kim, Purdue University at West Lafayette (COE); Ms. Athena Lin, Purdue University at West Lafayette (COE)

Understanding how engineers experience ethics in practice can support the alignment of engineering ethics education approaches and preparing engineers for professional ethical practice. Over the past three years, we have been conducting a phenomenographic study in order to capture, analyze, and map the qualitatively different ways in which engineers experience ethical engineering in practice in the health-products industry. We identified six ways of experiencing ethical engineering, referred to as “categories of description.” Variation between these categories included aspects such as perceived complexity of ethics, role of self, role of others, and role of the system. For this special session, we translated these categories into six “personas,” or fictional characters, which represent the essence of each of these six ways of experiencing ethical engineering. The objective is to help interested ethics educators better understand the ethical experiences and perspectives of practicing engineers. In this presentation, each researcher-panelist will embody a persona. The session will begin with a brief summary of the research methods and findings, followed by the panel presentation in which the personified characters will be asked about their perceptions of and experiences with ethics in their careers. Each panelist will respond to targeted questions about their understanding of ethical engineering and how it relates to their experiences in practice. Session participants will observe the variation in the ways that engineers experience ethical engineering in their careers and have the opportunity to discuss with their peers the potential implications for pedagogy and research in ethics education prompted by these perspectives and persona representations.

R320B - Critical Reflections on Engineering Ethics Education

11:30 A.M. - 1:00 P.M.

Sponsor: Engineering Ethics Division

Moderators: Luan Nguyen, Iowa State University of Science and Technology; Rockwell Clancy, Delft University of Technology

Engineering Existential Risks
Prof. Carl Mitcham, Colorado School of Mines

The Ultimate Goal of Ethics Education Should Be More Ethical Behaviors
Dr. Rockwell Franklin Clancy III, Delft University of Technology

STEM, Gender, Ethnicity, and Cyberbullying
Dr. Andrea Gammon, Delft University of Technology
Dr. Claire Lynne McCullough P.E., High Point University
Dr. Svetlana Chesser, Auburn University
Dr. Brian J. O’Leary, University of Tennessee at Chattanooga
Dr. Bart L. Weathington, WECO Solutions

High School STEM Teacher Perspectives on the Importance and Obstacles to Integrating Engineering Ethical Issues in Their Courses
Jake Walker Lewis
Dr. Angela R. Bielefeldt, University of Colorado Boulder

R321 - Engineering Libraries Division (ELD) Roundtable Discussions
11:30 A.M. - 1:00 P.M.
Sponsor: Engineering Libraries Division
Moderators: Amy Van Epps, Harvard University; Kari Kozak, University of Iowa; David Hubbard, Texas A&M University

Open discussion, held outside the ASEE virtual platform, for members to talk about current topics and issues facing engineering librarianship.
We will be using the CONGREGATE platform for our open roundtables based on topic suggestions on the Padlet before the sessions start. Participants will have the ability to add topics during the session based on hot topics that arise during the conference.

Please note: ELD members should check listservs or asee.org/eld to register for this event.

R322 - Engineering Management Division Technical Session 3
11:30 A.M. - 1:00 P.M.
Sponsor: Engineering Management Division
Moderators: John Richards, U.S. Army Corps of Engineers; Christopher Rowe, Vanderbilt University

Using a Deming Lens to Investigate and Solve Managerial Challenges
Dr. Mustafa Shraim, Ohio University
Mr. Kelly Allan, Kelly Allan Associates, Ltd.

Administering an Asynchronous Professional Master’s Degree: Effective Strategies for Design, Delivery, and Engagement
Dr. Jena Shafai Asgarpoor, University of Nebraska - Lincoln
Ms. Yaoling Wang, University of Nebraska - Lincoln

R323A - MET Department Heads
11:30 A.M. - 1:00 P.M.
Sponsor: Engineering Technology Division
Moderators: Christopher Leblanc, University of New Hampshire; Clay Gloster, North Carolina Agricultural and Technical State University

Annual meeting of mechanical engineering technology department heads

R323B - Engineering Technology Leadership Institute
11:30 A.M. - 1:00 P.M.
Sponsor: Engineering Technology Division
Moderators: Christopher Leblanc, University of New Hampshire; Clay Gloster, North Carolina Agricultural and Technical State University

ETLI business meeting and marketing discussion

R323C - New Directions for Engineering Technology
11:30 A.M. - 1:00 P.M.
Sponsor: Engineering Technology Division
Moderators: Anne Lucietto, Purdue University at West Lafayette (PPI); Christopher Leblanc, University of New Hampshire; Clay Gloster, North Carolina Agricultural and Technical State University

How Deep is Your Knowledge? Consideration to the Breadth and Depth of Knowledge of CAD/CAM in M3-powered Technology CTE Classes
Mr. Osazuwa John Okundaye Jr., Texas A&M University
Dr. Malini Natarajarathinam, Texas A&M University
Dr. Mathew Kuttolamadom, Texas A&M University
Prof. Francis Quek, Texas A&M University
Dr. Sharon Lynn Chu, University of Florida

**Impact of a Common Engineering First-year Experience on Enrollment and Recruiting in Engineering Technology**

Dr. Jay R. Porter, Texas A&M University
Dr. Michael D. Johnson, Texas A&M University
Dr. Andrea M. Ogilvie P.E., Texas A&M University
Mr. Christopher Cantrell, Texas A&M University

Mr. Yury Alexandrovich Kuleshov, Purdue University, West Lafayette
Miss Emily Rada, Purdue University, West Lafayette
Dr. Anne M. Lucietto, Purdue University, West Lafayette

**Minority Graduates in Engineering Technology: Trends in Choice of Major**

**Redesigned Electrical Circuit Lab Course to Face the Challenges of Remote Learning**

Dr. Chen Xu, New York City College of Technology
Dr. Ohbong Kwon, New York City College of Technology

Dr. Shaoping Qiu, Texas A&M University
Dr. Malini Natarajarathinam, Texas A&M University
Dr. Michael D. Johnson, Texas A&M University
Dr. Elizabeth A. Roumell, Texas A&M University

**The Future of Work: Identifying Future-ready Capabilities for the Industrial Distribution Workforce**

Dr. Shaoping Qiu, Texas A&M University
Dr. Malini Natarajarathinam, Texas A&M University
Dr. Michael D. Johnson, Texas A&M University
Dr. Elizabeth A. Roumell, Texas A&M University

Onyinyechi Nwadiuto Agu, University of New Haven
Erica Maggiore, University of New Haven

**Introducing Entrepreneurship and Innovation in a Design Course**

Dr. Jaby Mohammed, Illinois State University

**Using Rapid Prototyping to Realize Design: Mindset and Engineering Self-Efficacy**

Dr. Andrea T. Kwaczala, Western New England University
Prof. Robert Gettens, Western New England University
Dr. Denine A Northrup, Western New England University

**Students’ Self-Perception of Their Entrepreneurial Characteristics**

Miss Vibhavari Vempala, University of Michigan
Mr. Jacob Frederick Fuher, University of Michigan
Ms. Heydi L. Dominguez, New Jersey Institute of Technology
Mr. Jeremiah Ogunbunmi, New Jersey Institute of Technology
Dr. Aileen Huang-Saad, Northeastern University
Dr. Prateek Shekhar, New Jersey Institute of Technology

**Virtual Elevator Pitch: Disruption or Opportunity?**

Mrs. Sandra Furnbach Clavijo P.E., Stevens Institute of Technology (School of Engineering and Science)
Dr. Kishore Pochiraju, Stevens Institute of Technology (School of Engineering and Science)

**R324 - Entrepreneurship & Engineering Innovation Division Technical Session 7**

11:30 A.M. - 1:00 P.M.

**Sponsor: Entrepreneurship & Engineering Innovation Division**

Moderator: Prashanth Asuri, Santa Clara University

**A Virtual Internship Experience**

Mr. Rodney Boehm, Texas A&M University College of Engineering
Prof. Michael Beyerlein, Texas A&M University
Kiersten Potter, Student Engineers’ Council
Jiacheng Lu
Lori L. Moore, Texas A&M University

**How Well Can Makerspaces Build an Entrepreneurial Mindset?**

Dr. Stephanie M. Gillespie, University of New Haven

**R327 - First-Year Programs: Cornucopia**

11:30 A.M. - 1:00 P.M.

**Sponsor: First-Year Programs Division**

Moderators: Haritha Malladi, University of Delaware; Ruth Wertz, Valparaiso University; Kaitlin Mallouk, Rowan University; Timothy Hinds, Michigan State University

**Types of Models Identified by First-Year Engineering Students**

Dr. Kelsey Joy Rodgers, Embry-Riddle Aeronautical University-Daytona Beach
Dr. Angela Thompson P.E., University of Louisville
Dr. Matthew A. Verleger, Embry-Riddle Aeronautical University-Daytona Beach
Dr. Farshid Marbouti, San Jose State University
Mr. Nishith Shah
Pujan Thaker, Embry-Riddle Aeronautical University-Daytona Beach

**The Impact of Brief, Detached, Mandated Verbal**
Participation Activities on Student Learning Habits in an Introductory Course
Abigail E. Heinz, Rowan University
Matthew Strauss
Dr. Mary Staehle, Rowan University

“Mapping” the Landscape of First-Year Engineering Students’ Conceptualizations of Ethical Decision Making
Joshua Bourne Reed, Rowan University
Dr. Scott Streiner, Rowan University
Dr. Daniel D. Burkey, University of Connecticut
Dr. Richard Tyler Cimino, New Jersey Institute of Technology
Dr. Jennifer Pascal, University of Connecticut
Prof. Michael F. Young, University of Connecticut

Scaffolding Technical Writing Within a First-Year Engineering Lab Experience
Cassie Wallwey, Ohio State University
Tyler Milburn, Ohio State University
Brooke Morin, Ohio State University

R330 - Computing and Information Technology Division Business Meeting
11:30 A.M. - 1:00 P.M.
Sponsor: Computing and Information Technology Division
Moderators: Afsaneh Minaie, Utah Valley University; Mudasser Wyne, National University; Reza Sanati-Mehrizy, Utah Valley University

All interested members of the CIT Division are invited to this annual meeting, at which next year's officers are elected.

R331 - Instrumentation Division Business Meeting
11:30 A.M. - 1:00 P.M.
Sponsor: Instrumentation Division
Moderators: Herbert Hess, University of Idaho; Asad Yousuf, Savannah State University

In our annual business meeting of the Instrumentation Division, we will discuss division activities and bylaws. Our elections are biennial. The next election is 2022. Come and join us as we plan our next year in the Instrumentation Division.

R333 - Pre-College Engineering Education Division Business Meeting
11:30 A.M. - 1:00 P.M.
Sponsor: Pre-College Engineering Education Division
Moderators: Katey Shirey, EduKatey; Bradley Bowen, Virginia Polytechnic Institute and State University; Andrea Burrows, University of Wyoming; Manuel Figueroa, College of New Jersey; Rebekah Hammack

This is the business meeting for the Pre-College Engineering Education (PCEE) Division

R334 - Governance, Diplomacy, and International Comparisons in Engineering Education
11:30 A.M. - 1:00 P.M.
Sponsor: Liberal Education/Engineering & Society Division
Moderators: Atsushi Akera, Rensselaer Polytechnic Institute; Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University

ABET’s Maverick Evaluators and the Limits of Accreditation as a Mode of Governance in Engineering Education
Dr. Atsushi Akera, Rensselaer Polytechnic Institute
Sarah Appelhans, University at Albany-SUNY
Dr. Alan Cheville, Bucknell University
2021 ASEE VIRTUAL CONFERENCE
THURSDAY, JULY 29th SESSIONS

ALL SESSIONS ARE PACIFIC DAYLIGHT TIME

Thomas De Pree, Rensselaer Polytechnic Institute
Dr. Soheil Fatehiboroujeni, Cornell University
Dr. Jennifer Karlin, Minnesota State University, Mankato
Dr. Donna M. Riley, Purdue University at West Lafayette
Rafael Julián Burgos-Mirabal

Science Diplomacy: Results from a Three-Year Pilot
Dr. Daniel B. Oerther, Missouri University of Science and Technology

Visions of Engineers for the Future: A Comparison of American and Chinese Discourses on Engineering Education Innovation
Miss Yi Cao, Virginia Polytechnic Institute and State University
Mr. Xiaoye Ma, Tsinghua University
Dr. Jennifer M. Case, Virginia Polytechnic Institute and State University
Prof. Brent K. Jesiek, Purdue University at West Lafayette
Dr. David B. Knight, Virginia Polytechnic Institute and State University
Dr. William "Bill" C. Oakes, Purdue University at West Lafayette
Dr. Marie C. Paretti, Virginia Polytechnic Institute and State University
Dr. Xiaofeng Tang, Tsinghua University
Zheping Xie, Tsinghua University
Prof. Haiyan Zhao

Assessing ABET Student Outcome 5 (Teamwork) in BSME Capstone Design Projects
Dr. James A. Mynderse, Lawrence Technological University
Dr. Andrew L. Gerhart, Lawrence Technological University
Dr. Liping Liu, Lawrence Technological University

Development and Assessment of a Polymer Processing Learning Module
Dr. Michele Miller, Campbell University

Information Fluency Instruction as a Continuous Improvement Activity
Dr. William W. Tsai, California State University Maritime Academy
Ms. Amber Janssen, California State University Maritime Academy

Work in Progress: Student-Guided Project for Measurement System Development with ABET and EM Assessment
Dr. James A. Mynderse, Lawrence Technological University

R335 - Manufacturing Division Business Meeting
11:30 A.M. - 1:00 P.M.
Sponsor: Manufacturing Division
Moderators: Irina Ciobanescu Husanu, Drexel University; Yalcin Ertekin, Drexel University

The Mechanics Division executive committee will report out on their work in the past year. In addition, elections will be held for membership of the executive and various other committees. Come and get involved! Become a Mechanics Division member and join the fun!

R338 - Learn About Assessment
11:30 A.M. - 1:00 P.M.
Sponsor: Mechanical Engineering Division
Moderators: Rungun Nathan, Pennsylvania State University, Berks Campus; Thomas DeNucci, United States Coast Guard Academy; Dustyn Roberts, University of Pennsylvania

Papers related to assessment are presented in this session.

R341 - Multidisciplinary Endeavors: Mechatronics, Robotics, and Technology
11:30 A.M. - 1:00 P.M.
Sponsor: Multidisciplinary Engineering Division
Moderators: Cynthia Barnicki, Milwaukee School of Engineering; AJ Hamlin, Michigan Technological University; Nebojsa Sebastijanovic, Milwaukee School of Engineering; Jeffrey Phillips, Hanover College
The COVID-19 pandemic has altered best practices by which instructors can most effectively support student learning. Shifts in student expectations have further complicated the efforts of college teachers at all levels, from teaching assistants (TAs) to senior faculty, to meet the needs of students and facilitate educational excellence during hybrid and remote course offerings. When the COVID-19 pandemic passes and classes return to normal, it is unlikely that student expectations and instructional teaching patterns will simply revert back to pre-pandemic practices. Although the COVID-19 crisis has upset teaching, learning, and degree completion across the board in higher education institutions, it also has provided an opportunity to reflect on pre-pandemic practices and think about a future in teaching that leverages positive outcomes from instructional shifts resulting from the pandemic.

This special session presents comprehensive results from our research on academic support (TA support, faculty support, TA-student interactions, faculty-student interactions, peer support, and peer harassment) in both traditional, in-person classroom settings and remote learning settings assessed prior to as well as during the pandemic. Our goal is to facilitate strategic conversations about how to emerge from the pandemic as better teachers but to do so within realistic expectations of the time and energy that teachers have to dedicate to students. At the start of the COVID-19 crisis, teachers at many higher education institutions entered into unfamiliar hybrid and remote learning settings with a "hold nothing back" or shared sacrifice approach to supporting students through social isolation while upholding educational excellence. Many worked around the clock, seven days a week, at a moment's notice to convert in-person lesson plans to effective modes of teaching across Zoom and other virtual channels. While the massive effort involved in such an instructional shift is to be applauded, it is not sustainable.

The audience for this session is all educators, from TAs to senior faculty, who wish to better manage their teaching workload while remaining effective educators. Special emphasis will be placed on emerging faculty (TAs) and early career faculty who face particular challenges with mounting tenure and promotion pressures and ripple effects from the COVID-19 crisis. This special session will be led by the diverse members of our research team (a teaching faculty member, a research faculty member, two graduate researchers in engineering, and two graduate researchers

(Note: additional resources for this special session can be found at https://labs.ece.uw.edu/community/Covid19)
in education) and will alternate between brief presentations by our team and opportunities for attendees to discuss and strategize post-pandemic teaching strategies for improved and sustainable instruction support. Our goal is for every attendee to walk away from this special session with at least one new strategy for teaching that is likely to better meet student expectations in the post-COVID era, improve students' sense of academic support, and also allow for improved work-life balance.

R342B - Tools and Strategies for Teaching Online Courses
11:30 A.M. - 1:00 P.M.
Sponsor: New Engineering Educators Division
Moderators: Derek Breid, Saint Vincent College; Kerry Widder, Milwaukee School of Engineering; Ahmed Dallal, University of Pittsburgh; Matthew Ford, Cornell University

Competency-based Learning in “Aerospace Structures I” in an Online Environment – Work in Progress
Dr. Maria Chierichetti, San Jose State University
Nataliya Grigoryan, San Jose State University
Dr. Radha Aravamudhan, San Jose State University
Prof. Joseph Rodriguez, San Jose State University

Tools for Detecting Plagiarism in Online Exams
Dr. Edward F. Gehringer, North Carolina State University at Raleigh
Ashwini Menon
Ms. Guoyi Wang

Faculty Development and Instructional Design Through a Quality Matters Tool for Online and Hybrid Course Assessment
Dr. Alyson Grace Eggleston, The Citadel
Dr. Robert J. Rabb P.E., The Citadel

Redesigning a Large Enrollment Online Course Using a Learner-Centered Approach
Dr. John Alexander Mendoza-Garcia, University of Florida

R344 - Esteemed Panel on Ocean and Marine Engineering Student Competitions
11:30 A.M. - 1:00 P.M.
Sponsor: Ocean and Marine Engineering Division
Moderators: Lynn Albers, Hofstra University; Robert Kidd, State University of New York Maritime College
Speakers: Dr. Leigh S. McCue, George Mason University; Kelly Cooper, United States Navy; Michael Briscoe, American Society of Naval Engineers; Mr. Daryl Davidson, RoboNation, Inc; Dr. Steve Russell, ONR Sea Warfare and Weapons Department; Dr. Vukica M. Jovanovic, Old Dominion University

The OMED is honored to present a panel of speakers representing both sponsors and teams participating in various maritime-related STEM competitions. Join us for an informal discussion on creation and participation in these types of outreach and capstone experiences, as panelists discuss their respective program(s) and the impact on student learning, retention, and recruitment.

R351 - Women in Engineering Division Business Meeting
11:30 A.M. - 1:00 P.M.
Sponsor: Women in Engineering Division
Moderators: Kristi Shryock, Texas A&M University; Janet Callahan, Michigan Technological University; Idalis Villanueva, University of Florida

Annual business meeting of the Women in Engineering Division

R355 - Research Methods and Theories in Engineering Leadership Education
11:30 A.M. - 1:00 P.M.
Sponsor: Engineering Leadership Development Division
Moderators: Rebecca Komarek, University of Colorado Boulder; Cindy Rottmann, University of Toronto; Meagan Kendall, University of Texas at El Paso; Brian
Novoselich, United States Military Academy; David Nino, Massachusetts Institute of Technology

This special session will provide an overview of best practices for conducting research and scholarship on teaching and learning in engineering education. Within engineering leadership education specifically, many of the advancements made in recent years have been based on leveraging the wealth of prior knowledge and experience of engineers and leaders returning to academia to design and implement leadership programs. These leadership programs respond to the call from industry and governing bodies, such as ABET, to provide engineering graduates with an understanding of leadership principles and practices. But many of the origin stories of these programs, how they approach leadership development, the frameworks they use, and the efficacy of their approaches, have often remained institutional knowledge and not been broadly disseminated for a myriad of reasons. Therefore, this session is intended to bolster the efforts of faculty seeking to conduct research or scholarship on teaching and learning, and disseminate their innovations in engineering leadership education by providing an overview of best practices and approaches. Specifically, this session will include a roundtable discussion of topics related to study design, theoretical frameworks, ethics of human-subjects research, data collection and analysis, and communication of findings, emphasizing the expectations of the ASEE LEAD division. Following the roundtable discussion, facilitators will coach participants through the design of a study to assess a phenomenon of interest in their leadership program. As a result, both established and emerging researchers will contribute to advancing the engineering leadership education community’s ability to better respond to our students’ leadership development needs through a research-oriented focus on sharing best practices.

This session is sponsored by the ASEE Engineering Leadership Development (LEAD) Division and facilitated by members of the division and the program chair, program co-chair, and director of scholarly activities.

R357 - Faculty Development 4: COVID-19’s Impact on Students

11:30 A.M. - 1:00 P.M.

Sponsor: Faculty Development Division

This session focuses on the impact of COVID-19 on students. Traditional 12-minute presentations will be given, followed by three minutes of clarifying questions. The final 15-30 minutes will be for the group to synthesize major lessons learned, feedback for presenters, and future directions for faculty development. The audience will be engaged through polls, chats, and other features to make the session enjoyable for all.

Learning from the Student Experience: Impact of Shelter-in-Place on the Learning Experiences of Engineering Students at SJSU

Dr. Patricia R. Backer, San Jose State University
Dr. Maria Chierichetti, San Jose State University
Dr. Laura E. Sullivan-Green, San Jose State University
Prof. Liat Rosenfeld, San Jose State University

Evaluation of Teaching Through Online Tools and Canvas Learning-management System at Morgan State University

Dr. Celeste Chavis P.E., Morgan State University
Dr. Steve U. Efe, Morgan State University

Creating ACTIVE Learning in an Online Environment

Dr. Katie LeAnne Basinger, University of Florida
Miss Behshad Lahijanian, University of Florida
Dr. Michelle M. Alvarado, University of Florida
Mr. Diego Alvarado, University of Florida
Ariana Virginia Ortega

A Grounded Theory Analysis of COVID-19 Information and Resources Relayed Through University Web Pages: Implications for a More Inclusive Community

Dr. Sreyoshi Bhaduri, McGraw Hill
Dr. Lilianny Virguez, University of Florida
Dr. Debarati Basu, University of North Carolina at Charlotte
Dr. Michelle Soledad, Ohio State University

R359 - In Conversation: Making Space for More Than Race

11:30 A.M. - 1:00 P.M.

