JUNE 22 - 26, 2020

ASEE’S VIRTUAL CONFERENCE
At Home with Engineering Education

CONFERENCEx
PROGRAM

PRESENTED BY UNIVERSITY OF MARYLAND
TRANSFORMING HIGHER EDUCATION THROUGH PROJECT-BASED LEARNING

WPI, a purpose-driven community of educators and researchers, has been the global leader in project-based learning for 50 years.

Learn more at [wpi.edu/+asee](http://wpi.edu/+asee).
Welcome to ASEE’s 127th Annual Conference and Exposition—“At Home with Engineering Education.” It’s our first annual meeting conducted entirely online. Like many of you, I looked forward to a festive gathering in Montréal, but that will have to wait. Given the risk to the health of our members, the uncertainty of travel, and the likelihood that no city could host a crowd of thousands during a global pandemic, cancellation of the meeting became inevitable. The question then was, do we reschedule for later in the year or try something else?

ASEE’s Board of Directors gambled that an all-virtual conference, held at the same time in June, would work. Your response has been awesome, proving once again the resilient strength of our Society. I’m delighted to report that we have more than 3,000 attendees, over 1,700 peer-reviewed papers, hundreds of sessions, and more than 1,400 authors. While none of us pretends that computer screens capture the fun and conviviality of in-person connections, it’s amazing how close we’ve come to the real thing.

The workshops, distinguished lectures, panel discussions, and technical sessions in this program reflect an engineering education community buzzing with creative ideas. Some of the sessions are up to the minute, like Monday’s panel discussion among engineering and engineering technology deans on how their campuses have responded to COVID-19. Other sessions fuse cutting-edge technical research and pedagogy. One panel explores smart and renewable energy systems and accompanying teaching innovations. Another looks at new forms of micro-mobility and their impact on engineering education. You can also join several 30-minute virtual tours of energy facilities.

Times of economic uncertainty—like the present—prompt us all to think about our own and our colleagues’ careers and where they’re headed. To hear voices of wisdom and experience on this topic, tune in Tuesday for a session entitled “Busting a Career Move? When and Why or Why Not?” and another on Friday geared to junior and professional-track faculty.

As some of you know, a focus of my attention this year has been the well-being of our graduate students. So I’m personally gratified to see so many students registered and sessions offering insights on graduate education, such as a workshop on helping underrepresented minority doctoral candidates across the finish line.

Every conference involves hard work by many people and last-minute workarounds, but this one demanded an extra-large measure of ingenuity. It’s a true engineering feat. So I want to extend an especially warm thank you to sponsors and exhibitors, volunteer leaders, ASEE Executive Director Norman Fortenberry, and the headquarters staff who turned a risky idea into reality.

While we can’t share food and drink, you’ll notice many of our regular social events on the schedule. There’s one in particular I hope you’ll attend. At 5 p.m. ET on Friday, June 26, please fix a libation of your choice and join your friends and colleagues for the President’s Farewell Reception, where I will pass the gavel virtually to President-Elect Sheryl Sorby.

Thank you for the honor of a lifetime: serving as your President. I have learned many things, made many new friends, and remain steadfast in my appreciation for—and commitment to—ASEE. Here’s to your continued good health and a successful conference!

Sincerely,

Stephanie Adams
ASEE President 2019-2020
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Schedule subject to change. Please go to [www.asee20.pathable.co](http://www.asee20.pathable.co) for up-to-date information.
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Villanova University

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Missouri University of Science and Technology

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Associate Professor of Mechanical Engineering
Mechanical and Civil Engineering Department
University of Evansville

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Kenneth Van Treuren
Professor and Interim Department Head, Mechanical Engineering
Baylor University

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

Chair, Council of Sections, Zone IV
Lily Gossage
Director, Maximizing Engineering Potential, Center for Gender, Diversity & Student Excellence
College of Engineering
California State Polytechnic University, Pomona

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

Executive Director
Norman L. Fortenberry
American Society for Engineering Education

ASEE’S VIRTUAL CONFERENCE
Board of Directors

#ASEEVC
ASEE’s Virtual Conference
2020 ASEE Program Chairs

ASEE would like to acknowledge and thank the 2020 ASEE Program and Division Chairs for their tireless efforts and dedication to our organization.