Sponsor: Equity, Culture & Social Justice in Education Division

Moderators: Walter C. Lee, Virginia Polytechnic Institute and State University; James Holly, Jr., Wayne State
University
Speakers: Dr. Lauren D. Thomas, IBM Research; Miss Fantasi Nicole, Purdue University at West Lafayette (COE); Dr. Christopher George Wright, Drexel University; Dr. James Holly, Jr., Wayne State University

This panel of invited scholars will have a community conversation among engineering educators about the ways in which our teaching and research practices continue to undermine and suppress Black-ness/people. As discussions of equity and social justice in engineering education (central to this division) increasingly pervade the discipline's mainstream discourse, Black students and educators must navigate the racial trauma resulting from a global pandemic and recycled proliferation of anti-Black violence in 2020. The agony brought on by these events are an addition to the ubiquitous racism within engineering and within America more broadly. Furthermore, being Black influences (and is influenced by) the ways other aspects of our identity manifest (e.g., spirituality/religiosity, gender, socioeconomic status) and the culture we bring to engineering is often ignored. Anti-Blackness, or anti-Black racism, is not widely discussed in engineering education scholarship, which necessitates further dialog to expound upon its significance and to inform the engineering education community about how to detach itself from a culture of teaching and research that censors the fullness of Blackness. We aim to instead build support for Black people bringing their whole selves to the engineering context.

As scholars within the higher education context, we understand research is essential to the educational infrastructure and plays a prominent role in driving curriculum, policy, and professional practice. Therefore, we situate this discussion as an examination of how engineering education researchers must reframe the problem of racial/ethnic exclusion and revolutionize the impetus and approach to equitable inquiry. As Black scholars, we assert our experiences and expertise as informative resources for acknowledging anti-Blackness in engineering education and generating a new way forward.

R360A - ASEE Annual Awards Ceremony Sponsored by the NSF America's Seed Fund
11:30 A.M. - 1:00 P.M.
Sponsor: ASEE Headquarters
Moderator: Sylvie Nguyen-Fawley, American Society for Engineering Education

R369 - Building a Research Scholarship Program
11:30 A.M. - 1:00 P.M.
Sponsor: Engineering Research Council
Moderator: Charles Bunting, Oklahoma State University

Research and scholarship are important responsibilities of engineering faculty and major considerations for tenure and promotion. Extramural funding is required to support faculty and graduate students in the pursuit of such new knowledge. The proposal process is extremely competitive and involves more than developing and submitting quality proposals. In this session, three invited panelists will make presentations addressing different aspects of this topic, including funding for educational research.
R377 - Collective Visioning for an Alternative Future for Engineering Education Centered on Care

11:30 A.M. - 1:00 P.M.

Sponsor: ASEE Committee on Diversity, Equity & Inclusion

Moderators: C. Lilley, University of Illinois at Chicago; Rachelle Reisberg, Northeastern University

Speakers: Dr. Ellen Foster, Purdue University at West Lafayette (COE); Dr. Donna M. Riley, Purdue University at West Lafayette (COE); Ms. Stephanie Quiles-Ramos, Virginia Polytechnic Institute and State University

As the COVID-19 pandemic progresses, this moment has brought to people’s attention the structural issues of academic capitalism, academic racism, and inequities that have long been reproduced by higher education in the United States. In response, this workshop asks, what would it mean to center collective care and dismantle hierarchies of power? We intend to examine these questions and establish modes of visioning for how the world could be otherwise via writing and ideation exercises.

R377B - Cultivating Inclusive Engineering Communities

11:30 A.M. - 1:00 P.M.

Sponsor: ASEE Committee on Diversity, Equity & Inclusion

Moderators: Jafar Al-Sharab, Northwestern State University of Louisiana; Rachelle Reisberg, Northeastern University

Speakers: Dr. Meagan C. Pollock, Engineer Inclusion; Ms. Brianna Shani Benedict, Purdue University at West Lafayette (PPI); Dr. Jeffrey W. Fergus P.E., Auburn University; Dr. Seyed Mohammad Seyed Ardakani; Ms. Hoda Ehsan, Georgia Institute of Technology

The Commission on Diversity, Equity, and Inclusion aims to empower those who wish to take a more active role in advocating DEI within their sphere of influence by facilitating opportunities to talk about issues and learn together. This session is a celebration and visioning gathering for those who wish to spend an uplifting hour networking and brainstorming with others who share their passion for equity and access in engineering!

R399B - SPONSORED SESSION: Invention to Impact - Presented by NSF ASF

11:30 A.M. - 12:10 P.M.

Speaker: Katie Bratlie, National Science Foundation

Innovation programs at the National Science Foundation (NSF) advance ideas from the laboratory to the marketplace to strengthen America’s economy, health, and security. The Division of Industrial Innovation and Partnerships (IIP) in the Engineering Directorate leads several programs to translate fundamental research into market solutions. IIP supports and trains researchers with promising technologies as well as funding high-tech start-ups. Learn about NSF’s central role in accelerating the growth of the national ecosystem and hear about specific funding opportunities.

R399A - SPONSORED SESSION: Reading Between the Lines: Advanced AI/ML Predictive Models for Engineering Program Success - Presented by EngineeringCAS

12:20 P.M. - 1:00 P.M.

Speaker: Andy Hannah, Othot

Looking for ways to improve undergraduate and graduate enrollment in your engineering program? How are you identifying “best-fit” students to ensure retention and success? As competition for students escalates, many institutions are struggling to find the answers but are still relying on outdated strategies like regression-based predictive models. Find out how advanced analytics—driven by artificial intelligence and machine learning—recalculates in real-time to:

• provide up-to-the-minute views into your enrollment and retention activity
• prescribe the appropriate actions and financial aid awards based on each individual’s profile
• maximize net tuition revenue from domestic and international students
This session will demonstrate the latest AI tools and how your institution can start to leverage advanced modeling to improve enrollment and student success in undergraduate and graduate engineering programs.

R360B - NETWORKING SESSION: Potpourri - Open Exchange
1:00 P.M. - 1:45 P.M.
Sponsor: ASEE Headquarters
Moderator: Nathan Kahl, American Society for Engineering Education

An Open Exchange Networking Session R360B - NETWORKING SESSION: Potpourri - Open Exchange 1:00 p.m. - 1:45 p.m. Sponsor: ASEE Headquarters Moderator: Nathan Kahl, American Society for Engineering Education An Open Exchange Networking Session

R411 - DISTINGUISHED LECTURE: Innovation Is Driving Business and Education Transformation
1:45 P.M. - 3:15 P.M.
Sponsors: Cooperative and Experiential Education Division; Ocean and Marine Engineering Division; Instrumentation Division; Manufacturing Division; Engineering Design Graphics Division; Multidisciplinary Engineering Division
Moderators: Katherine McConnell, University of Colorado Boulder; Robin Hammond, Arizona State University
Speaker: Stefan Jockusch, Siemens

In this talk, Dr. Stefan Jockusch, Vice President of Strategy for Siemens PLM Software, will talk about how technology innovation is changing business and the impact on society and education.

R414 - DISTINGUISHED LECTURE: Continuing the Conversation: Working Towards Anti-racist Engineering Education
1:45 P.M. - 3:15 P.M.
Sponsor: Educational Research and Methods Division
Moderators: Lisa Benson, Clemson University; Kerrie Douglas, Purdue University at West Lafayette (COE); Sarah Zappe, Pennsylvania State University
Speakers: Dr. Kelly J. Cross, University of Nevada, Reno; Dr. Leroy L. Long III, Embry-Riddle Aeronautical University - Daytona Beach; Dr. James Holly, Jr., Wayne State University; Dr. Ebony Omotola McGee, Vanderbilt University

Volume 109, Issue 4 of the Journal of Engineering Education highlights the work of engineering education scholars in guest editorials that address racism in engineering education history, curriculum, and research. Through the creation of that work, a recorded podcast conversation was conducted between these scholars: Dr. Kelly Cross, Dr. James Holly, Dr. Leroy Long, and Dr. Ebony McGee. This distinguished lecture continues that conversation and engages the broad audience of ASEE Annual Conference attendees.

R433 - DISTINGUISHED LECTURE: Creating Inclusive and Diverse P-12 Learning Environments
1:45 P.M. - 3:15 P.M.
Sponsors: Pre-College Engineering Education Division; Minorities in Engineering Division; Women in Engineering Division
Moderator: Jamie Gurganus, University of Maryland Baltimore County
Speaker: Dr. Renetta Garrison Tull, University of California Davis

As part of the distinguished lecturer series, the Pre-College Engineering Education Division has partnered with the Minorities in Engineering and Women in Engineering divisions to promote inclusion and diversity within the P-12 engineering education space by inviting a speaker with many accomplishments in this area.
Dr. Renetta Garrison Tull, the Vice Chancellor of Diversity, Equity, and Inclusion at the University of California, Davis, brings a wealth of knowledge and experience about inclusion and diversity in STEM education. In her distinguished lecture, she explains what we can do as an engineering education community to foster positive inclusion and diversity in different P-12 learning environments.

**R434 - DISTINGUISHED LECTURE: Engineering, Social Responsibility, and the Competing Accountabilities of Corporate Work: Lessons From the Field and Classroom**

1:45 P.M. - 3:15 P.M.

Sponsors: Liberal Education/Engineering & Society Division; Engineering Ethics Division; Community Engagement Division

Moderators: Juan Lucena, Colorado School of Mines; Amy Slaton, Drexel University

Speaker: Dr. Jessica Mary Smith, Colorado School of Mines

How is it that a group of professionals who all believe they are doing the “right thing” end up facilitating industrial development that can be judged as ethically suspect by others — and, at times, by themselves? Traditional answers to this question from engineers, as well as academics who think with them, call for protections for whistleblowing as a check on management directives and corporate power. In this vein, engineering students learn to use codes of ethics to reason through their responses to potential professional dilemmas that pit their professional social responsibility against the interests of their employers. Drawing on five years of ethnographic and educational research funded by the NSF’s Cultivating Cultures for Ethical STEM program, this talk proposes a new framework for conceptualizing engineers’ agencies and accountabilities in the context of corporate employment. Whereas the existing scholarship studies accountability through out-of-the-ordinary acts such as whistleblowing, ethics code building, or controversy management, anthropological research draws attention to engineers’ everyday efforts to reconcile competing domains of accountability and institutional divisions of labor as they engage in professional problem definition and solution. The talk will share the findings of educational research to show how this framework can serve as an engaging and effective platform for teaching engineering students about the inherent social responsibilities of their professional practice.

**R443 - ASEE Nominating Committee (will be held outside of the virtual meeting)**

1:15 P.M. - 3:15 P.M.

Sponsor: ASEE Board of Directors

ASEE Nominating Committee (by invitation only - Committee members will be sent login details.)

**R443B - DISTINGUISHED LECTURE: 2020 Best PIC and Zone Papers**

1:45 P.M. - 3:15 P.M.

Sponsor: ASEE Board of Directors

Moderator: Beth Holloway, Purdue University at West Lafayette (COE)

Best PIC and Zone paper winners from 2020

Please note: The OVERALL best PIC and Zone papers are presented at the Wednesday Plenary

**2020 BEST PIC I PAPER WINNER - Hands-On Cybersecurity Curriculum Using a Modular Training Kit**

Mr. Asmit De, Pennsylvania State University
Dr. Mohammad Nasim Imtiaz Khan
Mr. Abdullah Ash Saki
Mr. Md Mahabubul Alam
Mr. Taylor Steven Wood, Pennsylvania State University
Dr. Matthew Johnson, Pennsylvania State University
Mr. Manoj Varma Saripalli
Ms. Yu Xia, Pennsylvania State University
Dr. Stephanie Cutler, Pennsylvania State University
Swaroop Ghosh, Pennsylvania State University
Dr. Kathleen M. Hill
Dr. Ammarie Ward

**2020 BEST PIC II PAPER WINNER - Developing a Multi-Campus Model for REU Sites**
2021 ASEE VIRTUAL CONFERENCE
THURSDAY, JULY 29th SESSIONS

Dr. Pamela McLeod, Stanford University
Dr. Junko Munakata Marr, Colorado School of Mines
Prof. Richard G. Luthy, Stanford University

2020 BEST PIC IV PAPER WINNER - Student Perceptions of an Ethics Intervention - Exploration Across Three Course Types
Dr. Madeline Polmear, University of Florida
Dr. Angela R. Bielefeldt, University of Colorado Boulder
Dr. Nathan E. Canney
Dr. Chris Swan, Tufts University
Dr. Daniel Knight, University of Colorado Boulder

2020 BEST PIC V PAPER WINNER - Reimagining Engineering Education: Does Industry 4.0 Need Education 4.0?
Dr. Shuvra Das, University of Detroit Mercy
Dr. Darrell K. Kleinke P.E., University of Detroit Mercy
Dr. David Pistrui, University of Detroit Mercy

2020 BEST ZONE I PAPER WINNER - The Engineers' Orchestra: a Conductorless Orchestra for Developing 21st-Century Professional Skills
Dr. Diana S. Dabby, Franklin W. Olin College of Engineering

2020 BEST ZONE II PAPER WINNER - A New Assessment Model in Mechanics of Materials
Dr. Ron Averill, Michigan State University
Sara Roccabianca, Michigan State University
Dr. Geoffrey Recktenwald, Michigan State University

Dr. David Joseph Ewing, University of Texas at Arlington
Mrs. Catherine Mary Unite
Christina Natasha Miller
Mr. Cedric Shelby

Diversity and the Two-year College: Issues that two-year colleges face in creating a more diverse student population and the possible solutions to these issues.

The Path from Community College to Engineering Bachelor's Degree Through Partnerships and NSF S-STEM Funded Scholarships
Dr. A. Fort Gwinn, Lipscomb University
Dr. Todd Gary

Women In Engineering
Dr. Raymond Edward Floyd, Northwest College
Prof. Astrid K. Northrup P.E., Northwest College

Implementation of a Guided Mentorship Program in a STEM Community of Practice at a Two-Year College
Dr. Claire L. A. Dancz, Clemson University
Dr. Elizabeth A. Adams, Fresno City College
Dr. Carol Haden, Magnolia Consulting, LLC
Dr. Yushin Ahn
Karen Willis, Fresno City College
Deanna Craig, Clemson University

R460A - DISTINGUISHED LECTURE: Setting the Stage for P-12 Engineering Standards - How Our Community Can Revolutionize STEM Education for All Students
1:45 P.M. - 3:15 P.M.
Sponsor: ASEE Headquarters
Moderator: Geraldine Gooding, American Society for Engineering Education
Speaker: Dr. Tanner J. Huffman, College of New Jersey

STEM education in today’s schools comes in a variety of shapes and sizes. In many cases, STEM has drifted from its original intent to transform learning for all students and become just another buzzword to cover up a “business as usual” educational approach, bereft of the creative integration, innovation, and authentic, real-world student experiences that once defined its importance and urgency.

Engineering touches every aspect of human life, from providing access to clean drinking water to 5G telecommunications and drug/vaccine development. Now, more than ever, we must prepare and inspire our students
to grow into the informed designers, innovative creators, and engineering-literate global citizens necessary to solve the world’s toughest challenges today and in the future. Engineering learning is essential for every child, in every school, from every town, city, and municipality in the United States.

Engineering education is well positioned to deliver on many of the forgotten promises of STEM education. Many of us within the P-12 education community recognize that there is something special about engineering learning. When given the opportunity to engineer, students of a variety of ages and backgrounds are motivated to learn and eager to engage in solving difficult problems. They work together. They communicate. They are critical and creative and resourceful. We’ve seen it with our own eyes; experienced it as teachers and professional development coordinators; and advocated for it at parent/teacher nights, school board meetings, and legislative briefings. We KNOW that engineering should be taught in parallel with science and math education to ensure an equitable, authentic, relevant, and exciting STEM education experience. Yet, there have been minimal efforts from the education community toward adopting engineering as a distinct component of every child’s schooling. The Framework for P-12 Engineering Learning (AE3 and ASEE, 2020) is a step toward changing this reality and democratizing engineering learning across grades P-12.

This talk will argue that the Framework for P-12 Engineering Learning sets the stage for an educational revolution—one that sees engineering as a more integral part of a child’s learning through more authentic and comprehensive educational standards. Leverage points and groundwork necessary to realize this revolution will also be highlighted.

**Speaker: Dr. Barbara A. Oakley P.E., Oakland University**

Over the past decade, there has been a dramatic rush toward active learning as the best method to teach students. Certainly, active learning provides great value for students. But is all active learning, all the time, really the best way to teach, especially at a university level? What do evolutionary psychology and research involving high-impact teaching interventions have to say about active learning? Is active learning perhaps related to the procedural learning pathways involved in habit—is that where part of its value comes from? What is happening in students’ brains that makes certain interventions particularly effective—or less effective?

As it turns out, there are practical improvements that you could make right now in your teaching to improve student motivation, engagement, and learning, all growing from recent findings in neuroscience. We’ll be covering this, and much more, in this distinguished lecture based on Oakland University engineering educator Barbara Oakley's critically acclaimed new book, *Uncommon Sense Teaching*, (Penguin Random House, June 2021).

**R460C - DISTINGUISHED LECTURE: Rethinking Active Learning—Uncommon Sense Teaching in a Post-COVID, Neuroscientific World**

1:45 P.M. - 3:15 P.M.

**Sponsor: ASEE Headquarters**

**Moderator: Erin Steigerwalt, American Society for Engineering Education**

The George Floyd murder in May 2020 heralded a battle cry heard around the world. Academia saw the emergence of grassroots Black in STEM (science, technology, engineering, and mathematics) organizations whose members convened and communicated their expertise via social media. In June, this grassroots effort was catalyzed by the “BlackInTheIvory” hashtag trending on Twitter, where historically marginalized and minoritized...
populations in academia shared their experiences with implicit bias, marginalization, pioneerism, the double bind, hypervisibility, and invisibility.

Black engineering faculty responded to the “Black in X” movement by creating an arm of the 400-member Academic and Research Learning (ARL) Network called Black in Engineering (BIE), which focuses explicitly on racial equity and social justice in the STEM academy. By integrating media, policy, and activism, BIE offers a common gathering place for Black engineering faculty across disciplines to communicate and highlight their work, share experiences, and present anti-racism suggestions for engineering leadership, professional societies, and organizations. By amplifying these unique voices, BIE also meets a goal of diversifying the STEM academy by normalizing engineers’ experiences and work. Finally, it provides an avenue to connect with allies, sponsors, and financial support for the movement.

The combination of engineering, computing, and social justice provides an interdisciplinary perspective that is a unique and relevant skill for the engineer of the 21st century. Now is the time when the academy, as well as the world, is seeking comprehensive and transformational change, with engineers leading that challenge. Movements like Black Lives Matter have highlighted that structural as well as technical bias are at the heart of many racial justice issues (i.e., policing based upon biased data, infrastructure barriers to resources, water quality in historically minoritized communities, etc.). The future of modern engineering education is directly tied to how well the academy is able to adapt to meet the needs of an increasingly more diverse society.

This lecture will engage presenters in a candid discussion about practical strategies needed to transform engineering for Black faculty and students. Informed by BIE’s Call to Action, which provides anti-racism recommendations system-wide and for graduate students, undergraduate students, faculty, and staff, the panel will present practical, timely strategies to implement and sustain change for diversity, equity, and inclusion in engineering.

R499A - Innovations Worth Advancing: Big Ideas and Putting Them Into Action - Presented by the University of Maryland

1:45 P.M. - 3:15 P.M.

Moderator: Nathan Kahl, American Society for Engineering Education
Speakers: Dr. Amitava ’Babi’ Mitra, Massachusetts Institute of Technology; Dr. Rea Lavi, Massachusetts Institute of Technology; Dr. Charles W. Schwartz, University of Maryland College Park; Prof. Craig Zilles, University of Illinois at Urbana - Champaign; Dr. Stacy S. Klein-Gardner, Vanderbilt University; Mr. Ramsey Jabaji, University of Maryland College Park; Dr. Jennifer Keup, University of South Carolina

This session will explore innovations that engineering colleges have advanced in recent years to provide students with high-quality education, a meaningful college experience, and a broader professional outlook in a time of large-scale societal transition. It will focus on three types of such developments: the creation and rollout of new innovative curricula, assessment tools used to evaluate student design portfolios, and onboarding programs that strengthen community climate and culture. A panel of experts will provide an overview of the specific innovations to which they have contributed. Panelists and participants will then move into breakout rooms to dive deeper into these new areas of development and the challenges faced in adopting associated tools and practices. Participants will share their own experiences and insights as well as consider how they could promote similar positive change in engineering programs at their institutions.

R502 - Architectural Engineering Division Business Meeting

3:30 P.M. - 5:00 P.M.

Sponsor: Architectural Engineering Division
Moderator: John Phillips, Oklahoma State University

Join the members of the Architectural Engineering Division of ASEE for their annual business meeting - all are welcome. We will discuss the current state of the AE Division, announce future initiatives, and present awards for this year’s conference within our division.
R505 - Donald Woods Lectureship Award for Lifetime Achievement in Chemical Engineering Pedagogy: Taryn Bayles

3:30 P.M. - 5:00 P.M.

Sponsor: Chemical Engineering Division
Moderators: VJ Tocco; Ashlee Ford Versypt, University at Buffalo, the State University of New York
Speaker: Dr. Taryn Melkus Bayles, University of Pittsburgh

The Donald Woods Lectureship Award for Lifetime Achievement in Chemical Engineering Pedagogy recognizes the outstanding achievement of an individual through improvements of lasting influence to chemical engineering education.

R506 - Capitalizing on COVID: Using This Disruptor to Change the Educational Model

3:30 P.M. - 5:00 P.M.

Sponsor: Civil Engineering Division
Moderators: Sarah Christian, Carnegie Mellon University; Andrea Welker, Villanova University; Matthew Lovell, Rose-Hulman Institute of Technology; Steven Burian, University of Utah

This session covers lessons learned from the COVID-19 experience, including what programs should keep and what they should lose to improve courses or curricula.

An Insight into Students’ Feedback on Synchronous Distance Learning During the COVID-19 Lockdown
Dr. Amanda Bao P.E., Rochester Institute of Technology

Constructing Insights on Learning Analytic Student Activity Data from an Online Undergraduate Construction Management Course
Paige West, Virginia Polytechnic Institute and State University
Dr. Frederick Paige, Virginia Polytechnic Institute and State University
Dr. Natasha B. Watts, Virginia Polytechnic Institute and State University
Dr. Walter C. Lee, Virginia Polytechnic Institute and State University
Dr. Glenda R. Scales, Virginia Polytechnic Institute and State University

R511 - Cooperative and Experiential Education Division Technical Session 4

3:30 P.M. - 5:00 P.M.

Sponsor: Cooperative and Experiential Education Division
Moderators: Katherine McConnell, University of Colorado Boulder; Robin Hammond, Arizona State University

This session focuses on strategies for curriculum-integrated experiential learning. Following the paper presentations, participants will have an opportunity to both ask questions and join the presenters in breakout rooms to discuss their work.

Design-Based Research: Students Seeking Co-Op in Refined Educational Model
Dennis Rogalsky P.E., Minnesota State University, Mankato
Dr. Ronald Ulseth P.E., Iron Range Engineering
Dr. Bart M. Johnson, Itasca Community College

Student Perceptions of Connections Between an Introductory Dynamic Systems Class and Co-Op Work Experience

implementing a virtual surveying lab
Dr. John Tingerthal P.E., Northern Arizona University
Mr. Kaikea Kaoni, Northern Arizona University

Understanding Key Student Perspectives in an Interdisciplinary Flex-model Sustainability Course as Compared to a Traditional In-person Course
Dr. Tony Lee Kerzmann, University of Pittsburgh
Dr. David V.P. Sanchez, University of Pittsburgh
Claire P. Choinard, University of Pittsburgh

Shock to the System: How a Teaching and Learning Model Held up in a Global Pandemic
Jes Barron P.E., United States Military Academy
Col. Jakob C. Bruhl, United States Military Academy
Lt. Col. Brad C. McCoy, United States Military Academy
Dr. Brock E. Barry P.E., United States Military Academy
Dr. Rebecca Zifchock, United States Military Academy
Lt. Col. Margaret Nowicki, United States Military Academy
Lt. Col. James E. Bluman, United States Military Academy
Col. Brad Wambeke P.E., United States Military Academy
2021 ASEE VIRTUAL CONFERENCE
THURSDAY, JULY 29th SESSIONS

ALL SESSIONS ARE PACIFIC DAYLIGHT TIME

Dr. Diane L. Peters, Kettering University

Pivot to Remote Teaching of an Undergraduate Interdisciplinary Project-Based Program: Spring–Fall 2020
Dr. Amitava 'Babi' Mitra, Massachusetts Institute of Technology
Dr. Timothy Kassis, Massachusetts Institute of Technology
Dr. Yuan Lai, Massachusetts Institute of Technology
Mr. Justin A. Lavallee, Massachusetts Institute of Technology
Dr. Gregory L. Long Ph.D., Massachusetts Institute of Technology
Dr. Alice Nasto, Massachusetts Institute of Technology
Dr. M. Mehdi Salek, Massachusetts Institute of Technology
Dr. Rea Lavi, Massachusetts Institute of Technology
Rebecca Shepardson, Massachusetts Institute of Technology

Assessing and Communicating Professional Competency Development Through Experiential Learning
Dr. John H. Callewaert, University of Michigan
Dr. Joanna Mirecki Millunchick, University of Michigan
Cassandra Sue Ellen Woodcock, University of Michigan
Kevin Cai Jiang, University of Michigan

Dr. Amit Shashikant Jariwala, Georgia Institute of Technology
Nicholas Greenfield, Georgia Institute of Technology
Emily Orton, Georgia Institute of Technology
Mr. Rohan Banerjee, Georgia Institute of Technology

Student Recognition, Use, and Understanding of Engineering for One Planet Competencies and Outcomes in Project-based Learning
James Larson, Arizona State University
Wendy M. Barnard, Arizona State University
Dr. Adam R. Carberry, Arizona State University
Dr. Darshan Karwat, Arizona State University

Work in Progress: Exploration of Student Learning in Online Maker Communities
Danielle M. Saracino, Georgia Institute of Technology
Miss Kelly M. Sadel, James Madison University
Dr. Melissa Wood Aleman, James Madison University
Dr. Robert L. Nagel, James Madison University
Dr. Julie S. Linsey, Georgia Institute of Technology

R514 - Teaching In and Through Design, Maker Spaces, and Open-ended Problems
3:30 P.M. - 5:00 P.M.
Sponsor: Educational Research and Methods Division
Moderators: Micah Lande, South Dakota School of Mines and Technology; Kerrie Douglas, Purdue University at West Lafayette (COE)

Appraising Student Design Learning: Comparing Design Processes of First-year and Senior-year Engineering Students
Ms. Mycala Read, South Dakota School of Mines and Technology
Dr. Micah Lande, South Dakota School of Mines and Technology

Assessing the Impact of Engineering Problem Typology on Students’ Initial Problem-solving Trajectory
Dr. Andrew Olewnik, University at Buffalo
Dr. Randy Yerrick, Fresno State University
Mr. Manoj Madabhushi
Mr. Rachith Ramanathapura Ramaswamy, University at Buffalo

Design of a Comprehensive System to Benchmark Makerspaces

R514B - Research Methods and Studies on Engineering Education Research
3:30 P.M. - 5:00 P.M.
Sponsor: Educational Research and Methods Division
Moderators: Cijy Sunny, Baylor University; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Curriculum Design: Using the Five Discourses of Design Thinking
Javeed Kittur, Arizona State University
Mr. George K. Karway, Arizona State University
Mohammad Zaid Alrajhi, Arizona State University; King Saud University
Dr. Brian Carl Nelson, Arizona State University
Dr. Seungki Shin, Seoul National University of Education

Schedule subject to change. Please go to https://2021asee.pathable.co/ for up-to-date information.
Design Science in Engineering Education Research
Dr. Johanna Naukkarinen, Lappeenranta-Lahti University of Technology
Dr. Marja Talikka, Lappeenranta-Lahti University of Technology

Entering the Discipline of Engineering Education Research: A Thematic Analysis
Mr. Renato Alan Bezerra Rodrigues, University of Manitoba
Mr. Jeffrey Wayne Paul, University of Manitoba
Dr. Jillian Seniuk Cicek, University of Manitoba

Research Through Design: A Promising Methodology for Engineering Education
Kathryn Elizabeth Shroyer, University of Washington
Dr. Jennifer A. Turns, University of Washington

Using Natural Language Processing to Facilitate Student Feedback Analysis
Dr. Andrew Katz, Virginia Polytechnic Institute and State University
Matthew Norris, Virginia Polytechnic Institute and State University
Abdulrahman M. Alsharif, Virginia Polytechnic Institute and State University
Dr. Michelle D. Klopfer, Virginia Polytechnic Institute and State University
Dr. David B. Knight, Virginia Polytechnic Institute and State University
Dr. Jacob R. Grohs, Virginia Polytechnic Institute and State University

Using Design-based Research Methods to Scale in an Expanding Intervention
Dr. D. Matthew Boyer, Clemson University
Luke A. Duncan, Clemson University

The Relations between Ethical Reasoning and Moral Intuitions among Engineering Students in China
Dr. Rockwell Franklin Clancy III, Delft University of Technology

What Role do Civil Engineering Students See for their Profession in the COVID-19 Response?
Michaela Leigh LaPatin P.E., University of Texas at Austin
Dr. Cristina Poleacovschi, Iowa State University
Kate Padgett Walsh, Iowa State University of Science and Technology
Dr. Scott Grant Feinstein
Dr. Cassandra Rutherford, Iowa State University
Mr. Luan Minh Nguyen, Iowa State University
Dr. Kasey M. Faust, University of Texas at Austin
Liam Verses, University of Texas at Austin

Engineering Alumni Rate the Impact of Co-curricular Activities on their Ethical Development
Dr. Angela R. Bielefeldt, University of Colorado Boulder
Mr. Jake Walker Lewis, University of Colorado Boulder
Dr. Madeline Polmear, University of Florida
Dr. Daniel Knight, University of Colorado Boulder
Dr. Chris Swan, Tufts University

R520 - Moral Development and Ethics Assessment in Engineering
3:30 P.M. - 5:00 P.M.

Class Exercises Involving Ethical Issues Reinforce the Importance and Reach of Biomedical Engineering (and the Impact of the Coronavirus on Teaching Strategy and Measures of Assessment)
Dr. Charles J. Robinson, Clarkson University
Ms. Loretta Driskel, Clarkson University
Erin Blauvelt, Clarkson University
Ms. Laura Perry, Clarkson University

R521 - Engineering Libraries Division (ELD): Extended Executive Committee
3:30 P.M. - 5:00 P.M.

This meeting, held outside the ASEE virtual platform, is for all of the chairs of the various committees. Anyone is welcome to attend.

Please note: ELD members should check listservs or asee.org/eld to register for this event.
R524 - Entrepreneurship and Innovation Division Business Meeting

3:30 P.M. - 5:00 P.M.

Sponsor: Entrepreneurship & Engineering Innovation Division

Moderators: Prateek Shekhar, New Jersey Institute of Technology; Nassif Rayess, University of Detroit Mercy

Business meeting for Entrepreneurship and Innovation Division members

R530 - Computing and Information Technology Division Technical Session 8

3:30 P.M. - 5:00 P.M.

Sponsor: Computing and Information Technology Division

Moderators: Oludare Owolabi, Morgan State University; Reza Sanati-Mehrizy, Utah Valley University; Afsaneh Minaie, Utah Valley University

This session presents papers on a variety of topics pertaining to computing and information technology.

- Cracks in the Foundation: Issues with Diversity and the Hiring Process in Computing Fields
  Stephanie J. Lunn, Florida International University
  Dr. Monique S. Ross, Florida International University

- Positive Impact of an S-STEM Scholarship Program on Computer Science Students’ Academic Performance and Retention Rate
  Dr. Zhijiang Dong, Middle Tennessee State University
  Dr. Joshua Lee Phillips, Middle Tennessee State University
  Dr. Eric Oslund, Middle Tennessee State University
  Chrisila Pettey, Middle Tennessee State University
  Dr. Catherine E. Brawner, Research Triangle Educational Consultants

- Lab Performance Evaluation via a Workshop Survey
  Dr. Te-Shun Chou, East Carolina University
  Dr. Biwu Yang, East Carolina University

- Game Design in Computer Engineering Capstone Projects
  Dr. Afsaneh Minaie, Utah Valley University

- Design and Development of a 3D-printed Hexapod Robot
  Dr. Afsaneh Minaie, Utah Valley University
  Mr. Justin Limb
  Dr. Reza Sanati-Mehrizy, Utah Valley University

R543 - ASEE New Board Orientation

3:30 P.M. - 5:00 P.M.

Sponsor: ASEE Board of Directors

Held outside the virtual platform. Board members will be contacted directly with login information.

R544 - Ocean and Marine Engineering Division Business Meeting

3:30 P.M. - 5:00 P.M.

Sponsor: Ocean and Marine Division

Moderators: Lynn Albers, Hofstra University; Vukica Jovanovic, Old Dominion University; Robert Kidd, State University of New York Maritime College

R545 - Engineering Physics and Physics Division Business Meeting

3:30 P.M. - 5:00 P.M.

Sponsor: Engineering Physics and Physics Division

Moderators: Robert Ross, University of Detroit Mercy; Bala Maheswaran, Northeastern University
"Community engagement" is an umbrella term for service learning in engineering, humanitarian engineering, learning through service, community-based research, civically-engaged learners, technology-based social entrepreneurship, and more. Community organizations (either local or from abroad) partner with institutions of engineering education for the mutual benefit of communities and engineering students. Ideally, student teams and citizens work together via reciprocal partnerships for the shared purpose of completing community-identified projects aimed at increasing community assets.

Implementation of Sustainable Integrated Aquaculture, Aquaponic, and Hydroponic Systems for Egypt’s Western Desert Through Global Community Engaged Research
Lamyaa El-Gabry, Princeton University
Dr. Martina Sherin Jaskolski,

Engagement in Practice: Community Engagement Challenges for Food Supply-chain Engineering
Mrs. Pounah Abbasiyan, Texas A&M University
Dr. Malini Natarajarathinam, Texas A&M University
Dr. Sarah N. Gatson, Texas A&M University

Engineering Change: Addressing Need Through Collaborative Processes and Modest Means (A Case Study)
Mr. Scott Gerald Shall, Lawrence Technological University

Engineers Without Borders at a Community College: Lessons Learned
Callie Charleton
Miral Desai, California Polytechnic State University, San Luis Obispo
Ms. Carissa Elaine Noriega
Celeste Yi ming Soon Ramseyer
Ms. Elise Gooding
Michael S. Reyna
Dr. Lizabeth L. Thompson, California Polytechnic State University, San Luis Obispo

Dr. Jane L. Lehr, California Polytechnic State University, San Luis Obispo
Mr. Jeff Jones, Cuesta College

Role of Reflection in Service Learning-based Engineering Programs: A Cross-cultural Exploratory and Comparative Case Study in India and the United States
Mr. Srinivas Mohan Dustker, Purdue University, West Lafayette
Mr. Bandi Surendra Reddy, Hyderabad Institute of Technology and Management
Dr. Rohit Kandakatla, KLE Technological University
Prof. Gopalkrishna H. Joshi, KLE Technological University
Dr. William "Bill" C. Oakes, Purdue University, West Lafayette

The Latinx population is considered the largest and fastest-growing ethnic group in the United States. However, despite the progress made in Latinx student enrollment in higher education, retention and graduation rates for this population still are not on pace with other traditionally marginalized populations. The majority of Latinx students (62.3%) are enrolled in Hispanic-Serving Institutions (HSIs), which have considerably fewer resources when compared with predominantly white institutions (PWIs). Part of the problem is the sense of isolation that Latinx students and faculty have when working in predominantly white higher education institutions. For Latinx students and faculty, acquiring a community of cultural wealth requires the acquisition of different forms of capitals. In this panel we will focus on the navigational capital. The cultural knowledge nurtured among Latinx students and faculty who, despite distance and location, engender a
familia (family) creates connections and sense of belonging that positively influences their motivation to persist and succeed in learning and work environments where they are severely underrepresented. Similarly, understanding how to maneuver higher education institutions and develop networks of people and community can be positively impacted by starting a conversation with mentors that identify as Latinx. As part of our conversation, we plan to unpack what it means to be Latinx and a member of the Latinx community in the United States and the issues with how masquerading perpetuates the negative stereotypes around our community.

This panel session is designed for engineering educators interested in: (i) gaining an awareness about Latinx engineering faculty experiences, (ii) creating consciousness about the critical cultural assets Latinx engineering educators bring to their fields, and (iii) engendering an allyship with the Latinx community. Panelists will provide insights regarding their experiences as Latinx faculty members at different types of institutions, including their experiences in other countries, and discuss some of the challenges and opportunities associated with their Latinx identities when pursuing careers as engineering educators. The panel will provide highlights and facilitate a dialogue with the audience with the goal of uplifting those who contribute tremendously to the field of engineering education but whose voices and experiences rarely get recognition or opportunities to be “at the discussion table.”

### R577 - CDEI Roundtable Community Conversations

**3:30 P.M. - 5:00 P.M.**

**Sponsor:** ASEE Committee on Diversity, Equity & Inclusion

**Moderators:** Susan Walden, University of Oklahoma; Rachelle Reisberg, Northeastern University

**Speakers:** Dr. Elizabeth Litzler, University of Washington; Dr. Jeremi S. London, Virginia Polytechnic Institute and State University; Dr. Homero Murzi, Virginia Polytechnic Institute and State University

The ASEE Commission on Diversity, Equity, and Inclusion hosts any ASEE member wishing to discuss DEI topics in a community format. This year working groups will begin planning for Year of Impact on Racial Equity initiatives. One group may focus on continuing conversations from Distinguished Lecturers. Other topics are determined by those in the room.

### R643 - President's Farewell Reception

**5:15 P.M. - 6:15 P.M.**

**Sponsor:** ASEE Board of Directors

**Moderator:** Nathan Kahl, American Society for Engineering Education

**Speakers:** Dr. Sheryl A. Sorby, University of Cincinnati; Dr. Adrienne Minerick, Michigan Technological University; Dr. Jenna P. Carpenter, Campbell University

Join ASEE President Sheryl Sorby as she "passes the gavel" to incoming President Adrienne Minerick.

### R560 - ASEE 2022 Program Chair Orientation

**3:30 P.M. - 5:00 P.M.**

**Sponsor:** ASEE Headquarters

To be scheduled AFTER the conference; details will be sent directly to incoming program chairs.
## ABET Sponsored Sessions

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Session Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M679</td>
<td>ABET SESSION: Preparing for My Virtual ABET Accreditation Review in 2021 – 2022 ... Am I Ready?</td>
</tr>
<tr>
<td>T279</td>
<td>ABET SESSION: ABET Academic Advisory Council Listening Session: Ask Us Anything!</td>
</tr>
<tr>
<td>T679</td>
<td>ABET SESSION: Make an Impact on STEM Education and Support My Academic Program at the Same Time – Become an ABET Program Evaluator</td>
</tr>
</tbody>
</table>

## ASEE Board of Directors

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Session Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>S143</td>
<td>ASEE Long Range Planning Committee Meeting - held outside the virtual conference</td>
</tr>
<tr>
<td>U143A</td>
<td>ASEE Finance Committee Meeting - held outside the virtual conference</td>
</tr>
<tr>
<td>U143B</td>
<td>ASEE Executive Committee Meeting - held outside the virtual conference</td>
</tr>
<tr>
<td>M143</td>
<td>2020/2021 ASEE Board of Directors Meeting - held outside the virtual conference</td>
</tr>
<tr>
<td>M543</td>
<td>ASEE 101, Financial Town Hall &amp; General Body Meeting</td>
</tr>
<tr>
<td>T143</td>
<td>TUESDAY PLENARY Sponsored by Autodesk</td>
</tr>
<tr>
<td>R143</td>
<td>2021/2022 ASEE Board of Directors Meeting - held outside the virtual conference</td>
</tr>
<tr>
<td>R443</td>
<td>ASEE Nominating Committee - held outside the virtual conference</td>
</tr>
<tr>
<td>R443B</td>
<td>DISTINGUISHED LECTURE: 2020 Best PIC and Zone Papers</td>
</tr>
<tr>
<td>R543</td>
<td>ASEE New Board Orientation - held outside the virtual conference</td>
</tr>
<tr>
<td>R643</td>
<td>President's Farewell Reception</td>
</tr>
</tbody>
</table>

## ASEE Committee on Diversity, Equity & Inclusion

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Session Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M477</td>
<td>Safe Zone Ally Training - Level 1</td>
</tr>
<tr>
<td>M477B</td>
<td>Diversity, Equity, and Inclusion: 100</td>
</tr>
<tr>
<td>T277A</td>
<td>Best DEI Paper Award Finalists</td>
</tr>
<tr>
<td>T377</td>
<td>Understanding and Interrogating Racialized Power and Privilege in the STEM Classroom: An Anti-Racist Pedagogical Approach</td>
</tr>
<tr>
<td>T477</td>
<td>Diversity, Equity, and Inclusion: 200</td>
</tr>
<tr>
<td>T478</td>
<td>The Racial Pandemic: Engineering-Specific Problems and Solutions</td>
</tr>
<tr>
<td>T577</td>
<td>Safe Zone Ally Training - Level 2</td>
</tr>
<tr>
<td>W177</td>
<td>Student Panel: Understanding Queer Experiences in Engineering</td>
</tr>
<tr>
<td>W477</td>
<td>Community Organizing for the Year of Impact on Racial Equity</td>
</tr>
<tr>
<td>W577</td>
<td>Safe Zone Ally Training - Level 3</td>
</tr>
<tr>
<td>R177</td>
<td>Expanding the Accessibility of Mathematics Using PDFs: A Process-Driven Math Demo All Teachers Can Apply</td>
</tr>
<tr>
<td>R377</td>
<td>Collective Visioning for an Alternative Future for Engineering Education Centered on Care</td>
</tr>
<tr>
<td>R377B</td>
<td>Cultivating Inclusive Engineering Communities</td>
</tr>
<tr>
<td>R477A</td>
<td>DISTINGUISHED LECTURE: Black in Engineering: A Social Justice Movement for the Academy</td>
</tr>
<tr>
<td>R577</td>
<td>CDEI Roundtable Community Conversations</td>
</tr>
</tbody>
</table>

## ASEE Headquarters

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Session Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M360</td>
<td>GREET THE STARS! New Members and First-time Attendees Orientation</td>
</tr>
<tr>
<td>T260A</td>
<td>Accreditation of General Engineering Programs: History, Philosophy, and Current Trends</td>
</tr>
<tr>
<td>Time</td>
<td>Session Description</td>
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</tr>
<tr>
<td>T360</td>
<td>NETWORKING SESSION: ASEE Is Me</td>
</tr>
<tr>
<td>W160A</td>
<td>ASEE Fellows Networking Session (Fellows Only)</td>
</tr>
<tr>
<td>W360</td>
<td>NETWORKING SESSION: The Post-COVID Academic World - Lessons Learned from Lockdown</td>
</tr>
<tr>
<td>R360A</td>
<td>ASEE Annual Awards Ceremony Sponsored by the NSF America's Seed Fund</td>
</tr>
<tr>
<td>R360B</td>
<td>NETWORKING SESSION: Potpourri - Open Exchange</td>
</tr>
<tr>
<td>R460A</td>
<td>DISTINGUISHED LECTURE: Setting the Stage for P-12 Engineering Standards - How Our Community Can Revolutionize STEM Education for All Students</td>
</tr>
<tr>
<td>R460C</td>
<td>DISTINGUISHED LECTURE: Rethinking Active Learning—Uncommon Sense Teaching in a Post-COVID, Neuroscientific World</td>
</tr>
<tr>
<td>R560</td>
<td>ASEE 2022 Program Chair Orientation - scheduled for after the conference</td>
</tr>
</tbody>
</table>

**Architectural Engineering Division**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M402</td>
<td>Architectural Engineering Division Technical Session 1</td>
</tr>
<tr>
<td>M502</td>
<td>Architectural Engineering Division Technical Session 2</td>
</tr>
<tr>
<td>T209</td>
<td>Construction Engineering Division Technical Session 2</td>
</tr>
<tr>
<td>T409</td>
<td>Construction Engineering Division Technical Session 4</td>
</tr>
<tr>
<td>T509</td>
<td>Lessons Learned From the Pandemic: Looking Forward and Looking Back</td>
</tr>
<tr>
<td>W109</td>
<td>Construction Engineering Division Technical Session 1</td>
</tr>
<tr>
<td>W202</td>
<td>Architectural Engineering Division Poster Session</td>
</tr>
<tr>
<td>W402</td>
<td>Architectural Engineering Division Technical Session 3</td>
</tr>
<tr>
<td>W409</td>
<td>Construction Engineering Division Technical Session 5</td>
</tr>
<tr>
<td>W609</td>
<td>Construction Division Social</td>
</tr>
<tr>
<td>R502</td>
<td>Architectural Engineering Division Business Meeting</td>
</tr>
</tbody>
</table>