<table>
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<tr>
<th>Name</th>
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<td>Nadir Yilmas</td>
<td>Howard University</td>
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<td>ASEE Commission on Diversity, Equity &amp; Inclusion</td>
<td>Susan E. Walden</td>
<td>University of Oklahoma</td>
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<td>Chemical Engineering Division</td>
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<td>Malini Natarajarathinam</td>
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<td>Afsaneh Minaie</td>
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<td>Candace House Teixera</td>
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<td>Diane K. LaFreniere</td>
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<td>Corporate Member Council</td>
<td>Dan Sayre</td>
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<td>Dora Smith</td>
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<td>Zahed Siddique</td>
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<td>Educational Research and Methods Division</td>
<td>James J. Pembridge</td>
<td>Embry-Riddle Aeronautical University</td>
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<td>Jennifer L. Bonniwell</td>
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<td>Energy Conversion and Conservation Division</td>
<td>Siamak Farhad</td>
<td>University of Akron</td>
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<td>Engineering and Public Policy Division</td>
<td>Deanna H. Matthews</td>
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<td>Robert A. Chin</td>
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<td>Xiaofeng Tang</td>
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<td>David Nino</td>
<td>Massachusetts Institute of Technology</td>
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<td>David E. Hubbard</td>
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<td>Christopher J. Rowe</td>
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<tr>
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<td>Robert A. Ross</td>
<td>University of Detroit Mercy</td>
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<td>Pamela Marie Norris</td>
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<td>Kevin R. Cook</td>
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<td>Scott Dunning</td>
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<td>Jason Forsyth</td>
<td>James Madison University</td>
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<td>Michelle Marincel Payne</td>
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<td>Sally J. Pardue</td>
<td>Tennessee Technological University</td>
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<td>Stephanie Cutler</td>
<td>Pennsylvania State University, University Park</td>
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<td>First-Year Programs Division</td>
<td>Kaitlin Mallouk</td>
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<td>Ebisa Wollega</td>
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<td>Ali Alavizadah</td>
<td>Purdue University Northwest</td>
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<td>Purdue University, West Lafayette</td>
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<td>Justin L. Hess</td>
<td>Purdue University, West Lafayette</td>
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<td>Irina Ciobanescu Husanu</td>
<td>Drexel University</td>
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<td>Amitabha Ghosh</td>
<td>Rochester Institute of Technology</td>
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<td>Thomas W. DeNucci</td>
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<td>Patrick Bass</td>
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<td>Christopher Alexander Carr</td>
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<td>Cynthia Wise Barnicki</td>
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<td>Kerry R. Widder</td>
<td>IEEE</td>
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<td>NSF Grantees</td>
<td>Amber Genau</td>
<td>University of Alabama at Birmingham</td>
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<td>Ocean and Marine Division</td>
<td>Lynn A. Albers</td>
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<td>Andrea Burrows</td>
<td>University of Wyoming</td>
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<td>Software Engineering Division</td>
<td>Robert W. Hasker</td>
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<td>Cassandra Woodcock</td>
<td>University of Michigan</td>
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<td>Bryan Mesmer</td>
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<td>John R. Reisel</td>
<td>University of Wisconsin, Milwaukee</td>
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<td>Two-Year College Division</td>
<td>Dominic J. Dal Bello</td>
<td>Hancock College</td>
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<td>Undergraduate Experience Committee</td>
<td>Jenna P. Carpenter</td>
<td>Campbell University</td>
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<td>Women in Engineering Division</td>
<td>Janet Callahan</td>
<td>Michigan Technological University</td>
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# ASEE’S VIRTUAL CONFERENCE
## Conference-at-a-Glance

For detailed session information visit [https://www.asee.org/public/conferences/172/registration/sessions](https://www.asee.org/public/conferences/172/registration/sessions)

<table>
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<th>TUESDAY, JUNE 23</th>
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<tr>
<td>10:00 A.M. - 10:20 A.M.</td>
<td>SESSION 1 - Technical Session &amp; Sponsor Tech &amp; Live Q&amp;A</td>
<td>SESSION 7 - Technical Session &amp; Sponsor Tech &amp; Live Q&amp;A</td>
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<td>10:20 A.M. - 10:40 A.M.</td>
<td>SESSION 2 - Technical Session &amp; Sponsor Tech &amp; Live Q&amp;A</td>
<td>SESSION 8 - Technical Session &amp; Sponsor Tech &amp; Live Q&amp;A</td>
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<tr>
<td>10:40 A.M. - 11:00 A.M.</td>
<td>SESSION 3 - Technical Session &amp; Sponsor Tech &amp; Live Q&amp;A</td>
<td>SESSION 9 - Technical Session &amp; Sponsor Tech &amp; Live Q&amp;A</td>
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<tr>
<td>11:00 A.M. - 11:20 A.M.</td>
<td>SESSION 4 - Technical Session &amp; Sponsor Tech &amp; Live Q&amp;A</td>
<td>SESSION 10 - Technical Session &amp; Sponsor Tech &amp; Live Q&amp;A</td>
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<tr>
<td>11:20 A.M. - 11:40 A.M.</td>
<td>SESSION 5 - Technical Session &amp; Sponsor Tech &amp; Live Q&amp;A</td>
<td>SESSION 11 - Technical Session &amp; Sponsor Tech &amp; Live Q&amp;A</td>
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<tr>
<td>11:40 A.M. - 12:00 P.M.</td>
<td>SESSION 6 - Technical Session &amp; Sponsor Tech &amp; Live Q&amp;A</td>
<td>SESSION 12 - Technical Session &amp; Sponsor Tech &amp; Live Q&amp;A</td>
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<td>12:00 P.M. - 1:00 P.M.</td>
<td>Exclusive Live Interactive Exhibit Hall Time</td>
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<tr>
<td>1:00 P.M. - 1:30 P.M.</td>
<td>Live Panel Presentations</td>
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<tr>
<td>1:30 P.M. - 2:00 P.M.</td>
<td>Free Time</td>
<td>Free Time</td>
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<td>2:00 P.M. - 2:30 P.M.</td>
<td>Monday Keynote - Live Q&amp;A with Aldert Kamp</td>
<td>Tuesday Keynote - Live Q&amp;A with Remi Duquette</td>
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<td>2:30 P.M. - 3:00 P.M.</td>
<td>After COVID-19: The Role of Engineering Schools in the Post-Pandemic Era</td>
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<td>3:00 P.M. - 3:30 P.M.</td>
<td>GREET THE STARS &amp; ASEE 101 Live Q&amp;A</td>
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<td>3:30 P.M. - 4:00 P.M.</td>
<td>ASEE Financial Town Hall &amp; General Body Meeting Live Q&amp;A</td>
<td>Workshops 4:30 pm - 6:00 pm</td>
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<td>4:00 P.M. - 4:30 P.M.</td>
<td>Live Interactive DIVISION MIXER</td>
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<td>4:30 P.M. - 5:00 P.M.</td>
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<td>5:00 P.M. - 5:30 P.M.</td>
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<td>5:30 P.M. - 6:00 P.M.</td>
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<td>6:00 P.M. - 7:00 P.M.</td>
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# ASEE’S VIRTUAL CONFERENCE
Conference-at-a-Glance

## WEDNESDAY, JUNE 24
- SESSION 13 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 14 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 15 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 16 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 17 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 18 - Technical Session & Sponsor Tech & Live Q&A
- Exclusive Live Interactive Exhibit Hall Time
- Live Panel Presentations
- Free Time
- Distinguished Lectures Live Q&A
- MEETING 3 LIVE INTERACTIVE - Business Meetings, Round Tables & Special Sessions
- MEETING 4 LIVE INTERACTIVE - Business Meetings, Round Tables & Special Sessions
- Workshops 4:30 pm - 6:00 pm

## THURSDAY, JUNE 25
- SESSION 19 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 20 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 21 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 22 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 23 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 24 - Technical Session & Sponsor Tech & Live Q&A
- Exclusive Live Interactive Exhibit Hall Time
- Live Panel Presentations
- Free Time
- MEETING 5 LIVE INTERACTIVE - Business Meetings, Round Tables & Special Sessions
- MEETING 6 LIVE INTERACTIVE - Business Meetings, Round Tables & Special Sessions
- MEETING 7 LIVE INTERACTIVE - Business Meetings, Round Tables & Special Sessions
- MEETING 8 LIVE INTERACTIVE - Business Meetings, Round Tables & Special Sessions

## FRIDAY, JUNE 26
- SESSION 25 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 26 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 27 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 28 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 29 - Technical Session & Sponsor Tech & Live Q&A
- SESSION 30 - Technical Session & Sponsor Tech & Live Q&A
- Exclusive Live Interactive Exhibit Hall Time
- Live Panel Presentations
- Free Time
- MEETING 9 LIVE INTERACTIVE - Business Meetings, Round Tables & Special Sessions
- MEETING 10 LIVE INTERACTIVE - Business Meetings, Round Tables & Special Sessions
- MEETING 11 LIVE INTERACTIVE - Business Meetings, Round Tables, & Special Session
- PRESIDENT’S FAREWELL & Passing of the Gavel Interactive Social Event

Virtual Division Social Events & Fundraisers

Schedule subject to change. Please go to [www.asee20.pathable.co](http://www.asee20.pathable.co) for up-to-date information.
M258 Welcome Session
MONDAY, JUNE 22 9:30 TO 9:55 A.M.

Join President Stephanie Adams and Innovative Musician Kai Kight as we kick off ASEE’s First-Ever Virtual Annual Conference!

Kai Kight
Violin Virtuoso

Entrepreneur Kai Kight, a former engineering student and a product of Stanford University’s innovation mecca, the d. School, combines classical violin music with personal stories and insights on engineering and ingenuity. He says, “I have a method for inspiration that will provoke thought in any audience. I have one rule: I never offer an idea unless I can first articulate my own failure. I consider my work a failure if people walk away thinking about me, so I use interactive exercises to ensure that attendees can apply the metaphors directly to their own path.”