**Aerospace Division**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M201</td>
<td>MONDAY WORKSHOP: ASEE Satellite Workshop</td>
</tr>
<tr>
<td>M401</td>
<td>Aerospace Division Technical Session 1</td>
</tr>
<tr>
<td>T201</td>
<td>Aerospace Division Technical Session 3</td>
</tr>
<tr>
<td>T301</td>
<td>Aerospace Division Technical Session 2</td>
</tr>
<tr>
<td>T401</td>
<td>Aerospace Education in a Fiscally Constrained Environment</td>
</tr>
<tr>
<td>W401</td>
<td>Aerospace Division Technical Session 4</td>
</tr>
<tr>
<td>W501</td>
<td>Aerospace Division Technical Session 5</td>
</tr>
<tr>
<td>W701</td>
<td>Aerospace Division Social</td>
</tr>
<tr>
<td>R101</td>
<td>Aerospace Division Technical Session 6</td>
</tr>
<tr>
<td>R301</td>
<td>Aerospace Division Business Meeting</td>
</tr>
</tbody>
</table>

**Biological and Agricultural Engineering Division**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T303</td>
<td>How Can You Turn Quizzes into Meaningful Learning Experiences?</td>
</tr>
<tr>
<td>T403</td>
<td>Biological and Agricultural Engineering Division Technical Session 1</td>
</tr>
<tr>
<td>T503</td>
<td>Biological and Agricultural Engineering Division Technical Session 2</td>
</tr>
<tr>
<td>W103</td>
<td>Biological and Agricultural Engineering Division Business Meeting</td>
</tr>
</tbody>
</table>
Biomedical Engineering Division

M404 Biomedical Engineering Speed Networking
T204 Supporting Biomedical Engineering Students in Holistic Development
T404 Biomedical Engineering Postcard Session (Best of Works in Progress)
T704 Biomedical Engineering Division Social and Awards Dinner
W104 Publishing in BME Education
W204 Biomedical Engineering Division Poster Session (Works in Progress)
W404 Improving the BME Classroom on the Ground and Virtually
W504 Biomedical Engineering Business Meeting
R304 The Public Image of BME – Universities’ Role in Defining Perceptions and the Resulting Educational Impact

Undergraduate Engineers
W105 Chemical Engineering Pedagogy
W205 Chemical Engineering Division Poster Session
W405 Inclusion in Chemical Engineering: Reflections From the Conversation Series on Inclusion and Thriving
W505 Business and Professional Literacy Within Chemical Engineering
R105 Virtual Instruction of Chemical Engineering Courses
R305 Donald Woods Lectureship Award for Lifetime Achievement in Chemical Engineering Pedagogy: Milo Koretsky
R505 Donald Woods Lectureship Award for Lifetime Achievement in Chemical Engineering Pedagogy: Taryn Bayles

Civil Engineering Division

M406 Holy Cow! We’re Going Online When?
M506 Tech Tools and Tips
T206 Program Support Initiatives
T306 Supporting the Capstone Experience
T406 Development Around Diversity
T506 Project-based and Experiential Learning in Civil Engineering
T539 Hands-on Mechanics
W106 Civil Engineering Division Business Meeting
W106B Educational and Professional Issues of Strategic Importance to the Civil Engineering Profession and ASCE
W406 Supporting Successful Progression From First-year Studies
W506 Reassessing Your Teaching Through Turmoil
W606 Civil Engineering Annual Awards Banquet and RAP Session

Chemical Engineering Division

M405 Learning Outcomes and Assessment Within Chemical Engineering
M505 Experiential Learning in Chemical Engineering
T205 Works in Progress in Chemical Engineering Education
T305A Chemical Engineering Division Executive Committee Meeting
T305B Teaching Professional Skills in Chemical Engineering
T405 Chemical Engineering Division Business Meeting
T505 Promoting Mental Health and Wellness in Undergraduate Engineers

Campus Representatives

W463 Campus Rep Business Meeting

Chemical Engineering Division

M405 Learning Outcomes and Assessment Within Chemical Engineering
M505 Experiential Learning in Chemical Engineering
T205 Works in Progress in Chemical Engineering Education
T305A Chemical Engineering Division Executive Committee Meeting
T305B Teaching Professional Skills in Chemical Engineering
T405 Chemical Engineering Division Business Meeting
T505 Promoting Mental Health and Wellness in Undergraduate Engineers
2021 ASEE VIRTUAL CONFERENCE
ALL SESSIONS ARE PACIFIC DAYLIGHT TIME

SPONSOR GROUPS

R106A Industry and Practice Topics
R106B Civil Engineering Division Planning Meeting
R306 Best in 5 Minutes: Demonstrating Interactive Teaching Activities
R506 Capitalizing on COVID: Using This Disruptor to Change the Educational Model

College Industry Partnerships Division

M507 CIPD Board Meeting
T407 College Industry Partnerships Division Technical Session 1
T507 College Industry Partnerships Division Technical Session 2
W107 CIPD Business Meeting
W111 CIEC Social
W207 College Industry Partnerships Division Poster Session

Community Engagement Division

M452 Community Engagement Division Technical Session 6
T252 Community-Engaged Engineering Education Challenges and Opportunities in Light of COVID-19 Paper Presentations 2
T352 At the Crossroads of Community Engagement, Ethics, Liberal Education, and Social Responsibility: Community-Engaged Engineering Education Challenges and Opportunities in Light of COVID-19
T452 Community Engagement Division Technical Session 2
T752 Community Engagement Division Social
W152 Community-Engaged Engineering Education Challenges and Opportunities in Light of COVID-19 Paper Presentations 1
W452 What Are Crucial Barriers and Opportunities to Bring Our Whole Selves to Engineering Education? Moving Watermelons Together
W552 Community Engagement Division Business Meeting
R152 Community Engagement Division Technical Session 4
R434 DISTINGUISHED LECTURE: Engineering, Social Responsibility, and the Competing Accountabilities of Corporate Work: Lessons From the Field and Classroom
R552 Community Engagement Division Technical Session 5

Computers in Education Division

M408A Computers in Education 1 - Programming 1
M408B Computers in Education 2 - Programming 2
M508 Computers in Education 3 - Modulus I
T308 Computers in Education 4 - Online and Distributed Learning 1
T408 Computers in Education 5 - Online and Distributed Learning 2
T408B Computers in Education 6 - Best of CoED
T508 Computers in Education 7 - Modulus 2
T508B Computers in Education 8 - Video Technology
W108 Computers in Education 9 - Technology 1
W108B Computers in Education 10 - Technology 2
W508 Computers in Education (CoED) Business Meeting

Computing and Information Technology Division

M430 Computing and Information Technology
# 2021 ASEE Virtual Conference

**Sponsor Groups**

All sessions are Pacific Daylight Time.

### Construction Engineering Division

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M530</td>
<td>Computing and Information Technology Division Technical Session 1</td>
</tr>
<tr>
<td>T330</td>
<td>Computing and Information Technology Division Technical Session 2</td>
</tr>
<tr>
<td>T530</td>
<td>Computing and Information Technology Division Technical Session 3</td>
</tr>
<tr>
<td>W130</td>
<td>Computing and Information Technology Division Technical Session 4</td>
</tr>
<tr>
<td>W230</td>
<td>Computing and Information Technology Division Poster Session</td>
</tr>
<tr>
<td>W430</td>
<td>Computing and Information Technology Division Technical Session 5</td>
</tr>
<tr>
<td>W530</td>
<td>Computing and Information Technology Division Technical Session 6</td>
</tr>
<tr>
<td>R330</td>
<td>CIT Business Meeting</td>
</tr>
<tr>
<td>R530</td>
<td>Computing and Information Technology Division Technical Session 8</td>
</tr>
</tbody>
</table>

### Continuing Professional Development Division

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M410</td>
<td>CPDD Executive Board Meeting</td>
</tr>
<tr>
<td>T310</td>
<td>CPDD Networking Luncheon</td>
</tr>
<tr>
<td>T410</td>
<td>The Changing Face of Our Workforce</td>
</tr>
<tr>
<td>W110</td>
<td>CPDD Presenter and Faculty Breakfast</td>
</tr>
<tr>
<td>W111</td>
<td>CIEC Social</td>
</tr>
<tr>
<td>W410</td>
<td>Continuing Professional Development Division Technical Session 1</td>
</tr>
<tr>
<td>W510</td>
<td>Continuing Professional Development Division Technical Session 2</td>
</tr>
</tbody>
</table>

### Cooperative and Experiential Education Division

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>T311</td>
<td>Cooperative and Experiential Education Division Technical Session 1</td>
</tr>
<tr>
<td>T411</td>
<td>Engineering at Scale: the Role of Experiential Learning at the Modern-day Public Engineering Institution</td>
</tr>
<tr>
<td>W111B</td>
<td>CEED Business Meeting</td>
</tr>
<tr>
<td>W111</td>
<td>CIEC Social</td>
</tr>
<tr>
<td>W411</td>
<td>Support a Diverse Student Body for Experiential Learning Opportunities</td>
</tr>
<tr>
<td>W411B</td>
<td>Cooperative and Experiential Education Division Technical Session 2</td>
</tr>
<tr>
<td>W511</td>
<td>Cooperative and Experiential Education Division Technical Session 3</td>
</tr>
<tr>
<td>R311</td>
<td>Cooperative and Experiential Education Division Board Meeting - Part 2</td>
</tr>
<tr>
<td>R111</td>
<td>Cooperative and Experiential Education Division Board Meeting - Part 1</td>
</tr>
<tr>
<td>R411</td>
<td>DISTINGUISHED LECTURE: Innovation Is Driving Business and Education Transformation</td>
</tr>
<tr>
<td>R511</td>
<td>Cooperative and Experiential Education Division Technical Session 4</td>
</tr>
</tbody>
</table>

ASEE online session locator can be found at [www.asee.org/osl](http://www.asee.org/osl)
2021 ASEE VIRTUAL CONFERENCE
SPONSOR GROUPS

Corporate Member Council

T266 Agility in the Classroom - Lighthouse Industry-Academic Collaborations
W166 CMC Business Meeting
W366A WEDNESDAY PLENARY: Featuring Best Zone and PIC Papers & Corporate Member Council Keynote Speaker, Sponsored by EngineeringCAS
W466 Modernizing Engineering Education to Meet Industry 4.0
W566 Crisis-Driven Collaboration for Both Academia and Industry
W766 CMC Student Social

Council of Sections

T467 Best Zone Papers
W167A Zone I Business Meeting
W167B Zone II Business Meeting
W167C Zone III Business Meeting
W167D Zone IV Business Meeting
W167E Council of Sections Meeting

Design in Engineering Education Division

M213 MONDAY WORKSHOP: Putting Students to Work: Using Findings From a Multi-University Study of Engineers’ First Year of Work to Enhance Design Education
M213B MONDAY WORKSHOP: Learn to Apply Methods From Neuroscience for Engineering Design Education
M413A Design Mental Frameworks
M413B Design Methodologies 1
M413C Empathy and Human-centered Design 1
M513A Design Pedagogy
M513B Impact of COVID-19 on Design Education 1
T213 DEED Invited Speaker
T313 Design Methodologies 2
T313B Impact of COVID-19 on Design Education 2
T413A Design Across Curriculum 1
T413B Making in Design Education
T413C Design Pedagogy 2
T513A Design Teams 1
T513B Capstone Design
T513C Empathy and Human-centered Design 2
W113 Design Teams 2
W113B Design Across the Curriculum 2
W113D Design Across the Curriculum 2
W413 Best in DEED
W513 DEED Business Meeting
W713 DEED Social

Educational Research and Methods Division

M214 MONDAY WORKSHOP: Maximizing Interactivity in Online Classes
M214B MONDAY WORKSHOP: Fostering Well-Being Amid Cycles of Professional Shame in Faculty-Student Interactions
M414 The Role of Peers in Promoting Learning and Persistence
M414B Studies of Classroom Assessment: Exam Wrappers, Equitable Grading, Test Anxiety, and Use of Reflection
M514 Tools to Enhance Student Learning of Undergraduate Engineering Content
M514B Studies of Student Teams and Student Interactions
T214 FIE Steering Committee: Open Session
T247 Welcome Session
2021 ASEE VIRTUAL CONFERENCE

SPONSOR GROUPS

T259C Special Session
T314 FIE Steering Committee: Executive Session
T314B Studies of Shifting In-person Courses to Online and Students' Online Behavior
T414 FIE Planning Committee Meeting
T414B Motivation, Goal Orientation, Identity, and Career Aspirations
T514 Student Engagement, Socioemotional Needs, and Social Support During Pandemic
T514B Efforts to Understand and Support Students' Socioemotional Factors
W114 Innovative Pedagogies Afforded Through Technology and Remote Learning
W414A Faculty Perspectives of Active Learning, Inequity, and Curricular Change
W414B Assessing Hard-to-Measure Constructs in Engineering Education: Assessment Design and Validation Studies
W414C Medley of Undergraduate Programming and Pedagogies
W514 ERM Business Meeting
W514B Preparing Engineering Students for Their Professional Practice
W614 ERM Annual Community Celebration and Awards Reception
R114 Academic Success and Retention
R114B Research on Diversity, Equity, and Inclusion
R314A “I Don’t Think I Like Your Tone…” Thinking About and Evaluating Tone During Peer Review
R314B Undergraduate Students' Development of Computational and Programming Skills
R314C Undergraduate Students' Professional Skills and Reflection
R314D Engineering Education During the COVID-19 Pandemic
R414 DISTINGUISHED LECTURE: Continuing the Conversation: Working Toward Anti-racist Engineering Education
R514 Teaching In and Through Design, Maker Spaces, and Open-ended Problems
R514B Research Methods and Studies on Engineering Education Research

Electrical and Computer Engineering Division

M415 Electrical and Computer Engineering Division Technical Session 1
M515 Electrical and Computer Engineering Division Technical Session 2
M515B Electrical and Computer Engineering Division Technical Session 3
T315 Electrical and Computer Engineering Division Technical Session 4
T415 ECE Panel
T415B Electrical and Computer Engineering Division Technical Session 5
T515 Electrical and Computer Engineering Division Technical Session 6
W115 ECE Business Meeting
W215 Electrical and Computer Engineering Division Poster Session
W415 Electrical and Computer Engineering Division Technical Session 7
W515 Electrical and Computer Engineering Division Technical Session 8
W715 Electrical and Computer Engineering Division Social Event
R115 Electrical and Computer Engineering Division Technical Session 9

Energy Conversion and Conservation Division

M416 Energy Conversion and Conservation
Division Technical Session 1: Mechanical and CAD Track
M516 International Collaboration in Teaching Sustainable Energy Solutions
T316 Energy Conversion and Conservation Division Technical Session 2: Solar Track
T416 Energy Conversion and Conservation Division Technical Session 3: Education Track
W216 Energy Conversion and Conservation Division Poster Session
W416 ECCD Business Meeting
W716 ECCD Tour and Dinner
W735 Manufacturing Division Social
R316 Energy and Environmental Education in the Midst of Misfortunes
R411 DISTINGUISHED LECTURE: Innovation Is Driving Business and Education Transformation

Engineering Deans Council
T368 EDC Executive Board Meeting
T468 EDC Public Policy Committee Meeting
W168 EDC Business Meeting

Engineering Design Graphics Division
M218 MONDAY WORKSHOP: Teaching More Skills in the Same Amount of Time – Sketchtivity, an AI-Based Tutoring Platform for Free-Hand Sketching While Also Learning Spatial Visualization
M418 Executive Committee Meeting: Engineering Design Graphics Division
T318 Engineering Design Graphics Division Technical Session 1: Spatial Visualization
T418 Engineering Design Graphics Division Business Meeting
T509 Lessons Learned From the Pandemic: Looking Forward and Looking Back
W118 Engineering Design Graphics Division Technical Session 2: VR, AR, and CAD
W518 Engineering Design Graphics Division Technical Session 3: Flipped Classroom
W718 EDGD Award Banquet
R118 Engineering Design Graphics Division Technical Session 4: A Potpourri of Ideas
R318 Teaching Engineering Graphics During COVID-19 and Beyond: Best Practices and Lessons Learned
R411 DISTINGUISHED LECTURE: Innovation Is Driving Business and Education Transformation

Engineering Economy Division
M419 Engineering Economy Division Technical Session
T319 Engineering Economy Division Business Meeting
T519 Engineering Economy Course Strategy Panel Session
W622 Joint Divisions Social Event

Engineering Ethics Division
M220 MONDAY WORKSHOP: Launching the OEC's Engineering Ethics Educators Community of Practice: A Workshop to Share Strategies and Discuss Goals
T220 Past, Present, and Future of the OEC (Online Ethics Center)
T320 Engineering Ethics Division Business Meeting
T420 Innovative, Engaging Pedagogies for Engineering Ethics Education
T520 Our Ethical Actions: A Conversation About the New ASEE Codes
W120 Cross-cultural Sensitivity, Moral Imagination,
<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>W220</td>
<td>Engineering Ethics Division Poster Session: Neuroethics and Secondary STEM Classrooms</td>
</tr>
<tr>
<td>W420</td>
<td>Industrial, Professional, and Practical Contexts of Engineering Ethics</td>
</tr>
<tr>
<td>W520</td>
<td>Ethics Integration in Engineering Design</td>
</tr>
<tr>
<td>R120</td>
<td>Understanding Students’ Authentic and Reflective Experiences of Ethics Education</td>
</tr>
<tr>
<td>R320</td>
<td>Engineers’ Experiences of Ethics in Practice: An Interactive Exploration With Six Personas</td>
</tr>
<tr>
<td>R320B</td>
<td>Critical Reflections on Engineering Ethics Education</td>
</tr>
<tr>
<td>R434</td>
<td>DISTINGUISHED LECTURE: Engineering, Social Responsibility, and the Competing Accountabilities of Corporate Work: Lessons From the Field and Classroom</td>
</tr>
<tr>
<td>R520</td>
<td>Moral Development and Ethics Assessment in Engineering</td>
</tr>
<tr>
<td>M521</td>
<td>Lightning Talks 2 - held outside ASEE virtual platform</td>
</tr>
<tr>
<td>T221</td>
<td>Getting Started With LaTeX and Overleaf</td>
</tr>
<tr>
<td>T321</td>
<td>Librarian’s Role in the Accreditation Process</td>
</tr>
<tr>
<td>T421</td>
<td>Engineering Libraries Division Technical Session 1: Diversity</td>
</tr>
<tr>
<td>T521</td>
<td>Operationalizing Equity, Diversity, Inclusion, and Social Justice (EDISJ) in Engineering Librarianship</td>
</tr>
<tr>
<td>T721</td>
<td>Engineering Libraries Division Evening Social Event</td>
</tr>
<tr>
<td>W121</td>
<td>ELD Annual Business Meeting</td>
</tr>
<tr>
<td>W221</td>
<td>Engineering Libraries Division Poster Session</td>
</tr>
<tr>
<td>W421</td>
<td>Engineering Libraries Division Technical Session 2: Special Topics</td>
</tr>
<tr>
<td>W521</td>
<td>Preprints, Postprints, ePrints: The Case for Engineering Information</td>
</tr>
<tr>
<td>R121</td>
<td>TS3: Working with Students</td>
</tr>
<tr>
<td>R321</td>
<td>Engineering Libraries Division (ELD) Roundtable Discussions</td>
</tr>
<tr>
<td>R521</td>
<td>Engineering Libraries Division (ELD): Extended Executive Committee</td>
</tr>
</tbody>
</table>

**Engineering Leadership Development Division**

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>T355</td>
<td>Designing and Evaluating Engineering Leadership Programs</td>
</tr>
<tr>
<td>T455</td>
<td>Innovative and Impactful Engineering Leadership Pedagogy</td>
</tr>
<tr>
<td>W455</td>
<td>Embracing Diversity, Equity, and Inclusion in Our Classroom and Teaching</td>
</tr>
<tr>
<td>W555</td>
<td>LEAD Division Business Meeting</td>
</tr>
<tr>
<td>W755</td>
<td>LEAD Division Social</td>
</tr>
<tr>
<td>R155</td>
<td>Career Advancement Through Engineering Leadership Development</td>
</tr>
<tr>
<td>R355</td>
<td>Research Methods and Theories in Engineering Leadership Education</td>
</tr>
</tbody>
</table>

**Engineering Management Division**

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
</tr>
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<tbody>
<tr>
<td>W122A</td>
<td>CEMAL Meeting</td>
</tr>
<tr>
<td>W122B</td>
<td>Engineering Management Division Technical Session 1</td>
</tr>
<tr>
<td>W422</td>
<td>EMD Business Meeting</td>
</tr>
<tr>
<td>W622</td>
<td>Joint Divisions Social Event</td>
</tr>
<tr>
<td>R122</td>
<td>Engineering Management Division Technical Session 2</td>
</tr>
<tr>
<td>R322</td>
<td>Engineering Management Division Technical Session 3</td>
</tr>
</tbody>
</table>

**Engineering Libraries Division**

<table>
<thead>
<tr>
<th>Session ID</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M421</td>
<td>Engineering Libraries Division Lightning</td>
</tr>
</tbody>
</table>
2021 ASEE VIRTUAL CONFERENCE
SPONSOR GROUPS

Engineering Physics and Physics Division

- M245: MONDAY WORKSHOP: Projects-Based Arduino/Raspberry Pi Activities
- M445: Engineering Physics and Physics Division Technical Session 1
- T345: STEAM Education–Powering the Next Generation
- T545: Engineering Physics and Physics Division Executive Business Meeting
- T745: Engineering Physics and Physics Social Event
- W145: Engineering Physics and Physics Division Technical Session 2
- W445: Engineering Physics and Physics Panel Discussion on Accreditation
- R545: Engineering Physics and Physics Division Business Meeting

Engineering Research Council

- W569: ERC Business Meeting
- R369: Building a Research Scholarship Program

Engineering Technology Council

- W470: ETC Board Meeting

Engineering Technology Division

- M423: Engineering Technology Pedagogy 2
- M523: Engineering Technology Curriculum and Programs
- T423A: STEM Issues
- T523: Engineering Technology Potpourri
- W123A: JET Board Meeting