FOCUS ON EXHIBITS: Virtual Showcases

M360· MONDAY, JUNE 22 NOON TO 1:00 P.M.
T360· TUESDAY, JUNE 23 NOON TO 1:00 P.M.
W360A· WEDNESDAY, JUNE 24 NOON TO 1:00 P.M.
R360· THURSDAY, JUNE 25 NOON TO 1:00 P.M.
F360· FRIDAY, JUNE 26 NOON TO 1:00 P.M.

The Exhibit Hall will be open daily from noon to 1 p.m. for live interactions with exhibitors and sponsors, and you have exclusive access! Whether it’s lab equipment, quality textbooks for your classes, innovative engineering initiatives, or cutting-edge software, you’ll likely find something interesting in ASEE’s virtual exhibit hall.

M458· Monday Keynote Live Question and Answer
Sponsored by the University of Maryland
MONDAY, JUNE 22, 2:00 TO 2:30 P.M.

Join friends and colleagues at our Monday Plenary, featuring a live question and answer session with TU Delft’s Aldert Kamp, moderated by ASEE President Stephanie Adams.

Aldert Kamp, director of education for TU Delft’s faculty of aerospace engineering, has been deeply involved in the rethinking of higher engineering education with a horizon of 2030. He has more than 20 years of industrial experience in space systems engineering and 15 years of academic teaching, educational management, and leadership. Author of the report “Engineering Education in a Rapidly Changing World - Rethinking the Vision for Higher Engineering Education,” and publisher of a blog entitled “Adapting Engineering Education to Change,” Kamp has extensive insight into the competencies engineering students will need at graduation for a successful career in the rapidly changing world of work. He has been involved in university-level education policy development, reconstruction of engineering curricula, and audits of Dutch and international engineering degree programs. He is the academic liaison for the Global E3 university consortium, European co-leader and council member of the CDIO Initiative (an innovative education framework for producing the next generation of engineers), and co-leader of the Dutch 4TU.Centre for Engineering Education, which facilitates innovations in higher engineering education.
M560B·COVID-19 Campus Response - Featuring Engineering and Engineering Technology Deans
Presented by the University of Maryland
MONDAY, JUNE 22 2:30 TO 3:30 P.M.
University of Maryland–College Park President Darryll Pines moderates a panel discussion with engineering and engineering technology deans on campus responses to the COVID-19 pandemic.

M560A·GREET THE STARS AND ASEE 101!
New Members Orientation and How to Get Involved with ASEE
MONDAY, JUNE 22, 3:30 TO 4:00 P.M.
Come learn what ASEE membership is all about, how to get involved in our unique organization, and tips for making the most of the Annual Conference experience at this orientation for new members and first-time conference attendees.
Moderated by ASEE Board member Gary D. Steffen

M658·ASEE Finance Town Hall and General Body Meeting
MONDAY, JUNE 22 4:00 TO 4:30 P.M.
Moderated by ASEE Board member Doug Tougaw P.E. and ASEE chief financial officer Joseph E. Dillon

U660·ASEE DIVISION MIXER Virtual Showcase
MONDAY, JUNE 22, 4:30 TO 5:30 P.M.
Join us for this perennially popular showcase of different divisions.

T458·TUESDAY Keynote Live Question and Answer
TUESDAY, JUNE 23, 2:00 TO 2:30 P.M.
Join friends and colleagues for a live question and answer session with Remi Duquette, vice president of innovation at MAYA Heat Transfer Technologies Ltd.
Moderated by ASEE President-Elect Sheryl Sorby
Remi Duquette heads the Datacenter Clarity LC global business and R&D directions at MAYA HTT, a heat-transfer technologies company. His current focus on artificial intelligence and deep neural networks brings clients’ digitalization investment to new heights and has proven to become business-critical to many existing clients. He was the driving force behind Maya’s DCIM solution Datacenter Clarity LC and also was instrumental in analyzing structural components of four successful spacecraft currently orbiting Earth. A former speed-skating champion in Quebec, Canada, Duquette attended the International Space University after completing his M.A.Sc. thesis on MOST, Canada’s first space telescope, at the University of Toronto Institute for Aerospace Studies. He is an engineering graduate from McGill University in Montréal.
In response to the COVID-19 outbreak, universities around the country moved to remote instruction for the remainder of spring term. Faculty and staff were directed to work remotely, and students were asked to move out of their residence halls—presumably to homes where they were expected to have Internet access and a place to study so that they could participate in virtual learning.

History has taught us that in the times of a national crisis, those from marginalized populations suffer the most. The gap between students who belong to disadvantaged groups and those who do not widens. Research has shown that the ability to identify with engineering and the feeling that they belong in their undergraduate peer group is key to students’ persistence, satisfaction, and self-efficacy. This is especially true for students from underrepresented groups. Furthermore, students from marginalized groups benefit from supportive learning communities more than others.