W123B: ECET Department Heads Meeting
W123C: Engineering Technology Capstone Projects
W111: CIEC Social
W423: Tau Alpha Pi Meeting
W423B: Remote Instruction/COVID-19 Strategies
W523: Focus on ETAC Accreditation
R123: Engineering Technology Pedagogy 1
R323A: MET Department Heads
R323B: Engineering Technology Leadership Institute
R323C: New Directions for Engineering Technology

Engineering and Public Policy Division

- T417: Engineering and Public Policy Division Technical Session 1
- T617: Engineering and Public Policy Division Business Meeting
- T717: Engineering and Public Policy Social

Entrepreneurship & Engineering Innovation Division

- M424: Entrepreneurship and Engineering Innovation Division Technical Session 1
- M524: Entrepreneurship and Engineering Innovation Division Technical Session 2
- T524: Entrepreneurship and Engineering Innovation Division Technical Session 3
- W124: Entrepreneurship and Engineering Innovation Division Technical Session 4
- W524: Entrepreneurship and Engineering Innovation Division Technical Session 5
- W724: Entrepreneurship and Innovation Division Reception
- R124: Entrepreneurship and Engineering Innovation

Schedule subject to change. Please go to https://2021asee.pathable.co/ for up-to-date information.
### 2021 ASEE Virtual Conference

**Division Technical Session 6**
- R324 Entrepreneurship and Engineering Innovation
  - Division Technical Session 7
- R524 Entrepreneurship and Innovation Division
  - Business Meeting

**Environmental Engineering Division**
- M425 Environmental Engineering Division Technical Session 1: Intercultural Competency-infused Teaching
- T225 EED Panel Session
- T325 Environmental Engineering Division Technical Session 2: Innovative Approaches for Teaching Environmental Engineering
- T425 Environmental Engineering Division Technical Session 3: Teaching Environmental Engineering in the COVID-19 Era
- W125 EED Business Meeting
- W525 Environmental Engineering Technical Session 4: Environmental Issues and the Impacts of Intersectionality
- W725 EED Social

**Equity, Culture & Social Justice in Education Division**
- M459 Bridging Content and Context in the Classroom
- M459B Critical Conversations on Being Valued
- M559 Changing How We Pursue Change
- M559B Working Against Unjust Social Forces
- T252 Community-Engaged Engineering Education Challenges and Opportunities in Light of COVID-19 Paper Presentations 2
- T259A Opening Hearts and Minds Through Contextual Listening: Moving Towards an Education That Dignifies All

**Experimentation and Laboratory-Oriented Studies Division**
- M426 Virtual Laboratories: Experimentation and Laboratory-oriented Studies
- M526 Bring Your Own Experiment: Experimentation and Laboratory-oriented Studies
- T326 Remote Physical Laboratories: Experimentation and Laboratory-oriented Studies
- T426 Developing Teamwork, Student Attitudes, and Hardware Solutions for Laboratory Courses: Experimentation and Laboratory-oriented Studies Division
## First-Year Programs Division

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M227</td>
<td>MONDAY WORKSHOP: Helping First-Year Students Catalyze Success: How to Productively Bring Serendipity, Risk, and Failure Into the Classroom</td>
</tr>
<tr>
<td>M427</td>
<td>First-Year Engineering Experience Executive Board Business Meeting</td>
</tr>
<tr>
<td>M427B</td>
<td>First-Year Programs: Computation in the First Year</td>
</tr>
<tr>
<td>M527</td>
<td>First-Year Programs Division Executive Board Business Meeting</td>
</tr>
<tr>
<td>T327</td>
<td>The Best of First-Year Programs Division</td>
</tr>
<tr>
<td>T427</td>
<td>First-Year Programs: Virtual Instruction in the First Year 1</td>
</tr>
<tr>
<td>T427B</td>
<td>First-Year Programs: Focus on Student Success 2</td>
</tr>
<tr>
<td>T527</td>
<td>First-Year Programs: Unique Projects and Pedagogies</td>
</tr>
<tr>
<td>W127A</td>
<td>First-Year Programs Division Business Meeting</td>
</tr>
<tr>
<td>W127B</td>
<td>First-Year Programs: Virtual Instruction in the First Year 2</td>
</tr>
<tr>
<td>W127C</td>
<td>First-Year Programs: Student Perceptions and Perspectives</td>
</tr>
<tr>
<td>W227</td>
<td>First-Year Programs Division Poster Session</td>
</tr>
<tr>
<td>W427</td>
<td>First-Year Programs: Virtual Instruction in the First Year 3</td>
</tr>
<tr>
<td>W427B</td>
<td>First-Year Programs: Recruiting and Retention</td>
</tr>
<tr>
<td>W527</td>
<td>First-Year Programs: Focus on Student Success 1</td>
</tr>
<tr>
<td>W527B</td>
<td>First-Year Programs: Design in the First Year</td>
</tr>
<tr>
<td>W727</td>
<td>First-Year Programs Division Social</td>
</tr>
<tr>
<td>R127</td>
<td>First-Year Programs: Diversity, Equity and Inclusion in the First Year</td>
</tr>
<tr>
<td>R127B</td>
<td>First-Year Programs: First-Year Experiences</td>
</tr>
<tr>
<td>R327</td>
<td>First-Year Programs: Cornucopia</td>
</tr>
</tbody>
</table>

## Faculty Development Division

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M257</td>
<td>MONDAY WORKSHOP: Transform Your Institution’s Faculty Development with the ASPIRE Inclusive Professional Framework for Faculty (IPF: Faculty)</td>
</tr>
<tr>
<td>M457</td>
<td>Faculty Development 1: Social Justice Research</td>
</tr>
<tr>
<td>M557</td>
<td>Faculty Development Lightning Talk Session 1: COVID-19 Focus</td>
</tr>
<tr>
<td>T257</td>
<td>Exploring Anti-Racism and Social Justice in Engineering Curricula: Ideas, Reflections, and Challenges</td>
</tr>
<tr>
<td>T357</td>
<td>Faculty Development 2: COVID-19 Impact on Faculty</td>
</tr>
<tr>
<td>T457</td>
<td>Faculty Development Division Business Meeting</td>
</tr>
<tr>
<td>W157A</td>
<td>Faculty Development 3: Research, Practice, and Lessons Learned</td>
</tr>
<tr>
<td>W257</td>
<td>Faculty Development Division Poster Session</td>
</tr>
<tr>
<td>W457</td>
<td>Leading From the Middle During Times of Transition</td>
</tr>
<tr>
<td>W557</td>
<td>Faculty Development Lightning Talk Session 2</td>
</tr>
<tr>
<td>R157</td>
<td>Facilitating an Inclusive Classroom</td>
</tr>
<tr>
<td>R357</td>
<td>Faculty Development 4: COVID-19 Impact on Students</td>
</tr>
</tbody>
</table>

### SPONSOR GROUPS

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>T526</td>
<td>Assessment in Laboratory and Project-based Courses: Experimentation and Laboratory-oriented Studies Division</td>
</tr>
<tr>
<td>W126</td>
<td>Adaptation of Laboratory-based Courses During a Pandemic: Experimentation and Laboratory-oriented Studies Division</td>
</tr>
<tr>
<td>W226</td>
<td>Experimentation and Laboratory-oriented Studies Division Poster Session</td>
</tr>
<tr>
<td>W726</td>
<td>ELOS Division Business Meeting</td>
</tr>
</tbody>
</table>
Graduate Studies Division

M428 Graduate Studies Division Technical Session 1
M528 Graduate Studies Division Technical Session 2
T328 Graduate Studies Division Technical Session 3
T528 Doing More With More: Increasing Awareness, Applications, and Diversity in Engineering Programs
W128 Graduate Studies Division Technical Session 4
W528 Graduate Studies Division Business Meeting
R128 Graduate Studies Division Technical Session 5

Industrial Engineering Division

M429 Industrial Engineering Division Technical Session 1
T229 Industrial Engineering Division Business Meeting
W129 Industrial Engineering Division Technical Session 2
W622 Joint Divisions Social Event

Instrumentation Division

M431 Instrumentation Division Technical Session
R331 Instrumentation Division Business Meeting
R411 DISTINGUISHED LECTURE: Innovation Is Driving Business and Education Transformation

International Division

T232A International Division Technical Session 5
T232B Bridging the Gap in Engineering Education, Computational Thinking, and Artificial Intelligence for Education: International Perspectives in the Global Community
T332 International Division Business Meeting
T432 International Division Technical Session 1
T532 International Division Technical Session 2
W432 Global Engineering Education During and After the Covid-19 Pandemic
W532 International Division Technical Session 4

Liberal Education/Engineering & Society Division

M434 Olmsted Awardees: Reflections on Liberal Education in Engineering Education
M534 Professional Formation and Career Experiences
M534B Ethics, Mindfulness, and Reform During the COVID-19 Pandemic
T234 Socially Responsible Engineering I: Context, Innovation, and Reflection
T252 Community-Engaged Engineering Education Challenges and Opportunities in Light of COVID-19 Paper Presentations 2
T259C Special Session
T334A Teamwork: Priming, Empathy, and Metacognition
T352 At the Crossroads of Community Engagement, Ethics, Liberal Education, and Social Responsibility: Community-Engaged Engineering Education Challenges and Opportunities in Light of COVID-19
T334B Alternative Pathways for Engineering Education Predicated on Dismantling Hierarchies and Examining the Politics of Care Practices
T434 Breaking Out of 'Engineering Nice': Why Engineering Education Must Make Space for Conflict
T534 'Diversity' and Inclusion? Pedagogy, Experiences, Language and Performative Action
W134D Liberal Education/Engineering and Society
(LEES) Division Business Meeting

W134A Social Justice: Pedagogy, Curricular Reform, and Activism
W134B Engineering Communication I: History and Praxis
W134C Creating an Engineering Communication Community Within ASEE and Beyond
W152 Community-Engaged Engineering Education Challenges and Opportunities in Light of COVID-19 Paper Presentations 1
W434A Sociotechnical Thinking I: Classroom Experiences, Identity, and Theory
W434B Engineering Education Culture: Mental Health, Inclusion, and the Soul of Our Community
W534 Sociotechnical Thinking II: Interpretation, Curricular Practices, and Structural Change
W734 LEES Division Social
R134A Engineering Communication II: Curricular Practices, Integrations, and Collaborations
R134B Critical Participation in Engineering/STEM Education: Extending Critique Through Practices of Knowledge Expression and Travel
R234 Socially Responsible Engineering II: Pedagogy, Teamwork, and Student Experiences
R320 Engineers’ Experiences of Ethics in Practice: An Interactive Exploration With Six Personas
R334 Governance, Diplomacy, and International Comparisons in Engineering Education
R434 DISTINGUISHED LECTURE: Engineering, Social Responsibility, and the Competing Accountabilities of Corporate Work: Lessons From the Field and Classroom

Manufacturing Division

M435 Manufacturing Division Session: Make-it!
T235 Manufacturing Division Session - Virtual and Augmented Reality
T335 Remote Education in Manufacturing
T435 Manufacturing Division Technical Session - Robotics and Manufacturing
T535 Manufacturing Division - Workforce Development and Curricular Innovations
W135 Manufacturing Division Technical Session - Innovative Pedagogy in Manufacturing Education
W435 Manufacturing Division Technical Session - Online and Remote Learning Communities
W735 Manufacturing Division Social
R335 Manufacturing Division Business Meeting
R411 DISTINGUISHED LECTURE: Innovation Is Driving Business and Education Transformation

Materials Division

T236 Materials Division Business Meeting
T336 Advances in Materials Education
W136 Hybrid and Online Learning
W436 Computational Tools & Analysis
W736 Materials Division Social

Mathematics Division

T237 Math Division Business Meeting
T337 Mathematics Division Technical Session 1
T437 Mathematics Division Technical Session 2
T537 Mathematics Division Technical Session 3

Mechanical Engineering Division

M438 How We Tackled the Pandemic
M538 Design Related
## Sponsor Groups

### Military and Veterans Division
- **T556** Military and Veterans Division Business Meeting
- **W156** Military and Veterans Division Technical Session 2
- **W556** Military and Veterans Division Social

### Minorities in Engineering Division
- **M440** Minorities in Engineering Division Technical Session 1
- **T240** Growing the Domestic Pool of Diverse Graduate Students in Engineering
- **T259C** Special Session
- **T340** Minorities in Engineering Division Technical Session 2
- **T440** Minorities in Engineering Division Technical Session 3
- **T540** Minorities in Engineering Division Technical Session 4
- **T733** MIND/PCEE/WIED Annual Social
- **W140** Minorities in Engineering Division Technical Session 5
- **W240** Minorities in Engineering Division Poster Session
- **W440** Minorities in Engineering Division Technical Session 6
- **R140B** Minorities in Engineering Division Business Meeting
- **R140A** Minorities in Engineering Division Technical Session 7
- **R433** DISTINGUISHED LECTURE: Creating Inclusive and Diverse P-12 Learning Environments

### Mechanics Division
- **M439** The ABCs of FBDs
- **M539** Engaging the Online Classroom
- **T239** Using Technology to Support Learning in Mechanics
- **T339** Building Success in the Online Classroom
- **T439** Hands-On in the Online Classroom
- **T509** Lessons Learned From the Pandemic: Looking Forward and Looking Back
- **T539** Hands-On Mechanics
- **W139** MASS: Mastery, Assessment and Success of Students
- **W439** The 'Strengths' of Mechanics
- **W739A** Meals with Mechanicians
- **R139** Bringing a Different Perspective
- **R339** Mechanics Division Business Meeting

ASEE online session locator can be found at [www.asee.org/osl](http://www.asee.org/osl)
### Multidisciplinary Engineering Division

- **M441** Multidisciplinary Learning and Teaching Experiences
- **T341** Multidisciplinary Curriculum and Course Development
- **T441A** Multidisciplinary Engineering Division Social
- **T441B** How 'Interdisciplinary' and 'General' Engineering Programs Find Their Niche? Exploring Curricular Decisions and Storytelling
- **T541** Multidisciplinary Experiences: Teaching in a Pandemic
- **W141** Multidisciplinary Engineering Division Business Meeting
- **W441** Assessment in Multidisciplinary Learning Environment
- **W541** Design in Multidisciplinary Learning Environment
- **R141** Multidisciplinary Endeavors: Engineering, Art and Society
- **R341** Multidisciplinary Endeavors: Mechatronics, Robotics and Technology
- **R411** DISTINGUISHED LECTURE: Innovation Is Driving Business and Education Transformation

### NSF Grantees Poster Session

- **R271** NSF Grantees Poster Session

### New Engineering Educators Division

- **M242** MONDAY WORKSHOP: Educational Evaluation Skills for Improving Your Teaching and Outreach

### Ocean and Marine Division

- **T344** Microsoft Teams, Deep Learning, and Classroom Flipping
- **W744** Tour and Dinner Minus the Tour: Energy Conversion and Conservation Division
- **R144** Best Paper, Best Diversity Paper
- **R344** Esteemed Panel on Ocean and Marine Engineering Student Competitions
- **R411** DISTINGUISHED LECTURE: Innovation Is Driving Business and Education Transformation
- **R544** Ocean and Marine Engineering Division Business Meeting
### Pre-College Engineering Education Division

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M233</td>
<td>MONDAY WORKSHOP: What Makes a Project an “Engineering” Project</td>
</tr>
<tr>
<td>M233B</td>
<td>MONDAY WORKSHOP: Engineering For Us All (e4usa): “Us All” Includes You!</td>
</tr>
<tr>
<td>M433</td>
<td>Pre-College Engineering Education Division Technical Session 1</td>
</tr>
<tr>
<td>M533</td>
<td>Pre-College Engineering Education Division Technical Session 3</td>
</tr>
<tr>
<td>M533B</td>
<td>Pre-College Engineering Education Division Technical Session 4</td>
</tr>
<tr>
<td>T233</td>
<td>Pre-College Engineering Education Division Technical Session 14</td>
</tr>
<tr>
<td>T233B</td>
<td>Pre-College Engineering Education Division Technical Session 15</td>
</tr>
<tr>
<td>T333</td>
<td>Pre-College Engineering Education Division Technical Session 9</td>
</tr>
<tr>
<td>T333B</td>
<td>Pre-College Engineering Education Division Technical Session 13</td>
</tr>
<tr>
<td>T433</td>
<td>Pre-College Engineering Education Division Technical Session 10</td>
</tr>
<tr>
<td>T433B</td>
<td>Pre-College Engineering Education Division Technical Session 11</td>
</tr>
<tr>
<td>T533</td>
<td>Pre-College Engineering Education Division Technical Session 5</td>
</tr>
<tr>
<td>T533B</td>
<td>Pre-College Engineering Education Division Technical Session 6</td>
</tr>
<tr>
<td>T733</td>
<td>MIND/PCEE/WIED Annual Social</td>
</tr>
<tr>
<td>W133</td>
<td>Pre-College Engineering Education Division Technical Session 7</td>
</tr>
<tr>
<td>W133B</td>
<td>Pre-College Engineering Education Division Technical Session 8</td>
</tr>
<tr>
<td>W233</td>
<td>Pre-College Engineering Education Division Poster Session</td>
</tr>
<tr>
<td>W433</td>
<td>Engineering For Us All (e4usa) – Meet the Teachers!</td>
</tr>
<tr>
<td>R133</td>
<td>Pre-College Engineering Education Division Technical Session 12</td>
</tr>
<tr>
<td>R233</td>
<td>Pre-College Engineering Education Division Resource Exchange</td>
</tr>
<tr>
<td>R333</td>
<td>Pre-College Division Business Meeting</td>
</tr>
<tr>
<td>R433</td>
<td>DISTINGUISHED LECTURE: Creating Inclusive and Diverse P-12 Learning Environments</td>
</tr>
</tbody>
</table>

### Professional Interest Council

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>T573</td>
<td>2021 Interdivisional Town Hall Meeting</td>
</tr>
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</table>

### Software Engineering Division

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M246</td>
<td>MONDAY WORKSHOP: Expressing Computing Competency Statements</td>
</tr>
<tr>
<td>T346</td>
<td>Software Engineering Division Technical Session 1</td>
</tr>
<tr>
<td>T646</td>
<td>Software Engineering Division Business Meeting</td>
</tr>
<tr>
<td>W446</td>
<td>Crafting the Future of Computing Education in CC2020</td>
</tr>
<tr>
<td>R146</td>
<td>Software Engineering Division Technical Session 2</td>
</tr>
</tbody>
</table>

### Sponsored Sessions

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M299A</td>
<td>MONDAY WORKSHOP: From Invisible Knowledge to Successful Strategies: How to Make Funds of Knowledge Visible, Relevant, and Effective for Low-income, First-generation Students in Engineering</td>
</tr>
<tr>
<td>M299B</td>
<td>MONDAY WORKSHOP: Visual, Creative Problems for Any Engineering Course: Student-Created Problems that Reverse Engineer YouTube Videos</td>
</tr>
<tr>
<td>M299C</td>
<td>MONDAY WORKSHOP: America Learns Mathematics</td>
</tr>
<tr>
<td>M299D</td>
<td>MONDAY WORKSHOP: Tips and Tools to Integrate Sociotechnical Thinking in</td>
</tr>
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<td>Workshop Code</td>
<td>Title</td>
</tr>
<tr>
<td>---------------</td>
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</tr>
<tr>
<td>M299E</td>
<td>MONDAY WORKSHOP: Growing our Research Community, One Reviewer at a Time</td>
</tr>
<tr>
<td>M299F</td>
<td>MONDAY WORKSHOP: Hands-on Interactive Learning in Fluid Mechanics and Heat Transfer with Virtual Options</td>
</tr>
<tr>
<td>M299G</td>
<td>MONDAY WORKSHOP: Tools for Equitable and Impactful Pre-College Outreach</td>
</tr>
<tr>
<td>M299H</td>
<td>MONDAY WORKSHOP: Broadening Participation in Engineering through Community Colleges: Lessons Learned from the Black Engineering Student Transfer (BEST) Project</td>
</tr>
<tr>
<td>M299I</td>
<td>MONDAY WORKSHOP: Task-based Educational Interventions on Design for Additive Manufacturing</td>
</tr>
<tr>
<td>M299J</td>
<td>MONDAY WORKSHOP: Rethinking Engineering Degree Programs Using Ecosystem Metaphors</td>
</tr>
<tr>
<td>M299K</td>
<td>MONDAY WORKSHOP: Contemplative Pedagogies: A Way of Democratizing Engineering Education</td>
</tr>
<tr>
<td>M299L</td>
<td>MONDAY WORKSHOP: Collaborative Learning in Online Professional Development Engineering Courses</td>
</tr>
<tr>
<td>M299M</td>
<td>MONDAY WORKSHOP: Designing a High School Biomedical Engineering Curriculum for Differentiated In-person, Virtual, and Hybrid Classroom Environments</td>
</tr>
<tr>
<td>M299N</td>
<td>MONDAY WORKSHOP: New Digital Frontiers: Understanding Our Place in the Changing Landscape of Higher Education</td>
</tr>
<tr>
<td>M299O</td>
<td>MONDAY WORKSHOP: Using Learning Assistants in Face-to-Face and Virtual STEM Courses</td>
</tr>
<tr>
<td>M299P</td>
<td>MONDAY WORKSHOP: The Evolution of Tools in Enabling Effective Remote Laboratory Delivery in Engineering Curricula</td>
</tr>
<tr>
<td>M299Q</td>
<td>MONDAY WORKSHOP: Research-Based Strategies to Advising Graduate Students</td>
</tr>
</tbody>
</table>

**SPONSORED SESSIONS**

- **M499** | SPONSORED SESSION: Distributed FPGA Lab Between UW and Other Universities Using the LabsLand Network - Presented by Intel | A workshop presenting a distributed FPGA lab between universities using the LabsLand Network. |
- **M499B** | Faculty Focus Group | The workshop is about faculty focus groups.                                                                                                 |
- **M599B** | Department Chair Focus Group | It discusses department chair focus groups.                                                                                                 |
- **M599** | SPONSORED SESSION: Utilizing FPGAs for Teaching in the Classroom or Virtualized Lab -Presented by Intel | Workshop on utilizing FPGAs for teaching in the classroom or virtualized lab.                                                              |
- **T199** | ASCE Formal Engineering Education | Keynote session on ASCE formal engineering education.                                                                                     |
- **T199B** | KEYNOTE SESSION: Grand Challenges Demand Fearless Ideas - Presented by University of Maryland | Keynote addressing grand challenges in engineering and the need for fearless ideas.                                                      |
- **T299** | SPONSORED SESSION: What Is Generative Design and How to Integrate It Into Your Curriculum - Presented by Autodesk | Workshop on generative design and integrating it into your curriculum.                                                                      |
- **T399** | SPONSORED SESSION: Growing the Domestic Pool of Diverse Graduate Students in Engineering - Presented by EngineeringCAS | Workshop on growing the domestic pool of diverse graduate students in engineering.                                                        |
- **T499** | Infusing Environmental Sustainability Across Engineering Education: Launching | Workshop on infusing environmental sustainability across engineering education.                                                             |
and Integrating a Co-Developed Definition and Framework for Engineering for One Planet

W199 SPONSORED SESSION: Publishing Advanced Engineering Textbooks with Wiley - Presented by Wiley

W299A SPONSORED SESSION: Engineering for US All (e4usa) Program Overview - Presented by the University of Maryland

W299B SPONSORED SESSION: Modernize Your ECE Lab Without Breaking the Bank: Elevate Your Program, Enhance Your Curriculum, Recruit More Students, All Within Budget - Presented by Keysight Technologies

W299C SPONSORED SESSION: Pearson Digital Learning Platforms for Your Undergrad Engineering Courses (Intro Through Advanced) - Presented by Pearson

W299D SPONSORED SESSION: Engineering Assessment Strategies for Remote Course Delivery - Presented by Wiley

W299E SPONSORED SESSION: Advancements in Test and Measurement Equipment for Teaching Labs - Presented by Rohde & Schwarz

W299F SPONSORED SESSION: Instruction Success with a New Hands-On, Personal Control System - Presented by STMicroelectronics

W299G SPONSORED SESSION: Using the FE Exam for Effective Outcomes Assessment - Presented by NCEES

W299H SPONSORED SESSION: Are You Ready for AI? Integrating AI Into Your Courses with MATLAB - Presented by MathWorks


W299J SPONSORED SESSION: Demystifying Partnership: Leadership Advice and Challenges for the Future of Higher Education - Presented by HackerU

W299K SPONSORED SESSION: The 3 Cs of Post-Pandemic Engineering Admissions - Presented by EngineeringCAS

W299L SPONSORED SESSION: Presented by Gradescope by Turnitin

W599 SPONSORED SESSION: Faculty Focus Groups

W599B Advances in Engineering Education Editorial Board Meeting

W699 Department Chair Focus Group

W799 ASEE Prayer Breakfast: Can an Engineer Believe in Miracles?