In this round table, we will discuss the impact of COVID-19 on engineering students, especially those who belong to underrepresented groups. How has the abrupt conversion to virtual learning affected students’ self-efficacy, motivation, persistence, and engineering identity? What are examples of successfully maintaining supportive learning communities during a pandemic? What are other best practices that lead to offering equitable and inclusive virtual education for all students in our community?

Moderated by ASEE Board member Agnieszka Miguel and ASEE Immediate Past President Stephanie Farrell.

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**W411B·DISTINGUISHED LECTURE:**

**Continued Conversation: Social Disruption of Emerging Technologies & Implications for Engineering Education**

**WEDNESDAY, JUNE 24, 2:00 TO 2:30 P.M.**

Given the recent focus on emerging technologies, the anticipated shift in engineering education is toward a more socially relevant, outward-facing curricula. Such curricula emphasize multidisciplinary learning, societal impact, experiential learning (within and outside of the traditional classroom), and a global mindset. This distinguished lecture will introduce the global, legal, economic, environmental, and societal impacts of vehicle autonomy and electrification, and include an overview of some of the following impact areas: workforce disruption, driver safety, industry shifts, and educational training. Discussion will focus on the values of a liberal arts education in developing solutions for 21st-century emerging technologies, particularly the implications associated with vehicle autonomy and electrification in future mobility modes. Topics to be covered include the explosion in data-driven software development, innovation in vehicle design—such as composite bodies that are 3-D printed, and societal disruption involving vehicle operation, parking, auto industry employment, privacy, and business models.

Moderated by Dr. Brent Nowak and Mrs. Mary Andrade

**Speaker**

Kiran Bharwani

Rivian

Kiran Bharwani is a technical specialist in the domain of ADAS and autonomous driving. Starting his career with Caterpillar, he was tasked with leading the design and development of solutions to support ADAS and autonomous driving features on large mining trucks. He led a high-performing global team working on systems that include lidar, radar, cameras, GNSS, and V2X technologies. His journey from Caterpillar led him to the emerging industry of electric vehicles. He became the key member for developing the Level 4 self-parking feature on Faraday Future’s FF91, which was demonstrated live at CES 2017 in Las Vegas. Bharwani joined Rivian, an electric vehicle manufacturer, in 2017, eventually becoming vice president of autonomous driving. His team is developing technology for the electric adventure vehicles R1T and R1S.
The world is entering the “smart everything” age, and energy is no exception. Artificial intelligence (AI) is forming the new platform for tomorrow’s products, services, work environment, and the workforce. Data literacy is becoming an essential cross-cutting skill. Power grids are to be replaced by smart grids where electric generation plants, consumer devices, and storage systems are connected, and supply-and-demand analyses are made. To survive in this high-tech environment, society at large will have to embrace change and acquire new skills associated with Society 5.0. Future engineers will have to develop a creative mindset and focus on producing original ideas and inventing new goods and services.

Moderated by Dr. Lynn A. Albers and Dr. Maryam Younessi Sinaki

Dr. Yunus A. Çengel is a professor emeritus at the University of Nevada, Reno, and the founding dean of the Faculty of Engineering at Adnan Menderes University in Aydin, Turkey. He received his Ph.D. in mechanical engineering from North Carolina State University. Before joining ADU in 2012, he was the dean of the Faculty of Mechanical Engineering at Yildiz Technical University (YTU) and served as adviser to the president at the Scientific and Technological Research Council (TUBITAK) on international cooperation. He also served as adviser to several government organizations and private companies on energy efficiency, energy policies, and education reform. Çengel, a registered professional engineer in Nevada, is the author or coauthor of several widely adopted textbooks published by McGraw-Hill, including Thermodynamics: An Engineering Approach and Differential Equations for Scientists and Engineers. He has given numerous seminars and written articles and prepared reports on a variety of topics. The recipient of several outstanding teaching awards, he has twice received the ASEE Meriam/Wiley Distinguished Author Award.

Active learning classrooms are now a common feature at many higher education institutions. They are also rapidly blending the physical and virtual worlds to create new types of hybrid learning experiences. While these continue to be created, it is not always the case that faculty are engaged in the design process. However, faculty participation can make a significant difference in the design of learning spaces, and participation by faculty and students in the process is a way to promote the uptake of active pedagogy. Classroom space, which was largely static and relatively unstudied, is undergoing a renaissance both in terms of creative design and scholarly investigation. In her presentation, Prof. Susan McCahan will discuss the history of formal university classrooms and how we arrived at active-learning space design. She will describe an example of participatory design and the outcomes from that process.