R199 SPONSORED SESSION: Presented by Edibon USA

R299A SPONSORED SESSION: Advance your Research Agenda with Keysight - Presented by Keysight Technologies

R299B SPONSORED SESSION: How to Write an Incredible LinkedIn Profile as an Engineering Student - Presented by Rubin

R299C SPONSORED SESSION: Engineering zyVersions: Bringing Interactivity to Engineering Textbooks - Presented by zyBooks


R299E SPONSORED SESSION: Low-Code Development: Turning Learners Into Makers - Presented by Siemens Digital Industries Software

R299F SPONSORED SESSION: Improving Persistence in Spatial Visualization Training Through Automatic Grading of Student Sketches with the Spatial Vis Software - Presented by eGrove Education, Inc.

R299G SPONSORED SESSION: Simplifying Hands-on Learning of New Engineering Skills - Presented by Coursera

R299H SPONSORED SESSION: Preparing Students for the FE Exam - Presented by Kaplan
SPONSORED SESSION: Presented by The Ohio State University

SPONSORED SESSION: Reading Between the Lines: Advanced AI/ML Predictive Models for Engineering Program Success - Presented by EngineeringCAS

SPONSORED SESSION: Invention to Impact - Presented by NSF ASF

Innovations Worth Advancing: Big Ideas and Putting Them Into Action - Presented by University of Maryland

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### Student Division

- **M447** Student Division Technical Session 1
- **M447B** Student Division Technical Session 4
- **M547** Writing Your Diversity Statement for Academic Job Searches
- **M547B** Student Division Technical Session 2
- **T247** Educational Research and Methods Division (ERM) Community Welcome Session
- **T247B** Student Division Technical Session 5
- **T347** Student Chapter Panel: Getting Started and Staying Active
- **T347B** Student Division Technical Session 6
- **T447** Student Division Technical Session 7
- **W547** Student Division Business Meeting
- **W547B** Student Division Technical Session 3
- **W747** Student Division Social

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### Systems Engineering Division

- **M448** Systems Engineering Division Technical Session 1
- **M548** Systems Engineering Division Technical Session 2

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### 2021 ASEE VIRTUAL CONFERENCE

### ALL SESSIONS ARE PACIFIC DAYLIGHT TIME

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### Technological and Engineering Literacy/Philosophy of Engineering Division

- **M449** TELPhE Division Technical Session 1: Expanding Technological and Engineering Literacies
- **M549** TELPhE Division Technical Session 2: The Broadening Face of Engineering Education
- **T349** Technological and Engineering Literacy-Philosophy of Engineering (TELPhE) Division Technical Session 3 / Perspectives on Advances in Promoting Technological Literacy
- **T449** Importance of Technological Literacy - Where Do We Go From Here
- **W449** Technological and Engineering Literacy/Philosophy of Engineering (TELPhE) Division Business Meeting

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### Two-Year College Division

- **T450** The Challenges That Two-year College Students Face When Transferring to a Four-year College for Engineering and Engineering Technology Program
- **T550** Diversity and Two-year Colleges Part 1
- **W150** Workforce Preparation at the Two-year College
- **W450** Two-year College Division Business Meeting
- **R150** The Curriculum at Two-year Colleges’ Engineering Technology and Engineering Transfer Programs
- **R450** Diversity and Two-year Colleges part 2
# 2021 ASEE Virtual Conference

**Sponsor Groups**

## Undergraduate Experience Committee

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M178</td>
<td>UEC Associate Deans’ Meeting</td>
</tr>
<tr>
<td>M478</td>
<td>Silver Linings – Positive Changes to Keep and Embrace Post-COVID</td>
</tr>
<tr>
<td>M578</td>
<td>UEC Business Meeting</td>
</tr>
<tr>
<td>T478</td>
<td>The Racial Pandemic: Engineering-Specific Problems and Solutions</td>
</tr>
</tbody>
</table>

## Women in Engineering Division

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M451</td>
<td>Women in Engineering Division Technical Session 7</td>
</tr>
<tr>
<td>M551</td>
<td>Women in Engineering Division Technical Session 1</td>
</tr>
<tr>
<td>T251</td>
<td>Women in Engineering Division Technical Session 8</td>
</tr>
<tr>
<td>T351</td>
<td>Women in Engineering Division Technical Session 9</td>
</tr>
<tr>
<td>T451</td>
<td>Panel: Discussion of Intersectionality in Engineering Education</td>
</tr>
<tr>
<td>T451B</td>
<td>Women in Engineering Division: Panel on Discussion of Intersectionality in Engineering Education</td>
</tr>
<tr>
<td>T551</td>
<td>Women in Engineering Division Technical Session 3</td>
</tr>
<tr>
<td>T733</td>
<td>MIND/PCEE/WIED Annual Social</td>
</tr>
<tr>
<td>W151</td>
<td>Women in Engineering Division Technical Session 10</td>
</tr>
<tr>
<td>W451</td>
<td>Panel: Advocacy and Allyship by Men for Women in Engineering-related Fields at the College Level</td>
</tr>
<tr>
<td>W451B</td>
<td>Women in Engineering Division: Panel on Advocacy and Allyship by Men for Women</td>
</tr>
<tr>
<td>W525</td>
<td>Environmental Engineering Technical Session 4: Environmental Issues and the Impacts of Intersectionality</td>
</tr>
<tr>
<td>W551A</td>
<td>Women in Engineering Division Technical Session 6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>R151</td>
<td>Women in Engineering Division Technical Session 5</td>
</tr>
<tr>
<td>R351</td>
<td>WIED Business Meeting</td>
</tr>
<tr>
<td>R433</td>
<td>DISTINGUISHED LECTURE: Creating Inclusive and Diverse P-12 Learning Environments</td>
</tr>
</tbody>
</table>
Presenters are listed in alphabetical order, followed by their session numbers. An asterisk (*) before a session number indicates that the presenter has published a related paper in the conference proceedings. A plus (+) before a session number indicates that the paper has received a nomination for best paper.

<table>
<thead>
<tr>
<th>Author</th>
<th>Session(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caitlyn Aaron</td>
<td>W514B, R271</td>
</tr>
<tr>
<td>Dr. Duane L. Abata</td>
<td>W230, R151</td>
</tr>
<tr>
<td>Mrs. Pounah Abbasion</td>
<td>R552</td>
</tr>
<tr>
<td>Dr. Sherif Abdelhamid</td>
<td>T408B, T308</td>
</tr>
<tr>
<td>Mrs. Diane Nicole Abdullah</td>
<td>T551</td>
</tr>
<tr>
<td>Rohini Abhyankar</td>
<td>T351</td>
</tr>
<tr>
<td>Prof. Jeremiah Abiade</td>
<td>R271</td>
</tr>
<tr>
<td>Prof. Ahmed Aboutajedine</td>
<td>T413C</td>
</tr>
<tr>
<td>Ms. Imane Aboutajedine</td>
<td>T413C</td>
</tr>
<tr>
<td>Miss Nisha Abraham</td>
<td>W127B, W427B</td>
</tr>
<tr>
<td>Dr. Shiny Abraham</td>
<td>M415, W215</td>
</tr>
<tr>
<td>Dr. Eynande S. Abraham</td>
<td>W109</td>
</tr>
<tr>
<td>Dr. Lisa Abrams</td>
<td>W557, W157A, W451B, T351</td>
</tr>
<tr>
<td>Dr. Taher M. Abu-Lebdeh P.E.</td>
<td>T416, W435</td>
</tr>
<tr>
<td>Nusaybah Abu-Mulaweh</td>
<td>T252</td>
</tr>
<tr>
<td>Dr. Bonnie Achee</td>
<td>W430, R233, T433B, W233, T533</td>
</tr>
<tr>
<td>Dr. Thomas L. Acker</td>
<td>W128</td>
</tr>
<tr>
<td>Jorge Americo Acosta Feliz</td>
<td>R133</td>
</tr>
<tr>
<td>Mr. D’Andray James Adams</td>
<td>R114B</td>
</tr>
<tr>
<td>Dr. Elizabeth A. Adams</td>
<td>R450, R271</td>
</tr>
<tr>
<td>Dr. Robert D. Adams</td>
<td>M526</td>
</tr>
<tr>
<td>Dr. Stephanie G. Adams</td>
<td>M440</td>
</tr>
<tr>
<td>Eytan Adar</td>
<td>M413C</td>
</tr>
<tr>
<td>Rahman Adekunle</td>
<td>T508</td>
</tr>
<tr>
<td>Zach N. Adelman</td>
<td>W123C</td>
</tr>
<tr>
<td>Prof. Nicole Adelstein</td>
<td>R271</td>
</tr>
<tr>
<td>Dr. Olusola Adesope</td>
<td>R105, T205, T452, R314B, R114, T514B, R271</td>
</tr>
<tr>
<td>Dr. Sanjeev Adhikari</td>
<td>M402, W409, T209</td>
</tr>
<tr>
<td>Dr. Yasaman Adibi</td>
<td>W415</td>
</tr>
<tr>
<td>Ms. Amy N. Adkins</td>
<td>W204</td>
</tr>
<tr>
<td>Mr. Troy Lamarr Adkins II</td>
<td>T305B</td>
</tr>
<tr>
<td>David Andrew Adolphson</td>
<td>W227</td>
</tr>
<tr>
<td>Ms. Nadine B. Afari</td>
<td>T404</td>
</tr>
<tr>
<td>Dr. Samia Afrin</td>
<td>R123</td>
</tr>
<tr>
<td>Ms. Jitshy Agarwal</td>
<td>M427B</td>
</tr>
<tr>
<td>Dr. Anu Aggarwal</td>
<td>T508</td>
</tr>
<tr>
<td>Ashish Aggarwal</td>
<td>T330</td>
</tr>
<tr>
<td>Riya Aggarwal</td>
<td>W227</td>
</tr>
<tr>
<td>Onyinyechi Nwaduto Agu</td>
<td>R324</td>
</tr>
<tr>
<td>Mr. Fernando Aguado</td>
<td>W123C</td>
</tr>
<tr>
<td>Yumi Rosa Aguilar</td>
<td>R114B</td>
</tr>
<tr>
<td>Dr. Malena Agyemang</td>
<td>T313</td>
</tr>
<tr>
<td>Dr. Benjamin Ahn</td>
<td>M401, R106A</td>
</tr>
<tr>
<td>Dr. Yushin Ahn</td>
<td>R450, R271</td>
</tr>
<tr>
<td>Dr. AMM Nazmul Ahsan</td>
<td>W523</td>
</tr>
<tr>
<td>Dr. Chadia A. Aji</td>
<td>R314D, W114</td>
</tr>
<tr>
<td>Prof. Sam Ajlani</td>
<td>T535</td>
</tr>
<tr>
<td>Dr. Mustafa Ilhan Akbas</td>
<td>W430</td>
</tr>
<tr>
<td>Mr. Ahmet Akca</td>
<td>M515</td>
</tr>
<tr>
<td>Prof. Elif Akcali</td>
<td>W129</td>
</tr>
<tr>
<td>Dr. Zeynep Akcay Ozkan</td>
<td>T537</td>
</tr>
<tr>
<td>Dr. Atsushi Aker</td>
<td>M534B, R334, M447</td>
</tr>
<tr>
<td>Ms. Bezya Akgun</td>
<td>T413B</td>
</tr>
<tr>
<td>Dr. Shakti Akhtar</td>
<td>T530</td>
</tr>
<tr>
<td>Secil Akinci-Ceylan</td>
<td>R106A</td>
</tr>
<tr>
<td>Motolwasheso Akinlade</td>
<td>T408</td>
</tr>
<tr>
<td>Dr. Fenot Aklog</td>
<td>T550</td>
</tr>
<tr>
<td>Prof. Tuncay Aktosun</td>
<td>R271</td>
</tr>
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<td>Nathalie Al Kakoun</td>
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### Author Indices

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## Author Indices

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### 2021 ASEE Virtual Conference

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### Author Indices

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## Author Indices

### Author | Session(s)
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Ms. Elaine L. Craft | T550
Dr. Brian Craig P.E. | M429
Deanna Craig | R450
Dr. James L. Craig | R271
Prof. Philip Craiger | W430
Mrs. Johannah Lynn Crandall | M408A
Ms. Christina Anlynette Crawford | T533
Mr. William Crawford | M402
Dr. John Crepeau P.E. | T538
Mr. Michael Anthony Crespo | W156, R144
Mr. Kevin O'Neil Crespo Pagan | T452
Dr. Jacob Allen Cress P.E. | R314C
Mr. David J. Cribbs | R155
Mr. Kent A. Crick | W215
Dr. Kent J. Crippen | R271
Prof. Mark Crocker | M528
Caroline Crockett | M515
Dr. Kelly J. Cross | W257, W434B, T551, R271
Elizabeth A. Crotty | W133B
William N. Crowe | T426
Dr. Lesia L. Crompton-Young | T452
Dr. Alberto Cureg Cruz | T330
Dr. Juan M. Cruz | M440
Laura E. Cruz | T314B
Ms. Laura Melissa Cruz Castro | R271
Mr. Pablo J. Cueva Vera | W145
Fernando Antonio Cuevas | T452
Dr. Joseph Dennis Cuiffi | M435
Mr. Ryan Culbertson | T328
Katherine McMillan Culp | M433
Dr. Toby John Cumberbatch | M513B
Ms. Ashley Cummings | R314C
Mr. James Devin Cunningham | W108B, R271
Dr. Patrick Cunningham | W157A, R271
Mr. Matthew Curran | T515
Dr. James C. Curry | M429
Prof. Reagan Curtis | M551
Mr. Matthew Cushing | T437
Dr. Steven Matthew Cutchin | T421
Dr. Stephanie Cutler | R443B, W506, T514, M424, M557, W227
Nora Cuvelier | W233
Dr. Aleksander Czekanski | R122, M459B
Dr. Cynthia Marie D’Angelo | M426
Dr. Agnes Germaine d'Entremont P.Eng. | R139
Dr. Diana S. Dabby | +R341, R443B
Col. Matthew Dabkowski | W438
Dr. Melissa A. Dagley | M533B
Dr. Jerry Lynn Dahlberg Jr | +W156
Dr. Kevin D. Dahm | M405, R120
Dr. Maggie Dahn | M433
Mr. Aaron Dai | T513A
Dr. Minhao Dai | M413C
Ms. Susan Daigle | W423B
Dr. Ulan Dakeev | R152, M413B, T316, T423A, W123C
Prof. Dominic J. Dal Bello | R271
Dr. Medha Dalal | T433, W233
Prof. Ahmed Dailal | M415, W126, T542
Dr. Tim Dallas P.E. | T408, M524
Dr. Odesma Onika Dalrymple | M559
Dr. Christopher Dalton | T427, T440
Dr. Tejaswini S. Dalvi | T233B, R233
Mr. Casey Daly | T344
Dr. Shanna R. Daly | T204, M413B, M413C, R314C, M548, R271
Mr. Nattasit Danicholwichit | M538
Dr. Claire L. A. Dancz | R450, R271
Dr. Amir H. Danesh-Yazdi | M439
Dr. Melissa Danforth | T330
Miss Xuan T. Dang | W123C
Dr. Andrew Danowitz | R114B, M534B
Mr. Vyon Dansu | W410
Prof. Houshang Darabi | R127, R271
Dr. Maryam Darbeheshti | R127B, W227, R271
Dr. Deborah Athas Dardis | R233, T433B, W233, T533
Dr. Emily Anna Dare | W133B
Dr. Sandip Das | R314B
Dr. Shuvra Das | T407, W135, R443B
Johannah Daschil | T513A
Dr. Abhaya K. Datye | W505, M413B, T357
Dr. Vihuti Dave | T515
Locke Davenport Huyer | T233
Benjamin M. David | W404
Dr. Lisa Davidson | R127
Pauline Davila | M435
Major Brad Gregory Davis | W139
Dr. Edward W. Davis | R233, M547B, R271
Jared Larenz Davis | R271
Dr. Julian Ly Davis | T308
Dr. Karen C. Davis | M414B
Mr. Kyle Davis | R123
Dr. Melinda A. Davis | R271
Ms. Susan Davis | R155
Dr. Susannah C. Davis | W505, T357, R271
Prof. Virginia A. Davis | R233, M547B, R271
Dr. William J. Davis P.E. | M452, T437, M442
Eric Davishah | T439, M439, R271
Prof. Jill Davishah | R127B
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## Author Indices

<table>
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<tbody>
<tr>
<td>Ms. Kelly Downey</td>
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<td>Dr. Ronald S. Harichandan</td>
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<td>Dr. Jeanette Hariharan</td>
<td>W227</td>
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</table>
## 2021 ASEE Virtual Conference
### Author Indices

<table>
<thead>
<tr>
<th>Author</th>
<th>Session(s)</th>
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<th>Session(s)</th>
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</thead>
<tbody>
<tr>
<td>Dr. Danielle Harlow</td>
<td>T233B, R271</td>
<td>Dr. Michael Helms</td>
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<td>Dr. Angela Harris</td>
<td>W525</td>
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<td>Dr. Jerrod A. Henderson</td>
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<td>M408A</td>
<td>Dr. Dianne Gayace Hendricks</td>
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<td>Matthew Philip Hendricks</td>
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<td>Mr. Soren Henrichsen</td>
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<td>R127, R271</td>
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<td>M459, R271</td>
<td>Prof. Erin A. Henslee</td>
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<td>T330</td>
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<td>Dr. Geoffrey L. Herman</td>
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<td>M439, R271</td>
<td>Prof. Alfred Olivier Hero</td>
<td>T341</td>
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<td>T209, W420</td>
<td>Dr. Herbert L. Hess</td>
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<td>Dr. Erica Hauvgveitd</td>
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<td>Dr. Justin L. Hess</td>
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<td>Prof. Illya V. Hicks</td>
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<td>Dr. Karen A. High</td>
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<td>M430, W541</td>
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<td>W139</td>
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<td>Sara Hillman</td>
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<td>Dr. Ethan Clark Hilton</td>
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<td>M415</td>
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<td>T204, T404, T524, W124, R324, M442</td>
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<td>Dr. Markus Iseli</td>
<td>T508B</td>
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</tbody>
</table>
## 2021 ASEE Virtual Conference
### Author Indices