Moderated by Nathan Kahl

Susan McCahan is the Vice Provost, Innovations in Undergraduate Education and Vice Provost, Academic Programs at the University of Toronto. She is responsible for developing and implementing initiatives to re-imagine and strengthen academic experiences at the university. This includes strategic leadership on IT systems and data systems that support academic processes and teaching, and leadership on key pedagogical initiatives such as experiential learning. Her Academic Programs portfolio oversees governance and quality assurance of the university’s 700 graduate and undergraduate programs. Previously, she was the Vice Dean, Undergraduate in the Faculty of Applied Science and Engineering. She is a professor of mechanical engineering who specialized in thermodynamics. However, her current area of research is engineering education. She is the author of a textbook for first year engineering design, which she continues to teach. A fellow of the American Association for Advancement in Science, she is the past president of the Canadian Engineering Education Association. She has received numerous awards for education excellence and leadership, including the 3M National Teaching Fellowship.
## ASEE’S VIRTUAL CONFERENCE

### Conference Highlights

**W458A·DISTINGUISHED LECTURE: 2019 Best PIC, Zone, and Diversity Papers Live Q&A**

**Wednesday, June 24, 2:00 TO 2:30 P.M.**

Featuring the Best PIC, Zone, and Diversity Paper Award winners from the 2019 Annual Conference.

Moderated by ASEE Board member Peter L. Schmidt P.E.

**Papers Presented**

1. **Overall 2019 PIC Paper & PIC II Winner: “Assessment of Project-Based Learning Courses Using Crowd Signals”**
   
   Authors: Georgios Georgalis and Karen Marais, Purdue University at West Lafayette

2. **Best Overall 2019 Zone Paper & Zone 1 Winner: “Implementation and First-Year Results of an Engineering Spatial-Skills Enhancement Program”**
   
   Authors: Alexander John De Rosa and Maxine Fontaine, Stevens Institute of Technology

   
   Authors: La’Tonia Stiner-Jones and Wolfgang Windl, Ohio State State University

   
   Authors: Lindy Hamilton Mayled, Arizona State University; Lydia Ross, Arizona State University; Casey Jane Ankeny, Northwestern University; and Jay Oswald, Arizona State University

   
   Authors: Eric Davishahl, Whatcom Community College; Todd Haskell, Western Washington University; Jill Davishahl, Western Washington University; Lee Singleton, Whatcom Community College; and Wade H. Goodridge, Utah State University

6. **Best 2019 PIC IV Paper: “Students’ Views on their Role in Society as an Engineer and Relevant Ethical Issues”**
   
   Authors: Angela R. Bielefeldt, University of Colorado Boulder; David Zhao; Alexandra Kulich; Madeline Polmear, University of Florida; Nathan E. Canney; Chris Swan, Tufts University; and Daniel Knight, University of Colorado Boulder

   
   Author: Katherine McConnell, University of Colorado Boulder

8. **Best 2019 Zone II Paper: “Research to Practice: Leveraging Concept Inventories in Statics Instruction”**
   
   Authors: Ruth Wertz P.E., Valparaiso University; and Theresa Green, Utah State University

   
   Authors: Amardeep Kaur and Theresa Mae Swift, Missouri University of Science and Technology

10. **Best 2019 Zone IV Paper: “Assessing Student Assessment in a Flipped Classroom”**
    
    Author: Bryan Mealy, California Polytechnic State University, San Luis Obispo

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**W477B·DISTINGUISHED LECTURE: Indigeneering Engineering Education: Welcoming Indigenous Knowledge and Wisdom with Integrity**

**Wednesday, June 24 2:00 TO 2:30 P.M.**

A transforming world invites us to change our mindset and consider more innovation, collaboration, and responses to global challenges. Deanna Burgart, Indigeneer, believes that greater incorporation of diverse perspectives, including Indigenous perspectives and worldviews, can be a catalyst to finding solutions in a more meaningful, long-term way. In this distinguished lecture, Burgart will introduce participants to Indigenous ways of knowing, being, and doing. She will share her own stories of and examples of initiatives of Indigenous inclusion as well as the results of a two-day retreat held for Indigenous and non-Indigenous STEM professionals, educators, and community members exploring the best ways to inspire Indigenous youth to pursue STEM careers. She also will summarize a literature review, examine incidents of cultural appropriation, and discuss how to protect Indigenous knowledge going forward while bringing Indigenous perspectives to the engineering education landscape in an ethical space of cultural safety that protects the integrity of Indigenous beliefs and worldviews. Participants will leave feeling empowered to listen, learn, and grow with the wisdom of Indigenous peoples they are fortunate to meet on their journey.