<table>
<thead>
<tr>
<th>Author</th>
<th>Session(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Micah Iserman</td>
<td>M425</td>
</tr>
<tr>
<td>Mr. Fatihilah Iskandar</td>
<td>T235</td>
</tr>
<tr>
<td>Dr. ABM Rezbaul Islam</td>
<td>T541</td>
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<td>Mr. Tahzinul Islam</td>
<td>W114</td>
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<td>Prof. Brooke Istas</td>
<td>R271</td>
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<td>Dr. Stephanie S. Ivey</td>
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<td>Dr. Tony Ivey</td>
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<td>R114</td>
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<td>Dr. Paul J. Thomas</td>
<td>R314D</td>
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<td>Dr. Israd Hakim Jaafar</td>
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<tr>
<td>Mr. Ramsey George Jabaji</td>
<td>W227</td>
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<td>Dr. Hugh Jack</td>
<td>M526, T527</td>
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<td>Ms. Alexandra Mary Jackson</td>
<td>R124</td>
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<td>Dr. Andrew Jackson</td>
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<td>Jennifer Jacobs</td>
<td>R271</td>
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<td>Dr. Michael S. Jacobson</td>
<td>R127B, W227,</td>
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<td>Mr. Torey D. Jacques</td>
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<td>Dr. Mojgan A. Jadiidi</td>
<td>W411B</td>
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<td>Dr. Kris Jaeger-Helton</td>
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<td>Ms. Aparajita Jaiswal</td>
<td>R314D, M414</td>
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<td>T204</td>
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<td>Dr. Nebojsa I. Jaksic</td>
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<td>T408B, W120,</td>
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<td>Prof. Mohammad Jalayer</td>
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<td>Dr. Carolyn McCaffrey James</td>
<td>R271</td>
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<td>Mrs. Ita Lee Harrison James</td>
<td>W227</td>
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<td>Dr. Nikki James</td>
<td>T311</td>
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<td>Prof. Marnie V. Jamieson</td>
<td>M405</td>
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<td>Dr. Reihaneh Jamshidi</td>
<td>T339, W439</td>
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<td>Prof. Shinae Jang P.E.</td>
<td>T406, R271</td>
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<td>Ms. Amber Janssen</td>
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<td>W230, W113B,</td>
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<td>Dr. Martina Sherin Jaskolski</td>
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<td>Dr. James Jay Jaurez</td>
<td>W122B</td>
</tr>
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<td>Dr. Maria Javaid</td>
<td>W423B, W126,</td>
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<td>W404</td>
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<td>Dr. Adithya Jayakumar</td>
<td>W557, T351</td>
</tr>
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<td>R150</td>
</tr>
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<td>W401</td>
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<tr>
<td>Dr. Sarah Rajkumari Jayasekaran</td>
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<td>T452, R114B,</td>
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<td>R101, T301,</td>
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<td>R271</td>
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<td>R443B</td>
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<td>R323C, W133B,</td>
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<td>T513C, T524, T534</td>
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<td>T408B</td>
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<td>Dr. Michael Kagan</td>
<td>R271</td>
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<td>Dr. Indika Kahanda</td>
<td>W215</td>
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<td>Dr. Krishnamand Kaipa</td>
<td>W438, T333B</td>
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<tr>
<td>Kitana Kauphanilam</td>
<td>R105, T205, R271</td>
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<tr>
<td>Dr. Rachel Louis Kajfez</td>
<td>M524, R271</td>
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<td>Alan Kalish</td>
<td>W157A</td>
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<td>M413C, M451</td>
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<tr>
<td>Mr. Syed Ali Kamal</td>
<td>W557</td>
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<tr>
<td>Dr. Reza Kamali</td>
<td>W227</td>
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<td>Mr. Jeff Kamadian</td>
<td>R271</td>
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<td>Dr. Sagar Kamarthi</td>
<td>R271</td>
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<td>Dr. Anuja Kamat</td>
<td>T336</td>
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<tr>
<td>Dr. Elisabeth Kames</td>
<td>M413A</td>
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<tr>
<td>Dr. Rohit Kandakatla</td>
<td>R552</td>
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<td>Daniel Kane</td>
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<td>Mr. Acyut Kaneria</td>
<td>M429</td>
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<td>Kisung Kang</td>
<td>W436</td>
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<tr>
<td>Dr. Pil Kang</td>
<td>W505, T357</td>
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<tr>
<td>Dr. Uma Kannan</td>
<td>M530</td>
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<tr>
<td>Dr. Divina Donald Kaombe</td>
<td>T432</td>
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<td>R506</td>
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<td>Dr. Heather Kaplan</td>
<td>T233B</td>
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<td>Author</td>
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<td>W230</td>
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<td>R271</td>
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<td>Dr. Tugba Karabiyik</td>
<td>W413, M413A, R314D</td>
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<td>Neha Kardam</td>
<td>M414, T314B, T542</td>
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<td>R341</td>
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<tr>
<td>Dr. Amir Karimi P.E.</td>
<td>M438</td>
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<tr>
<td>Dr. Boshra Karimi</td>
<td>R314D</td>
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<tr>
<td>Mr. Ali Karji</td>
<td>T209</td>
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<td>Dr. Jennifer Karlin</td>
<td>R334</td>
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<td>Dr. Pavan Karra</td>
<td>T358, T338</td>
</tr>
<tr>
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<td>R514</td>
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<td>R271</td>
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<td>W156, R144</td>
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<td>Dr. Andrew Katz</td>
<td>T408B, T308, W413, R514B, M459B</td>
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<td>T330</td>
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<td>Prof. Autar Kaw</td>
<td>T338</td>
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<tr>
<td>Mais Kayyali</td>
<td>R128</td>
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<tr>
<td>Ms. Efthymia Kazakou</td>
<td>W108, W415</td>
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<td>Hadi Kazemiroodsari</td>
<td>T336</td>
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<td>W215</td>
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<tr>
<td>Dr. James A. Kearns</td>
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<td>R118</td>
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<td>Jacob Z. Keller</td>
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<td>Dr. Meagan R. Kendall</td>
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<td>R514B, W114, M514B</td>
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<td>T438</td>
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<td>R122</td>
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## 2021 ASEE Virtual Conference

### Author Indices

<table>
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<th>Author</th>
<th>Session(s)</th>
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<tr>
<td>Dr. Kimberly LeChasseur</td>
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<td>Dr. Cara Margherio</td>
<td>T259B, R271</td>
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<td>Dr. Candelia Marini</td>
<td>R141</td>
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<td>Dr. Joanna Marques Melo</td>
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<td>Dr. Alberto Marquez P.E.</td>
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<td>W156, R144</td>
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<td>T327, W227</td>
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<td>Ms. Erica J. Marti</td>
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<td>Baker A. Martin</td>
<td>R114, T427B, R271</td>
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<td>Dr. Julie P. Martin</td>
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<td>Dr. Kaela M. Martin</td>
<td>M414B, W514B, R233, R271</td>
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<td>W123C</td>
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<td>T316</td>
</tr>
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<td>Dr. Tye D. Martin</td>
<td>W204</td>
</tr>
<tr>
<td>Ms. Christina Martin-Ebosele</td>
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<td>Dr. David Martinelli</td>
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<td>Analyssa D. Martinez</td>
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<td>Mr. Antonio Estevan Martinez IV</td>
<td>T337</td>
</tr>
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<td>Dr. Joan Martinez</td>
<td>W413</td>
</tr>
<tr>
<td>Ms. Karen Dinora Martinez Soto</td>
<td>T532, W532</td>
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<tr>
<td>Prof. Carlos Eduardo Martinez-Torteya</td>
<td>T427B, T341</td>
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<td>Ms. Larkin Martini</td>
<td>R234</td>
</tr>
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<td>Cmdr. Christopher Adrian Martino</td>
<td>T415B</td>
</tr>
<tr>
<td>Dr. Amy Masnick</td>
<td>R271</td>
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<tr>
<td>Dr. Gregory Mason</td>
<td>M557, R271</td>
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<tr>
<td>Stephanie Masta</td>
<td>M514B</td>
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<tr>
<td>Mrs. Marialice Mastronardi</td>
<td>T533</td>
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<td>Dr. Christian Matheis</td>
<td>W120</td>
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<tr>
<td>Dr. Allen Munyaradzi Mathende</td>
<td>W135</td>
</tr>
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<td>Dr. Tiffany A. Mathews</td>
<td>W136</td>
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<td>Stephens Matsumoto</td>
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<td>Dr. Norma J. Mattei P.E.</td>
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<td>Memoria Matters</td>
<td>R271</td>
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<tr>
<td>Prof. Stephen P. Mattingly</td>
<td>W366A</td>
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<tr>
<td>Dr. Holly M. Matusovich</td>
<td>W157A, M440, T333, R271</td>
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<td>Dr. Rebecca L. Matz</td>
<td>T359</td>
</tr>
<tr>
<td>Dr. Michael R. Maughan</td>
<td>R271</td>
</tr>
<tr>
<td>Dr. Michael G. Mauk</td>
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</tr>
<tr>
<td>Dr. Sean Maw P.Eng.</td>
<td>R139</td>
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<td>M451</td>
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<tr>
<td>Mrs. Kayla R. Maxey</td>
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<td>Dr. Bruce R. Maxim</td>
<td>T346</td>
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<td>Dr. Andrew Maxson</td>
<td>R105</td>
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<tr>
<td>Dr. Dominik May</td>
<td>W108B, M515, M526</td>
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<td>T404</td>
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<td>Dr. Kathleen Mays</td>
<td>W541</td>
</tr>
</tbody>
</table>
## 2021 ASEE Virtual Conference
### Author Indices

<table>
<thead>
<tr>
<th>Author</th>
<th>Session(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Timothy W. Mays</td>
<td>M452</td>
</tr>
<tr>
<td>Dr. Rebecca Mazur</td>
<td>W414B</td>
</tr>
<tr>
<td>Mr. Kenchukwu Churchill Mbanisi</td>
<td>W233</td>
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<tr>
<td>Ms. Anne Marguerite McAlister</td>
<td>M428, R133</td>
</tr>
<tr>
<td>Dr. Susan McCahan</td>
<td>W414B, W414A</td>
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<tr>
<td>Ms. Christine M. McCall</td>
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<td>Mr. Tristan McCarty</td>
<td>T204</td>
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<td>Dr. Anita K. McCaulley</td>
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<td>Mr. Matthew McConnell</td>
<td>W515, M515B</td>
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<td>Lt. Col. Brad C. McCoy</td>
<td>T506, R506, W152, M513A</td>
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<td>Prof. Beth McGinnis-Cavanaugh</td>
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<td>T537</td>
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<td>Dr. Lisa D. McNair</td>
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<td>Dr. Molly McVey</td>
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<td>T209</td>
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<td>M441, M442</td>
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<td>T238</td>
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<td>Dr. Jamie N. Mikeska</td>
<td>T533B</td>
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<tr>
<td>Tyler Milburn</td>
<td>R327, M447B</td>
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<tr>
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<td>M414</td>
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<td>Dr. Marcy Bloom Milhomme</td>
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<td>T355</td>
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<td>Dr. Bailey Alan Miller</td>
<td>M408A</td>
</tr>
</tbody>
</table>
Author | Session(s)
---|---
Christina Natasha Miller | R433B
Mr. Drew Miller | T433B
Isabel Miller | W204, W434B, R271
Ms. Julia K. Miller | T523
Matthew K. Miller | T427B
Matthew J. Miller Ph.D. | T433
Melanie E. Miller | T359B, W434B
Dr. Michele Miller | T514, W414C, R338, R271
Ronnie Miller | T247B
Dr. Sharon Miller | R271
Dr. Sondra M. Miller P.E. | W227
Dr. Joanna Mirecki Millunchick | R511
Prof. Scott T. Milner | T205
Dr. Elizabeth Milonas | +M430, W128
Johanna Milord | R271
Dr. Mani Mina | M449, T349
Dr. Afzaneh Minaie | W230, W530, R530
Dr. Victor Hugo Minces | R271
Nathan Miner | T306
Jessica Marie Mingee | M441, W547B
Dr. Angela Minichiello P.E. | T452, R314B, M414, R114, T438, R271
Prof. John Charles Minor | T327
Mr. Joseph Francis Mirabelli | W257, R271
Lori B. Miraldi | W134B
Ms. Gennie Miranda | T340
Ms. Deanna Miranda Barrios | T308
Dr. John A. Mirth | W138
Diba Mirza | R271
Prof. Daigo Misaki | T513C
Dr. Elif Miskio lu | W514B, R233, R271
Ms. Shruti Misra | +T407, M414, T314B, T542
Prof. Carl Mitcham | R320B
Mr. Thomas Mitchell | R271
Veronica Mitchell | W204
Dr. Amitava ‘Babi’ Mitra | R511
Dr. Madhumi Mitra | M431
Mr. Paul Mitran | T355
Dr. Maryam Mobed-Miremadi | W204
Dr. Catherine Mobley | R271
Dr. Sarah J. Mobley | W506
Dr. Alicia A. Modenbach P.E. | T403
Prof. Mohsen Moghaddam | R271
Mr. Rajashekar Reddy Mogiligidda | T413A, W227
Dr. Mahnas Jean Mohammadi-Aragh | M408A, R271
Dr. Jaby Mohammed | R324, T535
Mostafa Kamel Osman Mohammed | T314B
Dr. Tijjani Mohammed | M530
Author | Session(s)
---|---
Dr. Sriram Mohan | T259B, R271
Lakshmy Mohandas | W127B
Md Nizamul Hoque Mojumder | M514B
Samira Momem | W227
Dr. Joi-Lynn Mondisa | W124, T328, T540
Dr. Jared Monschein | T508B
Dr. Alexander Monea | T420
Ms. Callan E. Monette | T247B
Dr. Jean-Michel Mongeau | T338
Mr. Wai-Leong Mook | R155
Simran Moolchandaney | T251
Ms. Jukrin Moon | M429
Prof. Thomas Moon | T315
Dr. Emily Moore P.Eng. | M534
Dr. Janie M. Moore | R271
Joe Dallas Moore | T406, T325
Dr. Kristen Moore | R114B, M559B, M528, W140
Lori L. Moore | R324
Dr. Roxanne Morgan | M508, M533B
Prof. Tamara J. Moore | W233, M548
Dr. Kimia Muzoeh | W414C
Ms. Lisa Morales | T440
ShahKyla Moran | R271
Alanna K. Moravetz JD | T355
Emily Moreno | T404
Cameron N. Morgan | T325
Dr. Kali Lynn Morgan | R134A, R151
Tania K. Morimoto | M513A, T427
Brooke Morin | R327, T327
Mrs. Megan Morin | W257
Dr. Beshry Morkos | M413A, M515
Dr. Patricia Morealle | M457
Mr. Gilbert Morris | R101
Dr. Karcher Morris | M515B
Dr. Melissa Lynn Morris | R127, R271
Ms. Sydney Anne Morris | T327
Mr. Michael G. Morrow | M508
Dr. Audra N. Morse | W106B
Javier Moscoso | T452
Prof. Fred Moshary | T550
Dr. Rachel Mosier P.E. | W409
Nazeer Mosley | W145
Miss Mayra Luján Mosqueda | W401
Dr. Jennifer D. Moss | T251
Ms. Anna M. Mostoller | R271
Dr. Erika A. Mosyjowski | M548, R271
Dr. Sanaz Motamed | W129
Dr. Sarira Motaref P.E. | R271
Jade Moten | R114B, T551, R271
Dr. Jennifer Mott | M559B
Mr. Daniel Patrick Mountain | +T347B, T347B
Ms. Angie Moussa | W113, T355
<table>
<thead>
<tr>
<th>Author</th>
<th>Session(s)</th>
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</thead>
<tbody>
<tr>
<td>Dr. Bing Mu</td>
<td>+T532</td>
</tr>
<tr>
<td>Dr. Karim Heinz Muci-Kuchler</td>
<td>M548, M448</td>
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<td>W410</td>
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<td>M526</td>
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<td>W238</td>
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<td>T247B</td>
</tr>
<tr>
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<td>W230, W113B</td>
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<td>T233B, R271</td>
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<td>+W413</td>
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<td>T238</td>
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<td>R118</td>
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<td>W413, T455, M459B, M557, W227, T232A, T532, W532, T340, M448</td>
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<td>Dr. Sneha Prabha Narra</td>
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<td>Dr. Malini Natarajarathinam</td>
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<thead>
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<th>Session(s)</th>
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<tr>
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<td>Rezvan Nazempour</td>
<td>R127, R271</td>
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<td>Dr. Mandoye Ndoye</td>
<td>W215, R271</td>
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<td>Dr. Kathryn A. Neeley</td>
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<td>Dr. Ashkan Negahban</td>
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<td>R271</td>
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<td>M557, W257</td>
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<td>M505</td>
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<td>Dr. Sunni Haag Newton</td>
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<td>R271</td>
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<td>Stanley Shie Ng</td>
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<td>T308</td>
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<td>Mr. Kien Truong Nguyen</td>
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<td>Mr. Luan M. Nguyen</td>
<td>W120, R520, R120, R271</td>
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<td>M502</td>
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<td>M402</td>
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<td>Prof. Truong Nguyen</td>
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<td>Dr. Carolyn Aitken Nichol</td>
<td>T437, T533</td>
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<td>Ms. Olivia Kay Nicholas</td>
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<td>Taco Niet Ph.D., P.Eng.</td>
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</table>

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# 2021 ASEE Virtual Conference

## Author Indices

<table>
<thead>
<tr>
<th>Author</th>
<th>Session(s)</th>
<th>Author</th>
<th>Session(s)</th>
</tr>
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<tbody>
<tr>
<td>Dr. Dean Nieusma</td>
<td>M534</td>
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<td>Michaela Ochotorena</td>
<td>T247B</td>
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<td>Dr. David Niño</td>
<td>R155</td>
<td>Dr. Joseph Learned Odenwald</td>
<td>T455</td>
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<td>T308</td>
<td>Dr. Brooke Odle</td>
<td>W520</td>
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<td>Dr. Swetha Nittala</td>
<td>T413C, T513C,</td>
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<td>T417, W525, R334</td>
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<td>R139</td>
<td>Dr. Andrea Nana Ofori-Boudu</td>
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<td>Dr. Andrea M. Ogilvie P.E.</td>
<td>R323C, R271</td>
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<td>Dr. Jennifer Harper Ogle</td>
<td>T414B, T359</td>
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<td>Mr. Jeremiah Ogundunmi</td>
<td>R324</td>
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<td>Dr. Adebayo Ogundipe</td>
<td>T432</td>
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<td>Mr. Louis Oh</td>
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<td>Chimindiu Ohaegbu</td>
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<td>Dr. Matthew W. Ohland</td>
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<td>Dr. Andrew Olewnik</td>
<td>W413, M413B, R514, R314C</td>
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<td>T347B</td>
<td>Dr. John Y. Oliver</td>
<td>T450</td>
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<td>Dr. Darlene M. Olsen</td>
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<td>M408A, R450</td>
<td>Wendy Michelle Olson</td>
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<td>Janet Aderemi Omitoyin</td>
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<td>W157A, W227</td>
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<td>Ariana Virginia Ortega</td>
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<td>W423B, W441</td>
<td>Mrs. Pearl Elizabeth Ortega-Darwin</td>
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<td>Dr. Araceli Martinez Ortiz</td>
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<td>R271</td>
<td>Mrs. Christina Sholars Ortiz</td>
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<td>M402</td>
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<td>R514</td>
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<td>W534</td>
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<td>W138</td>
<td>Dr. Anu Osta</td>
<td>T339</td>
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<td>Dr. Peter M. Ostafichuk P.Eng.</td>
<td>W227</td>
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<td>T533</td>
<td>Mr. Simon Ethan Oster</td>
<td>M408B</td>
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<td>R101</td>
<td>Miss Gabriela Alexandra Otero-Andino</td>
<td>T452</td>
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<td>T414B, R150</td>
<td>Dr. Wilkistar Otieno</td>
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<td>R271</td>
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<td>W204</td>
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</table>

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# 2021 ASEE Virtual Conference

## Author Indices

<table>
<thead>
<tr>
<th>Author</th>
<th>Session(s)</th>
<th>Author</th>
<th>Session(s)</th>
</tr>
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<tbody>
<tr>
<td>Chloe Otis</td>
<td>T514</td>
<td>Dr. Yolanda Parker</td>
<td>R271</td>
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<td>T201</td>
<td>Dr. Shannon L. Isovitsch Parks P.E.</td>
<td>T425</td>
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<td>Prof. Robin Ott</td>
<td>R271</td>
<td>Dr. Alexander P. Parobek</td>
<td>R271</td>
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<td>T541</td>
<td>Laura Parson</td>
<td>R271</td>
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<td>W524</td>
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<td>Dr. Jennifer Pascal</td>
<td>R120, M559B, R327, R271</td>
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<td>Dr. Oludare Adegbola Owolabi P.E.</td>
<td>R306, W410, T326, R271</td>
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<td>M515B</td>
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<td>T333</td>
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<td>W108</td>
<td>Smeet Patel</td>
<td>W145</td>
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<td>R271</td>
<td>Mr. Soham Patel</td>
<td>W547B</td>
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<td>T507, R140A</td>
<td>Ms. Alexis Pathwick-Paszyc</td>
<td>T327</td>
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<td>Dr. Desen Sevi Ozkan</td>
<td>M559B, T334A, W434A, T234</td>
<td>Dr. Priyadarsharun N. Patil</td>
<td>W414B</td>
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<td>W204</td>
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<td>R314C</td>
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<td>T455</td>
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<td>R514B</td>
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<td>R520, R120, R271</td>
<td>Dr. Jody Paul</td>
<td>R271</td>
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<td>Mr. Alexander Pagano</td>
<td>M513A</td>
<td>Dr. Kelli Paul</td>
<td>R133</td>
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<td>Dr. Christina Paguyo</td>
<td>R271</td>
<td>Patrick Paul</td>
<td>M559B</td>
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<td>R506, R106A</td>
<td>Mr. Thomas James Pauly</td>
<td>M559B</td>
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<td>T311</td>
<td>Dr. Alice L. Pawley</td>
<td>M514B, M528</td>
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<td>M438</td>
<td>Mr. Corey Payne</td>
<td>R271</td>
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<td>M423</td>
<td>Dr. Karl Pazdernik</td>
<td>T341</td>
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<td>W538</td>
<td>Dr. Pilar Pazos</td>
<td>W438, T333B</td>
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<td>Dr. Charles W. Peak</td>
<td>W204</td>
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<td>Mary Pearson</td>
<td>M513A, M514B, M524, T524, W441</td>
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<td>Dr. Yvette E. Pearson P.E.</td>
<td>W366A</td>
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<td>Dr. Laura Palucki Blake</td>
<td>T414B</td>
<td>Dr. Reg Recayi Pecen</td>
<td>R152, M413B, T316, T423A, W123C</td>
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<td>W123C</td>
<td>Mr. Blaine Austin Pedersen</td>
<td>R271</td>
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Schedule subject to change. Please go to [https://2021asee.pathable.co/](https://2021asee.pathable.co/) for up-to-date information.
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AUTHOR INDICES