Moderated by Dr. Susan E. Walden, 2019–20 chair of ASEE’s Commission on Diversity, Equity & Inclusion

**Speaker**

Deanna Burgart

Schulich School of Engineering, University of Calgary

Deanna Burgart, P.Eng, CET, is both an engineer and a technologist who began her career in 1998 as a technician analyzing oil sands in a Calgary laboratory. She brings over 20 years of experience and education in energy and pipelines, and is passionate about global energy transitions, the United Nations Sustainable Development Goals, and the United Nations Declaration on the Rights of Indigenous Peoples. She helps STEM-focused organizations move forward in increasing inclusion of Indigenous people, knowledge, and perspectives. She recently joined the University of Calgary’s Schulich School of Engineering as a senior instructor in chemical and petroleum engineering and is the first teaching chair focused on integrating Indigenous knowledge into engineering.
As members of a community of scholars, what we write about and who we write about are artifacts of our culture; they reflect who we are collectively. The engineering education community is unique: As students, educators, and researchers, we hail from different disciplinary backgrounds and bring different expectations about sharing ideas, data, and authorship, and about the standards we set for our scholarship. As our community develops and grows, many of us are wary of bringing along excess baggage from our home disciplines that make it difficult for students, early career faculty, and those from marginalized populations in engineering to survive and thrive. In fact, for many of us, negative experiences in our home disciplines (being overlooked for recognition or promotion, being harassed or patronized, being undervalued) served as the impetus for finding our way into engineering education.

In this distinguished lecture, Journal of Engineering Education editor Lisa Benson will identify parallels between scholarship in engineering education and approaches to transformational change in engineering education. She also will highlight the issue of access to engineering education scholarship and the ways our community reflects its values and beliefs through its scholarly work as well as its actions related to sharing and building on that work.

Moderated by Dr. James J. Pembridge and Dr. Sarah E. Zappe

**Speaker**

Dr. Lisa Benson  
Clemson University

Lisa Benson is a professor of engineering and science education at Clemson University and the editor-in-chief of the Journal of Engineering Education. Her research focuses on the interactions between student motivation and their learning experiences. Her projects include studies of student perceptions, beliefs, and attitudes toward becoming engineers and scientists, and their development of problem-solving skills, self-regulated learning practices, and epistemic beliefs. She is an ASEE Fellow and a member of the European Society for Engineering Education (SEFI), the American Educational Research Association (AERA) and Tau Beta Pi, and the 2018 recipient of the Clemson University Class of ‘39 Award for Faculty Excellence. She earned a B.S. in bioengineering (1978) from the University of Vermont, and M.S. (1986) and Ph.D. (2002) degrees in bioengineering from Clemson University.

COVID-19 has upended all aspects of traditional university life. Faculty are experiencing additional demands necessitated by the move to online platforms for all teaching and administrative work as well as strains placed on research agendas due to laboratories closing, limited fieldwork, and curtailed in-person contact. Off-campus life has also been upended. Faculty who are parents of school-age children are struggling to balance teaching virtually while also caring for their families. Those with elderly parents face extremely difficult decisions about social distancing and best care practices. Single faculty are isolated at home, separated from their friends and families. Given extensive evidence indicating that women disproportionately shoulder more caregiving at home, what are the implications now that female faculty find themselves balancing workloads that have grown heavier with the challenges associated with the abrupt move to remote instruction and working from home?

Scholars of women in the workplace note that many of the activities that are integral to the reputation and everyday functioning of an organization are often performed by women and, accordingly, are taken for granted as a “natural” expression of women’s preferences for this sort of work. Female faculty disproportionately perform “hidden work” within universities, and this essential work is not compensated within current faculty reward structures around promotion. How can we think strategically and systematically about the implications of the profound shifts in faculty work caused by COVID-19 for the long term, and how will it differentially impact diverse faculty in terms of workload, tenure and promotion, salaries, and teaching evaluations?

Moderated by ASEE Board member Agnieszka Miguel

**W758·PRESIDENT’S FAREWELL RECEPTION and Passing of the Gavel**

**FRIDAY, JUNE 26, 5:00 TO 6:00 P.M.**

Join us as we say goodbye to ASEE President Stephanie Adams and welcome President-Elect Sheryl Sorby.
Safe Zone Ally Training Workshops

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 1 Safe Zone workshop explores key LGBTQ+ terms and concepts, LGBTQ+ identity development and the coming out process, and simple ally strategies to help build an inclusive environment for LGBTQ+ individuals in STEM.

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.

The 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/.

T577B· Safe Zone Ally Training Workshop: Level 1
TUESDAY, JUNE 23 3:30 TO 4:30 P.M.
Speakers
Dr. Adrienne Minerick, Michigan Technological University
Dr. Kelly J. Cross, University of Nevada, Reno

W577B· Safe Zone Ally Training Workshop: Level 2
WEDNESDAY, JUNE 24 3:30 P.M. TO 4:30 P.M.
Speakers
Prof. Alon V. McCormick, University of Minnesota–Twin Cities
Mr. Tiago R. Forin, Rowan University

R577· Safe Zone Ally Training Workshop: Trans Allyship
THURSDAY, JUNE 25 3:00 TO 4:00 P.M.
Speakers
Dr. Alisha L. Sarang-Sieminski, Franklin W. Olin College of Engineering
Dr. Brian P. Kirkmeyer, Miami University
**M479·ABET Conducts Remote Program Accreditation Reviews in 2020 - 2021**  
**MONDAY, JUNE 22 1:00 TO 1:30 P.M.**

Repeate on Friday, June 26

This session will summarize how best to address ABET accreditation within the context of academic program response to the novel coronavirus pandemic.