Author | Session(s)
--- | ---
Dr. Rupa S. Valdez | T413A
Mr. Darinel Valencia-Marquez | R314D
Mrs. Rachael Valenz | W118
Joseph Valle | M559, W134A
Ms. Allison Van Beek | W414A
Dr. Lelli Van Den Einde | T318, T233
Dr. James Van Henghan | R271
Dr. Edwin van Hassel | R144
Mrs. Natalie C.T. Van Tyne P.E. | W527
Prof. Bernard J. Van Wie | R105, T205, R271
Dr. Christopher P. Vanags | R271
Dr. Tammy VanDeGrift | M459
Elin Vandebusche | W527B
Lyssa Vanderbeek | M408A
Michael R. VanDusen | T301
Caroline VanIngen-Dunn | T550, R271
Prof. Tommaso Alessandro Vannelli | R271
Mr. Cristián Eduardo Vargas Ordoñez P.E. | R141, R233
Dr. Valerie Varney | W108B
Dr. Ariana C. Vasquez | T514
Dr. Eleazar Vasquez | M533B
Dr. Erick S. Vasquez | T205
Mr. Collins N. Vaye | W410
Dr. Elena Nicolescu Veety | M533
Mr. Blas Fernando Vega BV | W401
Isamarie Vega Morales | W139
Jose Fernando Vega-Riveros | T415B
Prof. Adan Ernesto Vela | W230
Camille Velarde | T252
Dr. Maria Angelica Velazquez | W151
Isasio Velez | T530
Jennifer Velez M.Ed. | T433B, W233
Dr. Miguel Velez-Reyes | W215, T530, R271
Miss Vibhavari Vempala | T524, R324
Dr. Chris Venters | W126, R271
Ms. Ashley Nicole Venturini | T403
Dr. Dina Verdin | R114B, W414C, M440
Dr. Matthew A. Verleger (He/His/Him) | W430, R327
Mr. Rahul Verma P.E. | W156
Dr. Karinna M. Vernaza | R271
Dr. Julianne Vernon | W227
Liam Verses | R520
Dr. Nahid Vesali P.E. | M441
Major Raymond Vetter | W156
Ms. Norma L. Veurink | T318
Ms. Tessa Veurink | T316
Dr. Wei Dai Vian | T423A
Dr. Shawnna Vican | M457, W551A
Ms. Laura Vidal-Chiesa | M441
Sylvie Vieu | M439
Ms. Roobini Vijayabalan | R127B
Dr. Shazib Z. Vijilee | M533
Dr. Elsa Q. Villa | M457
Dr. Adrian Villalta-Cerdas | R271
Idalis Villanueva | T413B, W140, M451
Roopa Vinay | T357
Dr. Tyrone Vincent | T515
Dr. Jeffrey S. Vipperman | T326
Dr. Liliany Virguez | M426, R357
Dr. Vimal Viswanathan | M439
Dr. John Peter Voccio | W227
Dr. Chrysafis Vogiatzis | R271
Mr. Ronald Justin Vogler | R141
Ms. Sara Rose Vohra | R271
Dr. Matthew K. Voigt | T337
Dr. Ann-Marie Vollstedt | R314B, R271
Dr. Faye Linda Wachs | T308
Dr. Warren N. Waegenspack Jr. | T455
Prof. David R. Wagner | M505
Dr. Nicole Wagner | T541
Ms. Susan B. Wainscott | R121
Ms. Caressa Adalia Wakeman | R271
Prof. Scott Walbridge P.E. | W402
Dr. James Walker | T346
Dr. Candace Walkington | R271
Dr. Stephanie L. Walkup PE | R127B
Alexis Wall | W501
Dr. Benjamin Michael Wallen P.E. | T425
Mr. David Ray Walker | R114B, W527
Dr. Peter L.L. Walls | W227
Mr. William Harrison Walls | W233
Cassie Wallwey | R327, M547B
Miss Alexis Rae Walsh | V347B, T347B
Prof. Conor Walsh P.E. | W233
Dr. Deborah Walter | T532
Dr. Mark E. Walter | W113
Dr. Joachim Walther | M515, R271
Prof. Rebecca Walton | M559B
Dr. S. Patrick Walton | R271
Dr. Tobin N. Walton | W227, R271
Col. Brad Wambuke P.E. | R106A, R506
Annie AnMeng Wang | T204
Dr. Chao Wang | W427, W366A
Dr. Chaoli Wang | M408B
Dr. Chaoli Wang | M406, T406
Prof. Gerald J. Wang | M435
Ms. Guoyi Wang | R342B
Prof. HaiFeng Wang | M435
Mr. Hechuan Wang | R271
Dr. Jin Wang | R271
Dr. Jing Wang | T551
Prof. Ju Wang | T235
Dr. Jyhwen Wang | R271
Dr. Xi Wang P.E. | M413C
Dr. Xiaomei Wang | M429
<table>
<thead>
<tr>
<th>Author</th>
<th>Session(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Y. Curtis Wang</td>
<td>M549</td>
</tr>
<tr>
<td>Ms. Yaoling Wang</td>
<td>R322</td>
</tr>
<tr>
<td>Dr. Yu Wang</td>
<td>T526</td>
</tr>
<tr>
<td>Ms. Yue Wang</td>
<td>W515</td>
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<tr>
<td>Dr. Zhaozhong Wang</td>
<td>W430</td>
</tr>
<tr>
<td>Dr. Linda Wanless</td>
<td>M514</td>
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<tr>
<td>Dr. Annmarie Ward</td>
<td>R443B</td>
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<tr>
<td>Ms. Corinna Megan Ward</td>
<td>M401</td>
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<tr>
<td>Dr. Mark Daniel Ward</td>
<td>M414</td>
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<tr>
<td>Dr. Thomas A. Ward</td>
<td>M401</td>
</tr>
<tr>
<td>Dr. Gregg Morris Warnick</td>
<td>R155</td>
</tr>
<tr>
<td>Ms. Danielle S. Washington</td>
<td>T316</td>
</tr>
<tr>
<td>Dr. Gloria Washington</td>
<td>R314C</td>
</tr>
<tr>
<td>Dr. Nathan John Wathuta P.E.</td>
<td>T313, W518, M449</td>
</tr>
<tr>
<td>Dr. Kevin A. Waters P.E.</td>
<td>M506, R127B</td>
</tr>
<tr>
<td>Jessica Watkins</td>
<td>R271</td>
</tr>
<tr>
<td>Dr. Karan Watson P.E.</td>
<td>W414B, M459, M557</td>
</tr>
<tr>
<td>Dr. Mary Katherine Watson</td>
<td>M506, T437, M438, R271</td>
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<td>Nathan Watson</td>
<td>T530</td>
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<td>Kelsey Watts</td>
<td>M4442, R233</td>
</tr>
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<td>Dr. Natasha B. Watts</td>
<td>R506</td>
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<tr>
<td>Dr. Sandra M. Way</td>
<td>R114B</td>
</tr>
<tr>
<td>Dr. Bart L. Weathington</td>
<td>R320B</td>
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<td>Kari D. Weaver</td>
<td>W127C</td>
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<td>W233</td>
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<td>R139</td>
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<tr>
<td>Dr. Luke Gerard Weber P.E.</td>
<td>T415B</td>
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<tr>
<td>Dr. Joshua Levi Weese</td>
<td>M408B, W151</td>
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<tr>
<td>Ms. Hannah Wehlmann</td>
<td>R271</td>
</tr>
<tr>
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<td>R271</td>
</tr>
<tr>
<td>Mr. Siqing Wei</td>
<td>T513A, W127C</td>
</tr>
<tr>
<td>Dr. Mark H. Weichold</td>
<td>T341, R271</td>
</tr>
<tr>
<td>Prof. Jennifer Weiser</td>
<td>R105</td>
</tr>
<tr>
<td>Dr. Mark A. Weiss</td>
<td>T530, M447B</td>
</tr>
<tr>
<td>Dr. Marc Weissburg</td>
<td>M533B</td>
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<tr>
<td>Dr. Ronald W. Welch</td>
<td>T206</td>
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<td>M508</td>
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<tr>
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<td>M506</td>
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<td>T235</td>
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<td>Mr. Justyn James Paquette Welsh</td>
<td>M559B</td>
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<tr>
<td>Ayodeji B. Wemida</td>
<td>R306</td>
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<tr>
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<td>T233B, R233</td>
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<td>Mrs. Melissa Wendell</td>
<td>T233</td>
</tr>
<tr>
<td>Ms. Kaylee Andree Wersant</td>
<td>W233</td>
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<tr>
<td>Dr. Ruth E. H. Wertz</td>
<td>M427B</td>
</tr>
<tr>
<td>Dr. Christy Wheeler West</td>
<td>M405, R271</td>
</tr>
<tr>
<td>Meg West</td>
<td>M524, M447</td>
</tr>
<tr>
<td>Paige West</td>
<td>R506</td>
</tr>
<tr>
<td>Mr. Brian Westra</td>
<td>W421</td>
</tr>
<tr>
<td>Dr. Matthew Wettergreen</td>
<td>T413B, R118</td>
</tr>
<tr>
<td>Prof. Stephanie G. Wettstein</td>
<td>T305B</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Author</th>
<th>Session(s)</th>
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<tbody>
<tr>
<td>Ms. Denise Amanda Wetzel</td>
<td>R121</td>
</tr>
<tr>
<td>Dr. Richard Whalen</td>
<td>R121</td>
</tr>
<tr>
<td>Carter B. Wheat</td>
<td>W123C</td>
</tr>
<tr>
<td>Miss Adrienne J. Wheeler</td>
<td>W233</td>
</tr>
<tr>
<td>Laurel Whisler</td>
<td>T427B</td>
</tr>
<tr>
<td>Dr. Angela M. White</td>
<td>M447</td>
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<tr>
<td>Dr. Bob White P.E.</td>
<td>T519, M419</td>
</tr>
<tr>
<td>Prof. Elizabeth L. White</td>
<td>W257</td>
</tr>
<tr>
<td>Erich White</td>
<td>T311</td>
</tr>
<tr>
<td>Mr. Jarod White</td>
<td>T413C</td>
</tr>
<tr>
<td>Mr. Lance Leon Allen White</td>
<td>W414B, M557</td>
</tr>
<tr>
<td>Mel White</td>
<td>R233</td>
</tr>
<tr>
<td>Dr. Melissa Mae White</td>
<td>M513B</td>
</tr>
<tr>
<td>Miss Rachel Nicole White</td>
<td>T337</td>
</tr>
<tr>
<td>Prof. John Whitefoot</td>
<td>T326</td>
</tr>
<tr>
<td>Andrew Whitehead</td>
<td>T314B</td>
</tr>
<tr>
<td>Mr. John L. Whitman</td>
<td>W411B</td>
</tr>
<tr>
<td>Jennifer Whittfield</td>
<td>W133B</td>
</tr>
<tr>
<td>Mr. Lucas Wickham</td>
<td>R314C</td>
</tr>
<tr>
<td>Dr. James M. Widmann</td>
<td>W139, R271</td>
</tr>
<tr>
<td>Blake Wiehe</td>
<td>W233</td>
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<tr>
<td>Mr. Adam Jeffrey Wielobob</td>
<td>W423B</td>
</tr>
<tr>
<td>Dr. Jeanna R. Wieselmann</td>
<td>W133B, W233</td>
</tr>
<tr>
<td>Jameka Wiggins</td>
<td>W240</td>
</tr>
<tr>
<td>Dr. Joseph Wiimikka-Lydon</td>
<td>R234</td>
</tr>
<tr>
<td>Dr. Katherine Hennessey Wikoff</td>
<td>R141</td>
</tr>
<tr>
<td>Mr. Jeff R. Wilcox</td>
<td>T523</td>
</tr>
<tr>
<td>Prof. Uri Wilensky</td>
<td>W436</td>
</tr>
<tr>
<td>Dr. Stephen Andrew Wilkerson P.E.</td>
<td>W227, T541</td>
</tr>
<tr>
<td>Dr. Kerrie G. Wilkins-Yel</td>
<td>W551A</td>
</tr>
<tr>
<td>Prof. Karen E. Willcox</td>
<td>T408B</td>
</tr>
<tr>
<td>Jacob Willetts</td>
<td>M505</td>
</tr>
<tr>
<td>Ashayla Williams</td>
<td>W118</td>
</tr>
<tr>
<td>Ms. Brooke D. Williams</td>
<td>R121</td>
</tr>
<tr>
<td>Mr. Christopher Williams</td>
<td>T238</td>
</tr>
<tr>
<td>Dr. David F. Williams</td>
<td>T341</td>
</tr>
<tr>
<td>Dr. Jade Williams</td>
<td>W129</td>
</tr>
<tr>
<td>Dr. Julia M. Williams</td>
<td>W524, T259B, T328, R271</td>
</tr>
<tr>
<td>Shaylin Williams</td>
<td>R271</td>
</tr>
<tr>
<td>Dr. Troy Williams</td>
<td>R233, T433B, W233, T533</td>
</tr>
<tr>
<td>Eric J. Williamson</td>
<td>W501</td>
</tr>
<tr>
<td>Dr. Michael R. Williamson</td>
<td>T259B</td>
</tr>
<tr>
<td>Dr. Blake Williford</td>
<td>W414B</td>
</tr>
<tr>
<td>Dr. Barry Willis</td>
<td>T538</td>
</tr>
<tr>
<td>Mr. Geoffrey N.A. Willis</td>
<td>T301</td>
</tr>
<tr>
<td>Karen Willis</td>
<td>R450, R271</td>
</tr>
<tr>
<td>Ms. Sara Willner-Giwerc</td>
<td>T433B</td>
</tr>
<tr>
<td>Prof. Clinton S. Willson</td>
<td>M514</td>
</tr>
<tr>
<td>Ms. Carolyn Wilson</td>
<td>W257</td>
</tr>
<tr>
<td>Dr. Claudia Mara Dias Wilson</td>
<td>W506, R106A</td>
</tr>
<tr>
<td>Dr. Denise Wilson</td>
<td>T407, M414,</td>
</tr>
<tr>
<td>Author</td>
<td>Session(s)</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Dr. Sarah A. Wilson</td>
<td>T314B, M415, T542</td>
</tr>
<tr>
<td>Ms. Tara Gupte Wilson</td>
<td>T403</td>
</tr>
<tr>
<td>Dr. Timothy A. Wilson</td>
<td>T557, R271</td>
</tr>
<tr>
<td>Ms. Madalyn Wilson-Fetrow</td>
<td>W505, M413B, W126, T357</td>
</tr>
<tr>
<td>Dr. Amy Wilson-Lopez</td>
<td>R133</td>
</tr>
<tr>
<td>Dr. Kyle Nathan Wintree</td>
<td>T507</td>
</tr>
<tr>
<td>Dr. Kathryn Anne Wingate</td>
<td>T201, W501</td>
</tr>
<tr>
<td>Miss Leann Wishah</td>
<td>W414C</td>
</tr>
<tr>
<td>Miss Samantha E. Wismer</td>
<td>M539</td>
</tr>
<tr>
<td>Mr. Tom Withee</td>
<td>R271</td>
</tr>
<tr>
<td>Dr. Ann-Perry Witmer P.E.</td>
<td>M441, W547B</td>
</tr>
<tr>
<td>Mrs. Edie L. Wittenmyer</td>
<td>W126</td>
</tr>
<tr>
<td>Lea Wittie</td>
<td>W127C</td>
</tr>
<tr>
<td>Ms. Alexa Wnorowski</td>
<td>T247B</td>
</tr>
<tr>
<td>Prof. Sarah Wodin-Schwartz P.E.</td>
<td>+T439</td>
</tr>
<tr>
<td>Dr. Patti Wojahn</td>
<td>R271</td>
</tr>
<tr>
<td>Dr. Ava R. Wolf</td>
<td>M538</td>
</tr>
<tr>
<td>Prof. Michael Wolf</td>
<td>R271</td>
</tr>
<tr>
<td>Dr. Tilman Wolf</td>
<td>M428</td>
</tr>
<tr>
<td>Dr. Ebisa Wollega</td>
<td>M429</td>
</tr>
<tr>
<td>Dr. Deborah Won</td>
<td>W366A</td>
</tr>
<tr>
<td>Prof. Mark Wong</td>
<td>R271</td>
</tr>
<tr>
<td>Prof. Tak-Sing Wong</td>
<td>T338</td>
</tr>
<tr>
<td>Dr. Jeong H. Woo</td>
<td>T413B</td>
</tr>
<tr>
<td>Dr. Jeyoung Woo P.E.</td>
<td>T455</td>
</tr>
<tr>
<td>Dr. Alison Wood</td>
<td>W227</td>
</tr>
<tr>
<td>Mr. Jeff Wood</td>
<td>M452, W113</td>
</tr>
<tr>
<td>Mr. Taylor Steven Wood</td>
<td>R443B</td>
</tr>
<tr>
<td>Dr. Timothy Aaron Wood</td>
<td>R306, W109, M442</td>
</tr>
<tr>
<td>Dr. Brian Woodard</td>
<td>R118</td>
</tr>
<tr>
<td>Dr. C. Jason Woodard</td>
<td>W227</td>
</tr>
<tr>
<td>Cassandra Sue Ellen Woodcock</td>
<td>T204, R511, M442</td>
</tr>
<tr>
<td>Dr. Michael L. Woodrow</td>
<td>T513B</td>
</tr>
<tr>
<td>Johnny C. Woods Jr.</td>
<td>T232A, W532, T532, T340</td>
</tr>
<tr>
<td>Zuleka Woods</td>
<td>T232A</td>
</tr>
<tr>
<td>Prof. Thomas Woodson</td>
<td>R271</td>
</tr>
<tr>
<td>Dr. Erica Cusi Wortham</td>
<td>R271</td>
</tr>
<tr>
<td>Prof. Karen Woszyna-Birch</td>
<td>R271</td>
</tr>
<tr>
<td>Mr. Brandon David Wright</td>
<td>R530</td>
</tr>
<tr>
<td>Dr. Cameron H. G. Wright P.E.</td>
<td>M508</td>
</tr>
<tr>
<td>Casey E. Wright</td>
<td>M528</td>
</tr>
<tr>
<td>Ms. Courtney Janaye Wright</td>
<td>T359B, W434B</td>
</tr>
<tr>
<td>Prof. Chang-Yu Wu</td>
<td>R271</td>
</tr>
<tr>
<td>Dr. Jingzhe Wu</td>
<td>M502</td>
</tr>
<tr>
<td>Dr. Zhenhui Wu</td>
<td>T235, W135</td>
</tr>
<tr>
<td>Julia Lyn Wyatt</td>
<td>W156</td>
</tr>
<tr>
<td>Dr. Kristen N. Wyckoff</td>
<td>W506</td>
</tr>
<tr>
<td>Dr. Madasser Fraz Wyne</td>
<td>T530</td>
</tr>
<tr>
<td>Dr. James Wynn</td>
<td>T325</td>
</tr>
<tr>
<td>Patricia Xavier</td>
<td>M452, T334A</td>
</tr>
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</tbody>
</table>

Schedule subject to change. Please go to [https://2021asee.pathable.co/](https://2021asee.pathable.co/) for up-to-date information.
# 2021 ASEE Virtual Conference

## Author Indices

<table>
<thead>
<tr>
<th>Author</th>
<th>Session(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sherri Youssef</td>
<td>T313, W527B</td>
</tr>
<tr>
<td>Dr. Asad Youssef</td>
<td>M431</td>
</tr>
<tr>
<td>Ms. Boni Frances Yraguen</td>
<td>W557</td>
</tr>
<tr>
<td>Fan Yu</td>
<td>R271</td>
</tr>
<tr>
<td>Miss Yi-Hsuan Yu</td>
<td>M425</td>
</tr>
<tr>
<td>Jiawei Yuan</td>
<td>T315</td>
</tr>
<tr>
<td>Valeriya Yudina</td>
<td>W542</td>
</tr>
<tr>
<td>Modupe Omolara Yusuf</td>
<td>M441</td>
</tr>
<tr>
<td>Dr. Michael Zabinski</td>
<td>M427B</td>
</tr>
<tr>
<td>Dr. Kari Zacharias</td>
<td>T234</td>
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<tr>
<td>Dr. Arash E. Zaghi</td>
<td>R271</td>
</tr>
<tr>
<td>Dr. Mohamed A. S. Zaghoul</td>
<td>W126, T542</td>
</tr>
<tr>
<td>Leila Zahedi</td>
<td>T330</td>
</tr>
<tr>
<td>Miss Nathalie Zaldivar</td>
<td>R271</td>
</tr>
<tr>
<td>Dr. Victor Zaloom P.E.</td>
<td>M429</td>
</tr>
<tr>
<td>Prof. Israel Zamora-Hernández</td>
<td>M402</td>
</tr>
<tr>
<td>Dr. Sarah E. Zappe</td>
<td>T205, W506, T514, M424, W524, M426, M557</td>
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<tr>
<td>Dr. J. Asuncion Zarate-Garcia</td>
<td>M402</td>
</tr>
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<td>Dr. Ricardo Zaurin P.E.</td>
<td>W538</td>
</tr>
<tr>
<td>Prof. Genaro Zavala</td>
<td>M424, T427B, M428, T341</td>
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<td>R140A</td>
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<td>T414B, W514B</td>
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<tr>
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<td>T435</td>
</tr>
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<td>T408</td>
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<tr>
<td>Dr. Chengyi Zhang P.E.</td>
<td>T409</td>
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<td>Mr. Jianqiang Zhang</td>
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<td>Dr. Jiaqi Zhang</td>
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</tr>
<tr>
<td>Dr. Kun Zhang P.E.</td>
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<td>Mr. Peng Zhang</td>
<td>T532</td>
</tr>
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<td>Ms. Qianjin Zhang</td>
<td>W421</td>
</tr>
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<td>Dr. Qiping Zhang</td>
<td>+M430, W128</td>
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<td>Dr. Xiaorong Zhang</td>
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<td>W145</td>
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<td>Mr. Zhicheng Zhang</td>
<td>W135</td>
</tr>
<tr>
<td>Mr. Zhilin Zhang</td>
<td>T314B, W542</td>
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<td>R334</td>
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<td>Dr. Linda Zheng</td>
<td>W541</td>
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</table>

## Author

<table>
<thead>
<tr>
<th>Author</th>
<th>Session(s)</th>
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<tbody>
<tr>
<td>Dr. Mingxia Zhi</td>
<td>T328</td>
</tr>
<tr>
<td>Ms. Jody Zhong</td>
<td>R271</td>
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<tr>
<td>Dr. Yutao Zhong</td>
<td>W257</td>
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<tr>
<td>Mr. Chuhan Zhou</td>
<td>W127C</td>
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<td>Dr. Ziliang Zhou</td>
<td>R152</td>
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<td>Prof. Cheng Zhu</td>
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<tr>
<td>Dr. Haolin Zhu</td>
<td>W538, W441, M441</td>
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<tr>
<td>Jia Zhu</td>
<td>T330, W514B</td>
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<tr>
<td>Jiabin Zhu</td>
<td>W514B, W532</td>
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<td>M547B</td>
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<td>M429</td>
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<tr>
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<tr>
<td>Dr. Ben Behbood Zoghi</td>
<td>R155</td>
</tr>
<tr>
<td>Dr. Carla B. Zoltowski</td>
<td>R120, R271</td>
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<tr>
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<tr>
<td>Dr. Khalid Zouhri</td>
<td>W423B</td>
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<tr>
<td>Mr. Santiago Zuluaga</td>
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</tr>
<tr>
<td>Hector Zuniga-Robles</td>
<td>W114</td>
</tr>
</tbody>
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