ABET’s Chief Accreditation Officer, Dr. Joe Sussman, and Senior Director of Accreditation Operations, Jane Emmet, will discuss modifications to ABET operations and how these modifications will affect program reviews, acknowledging the current delivery changes to academic programs that have affected teaching and learning.

They also will answer questions regarding how best to prepare for ABET accreditation given the current status of academic program offerings at institutions around the globe.

We especially encourage participation from programs with ABET visits planned for Fall 2020. Please bring your ABET leaders to this session.

**Speakers**

Dr. Joseph L. Sussman, Chief Accreditation Officer, Chief Information Officer, ABET

Ms. Jane Emmet, Senior Director, Accreditation, ABET

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**W479·ABET Criteria and Opportunities for Inclusion in Engineering Education**  
**WEDNESDAY, JUNE 24 1:00 TO 1:30 P.M.**

Beginning in Fall 2019, programs undergoing review by the Engineering Accreditation Commission (EAC) of ABET are being evaluated based on recently revised criteria. ABET is never prescriptive about how programs choose to meet the requirements; its review process is designed to assure programs meet quality standards set forth in the EAC criteria and the Accreditation Policy and Procedure Manual, known as the APPM. The changes to EAC General Criteria create a number of opportunities to modify our traditional approaches to educating future engineers so they are not only aware of the need to practice engineering in an inclusive manner but are also equipped to do so.

This session will highlight ABET EAC criteria changes that promote diversity, equity, and inclusion, along with strategies for addressing them in ways that support the attainment of EAC Criterion 3 Student Outcomes.

Connections will be made to various engineering codes of ethics (e.g., NSPE, ASCE, IEEE, AIChE) as appropriate.

**Speaker**

Dr. Yvette E. Pearson, P.E., Rice University

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**R479·Making an Impact on STEM Education - Become an ABET Program Evaluator!**  
**THURSDAY, JUNE 25 1:00 TO 1:30 P.M.**

Each year, more than 2,000 academic administrators and faculty, industry and government officials, and technical professionals serve as ABET program evaluators, making initial accreditation recommendations and working together to ensure quality and confidence in technical education worldwide. These volunteer experts play a key role in ensuring that today’s college students are prepared to develop solutions that address some of the pressing sustainability challenges facing our planet. This session will provide important and timely information for prospective ABET Program Evaluators, including:

I. the impact of an ABET program evaluator on STEM education

II. an overview of ABET’s international growth and increasing need for program evaluators

III. the scope of program evaluator responsibilities

IV. requirements for service as an ABET program evaluator and an overview of the selection process

V. the program evaluator training process

**Speaker**

Dr. Jennifer McFerran Brock, University of Alaska Anchorage

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**F479·ABET Conducts Remote Program Accreditation Reviews in 2020 - 2021**  
**FRIDAY, JUNE 26 1:00 TO 1:30 P.M.**

ABET’s chief accreditation officer and senior director of accreditation operations will summarize recent modifications to ABET operations and discuss how best to address ABET accreditation within the context of academic program response to the COVID-19 pandemic and changes in delivery that affect teaching and learning.

**Speakers**

Dr. Joseph L. Sussman, Chief Accreditation Officer, Chief Information Officer, ABET

Ms. Jane Emmet, Senior Director, Accreditation, ABET
#ASEEVC

## ASEE’S VIRTUAL CONFERENCE

### Industry Day

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<tr>
<th>Event</th>
<th>Date/Time</th>
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<tr>
<td>Corporate Member Council and College-Industry Partnerships Division</td>
<td>Wed. June 24 7:00 to 9:00 P.M.</td>
<td>The Corporate Member Council (CMC) and College-Industry Partnerships Division (CIPD) invites members and those interested in becoming members to attend the CMC and CIPD joint virtual social to kick off Industry Day.</td>
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<td>INDUSTRY DAY: CMC and CIPD Virtual Kick-off</td>
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<td>R466A·INDUSTRY DAY: Hearing from Diverse Voices from the Classroom</td>
<td>Thu. June 25 1:00 to 1:30 P.M.</td>
<td>Hear from a diverse group of recent graduates to learn why they decided to change the world as engineering students. What does it mean to these new engineers to see diversity in the classroom and how can it help drive innovation in the workplace? Learn what educators, academic institutions, and industry need to do to nurture creativity in high school and maintain excitement throughout the college experience. Be a part of the discussion on increasing different perspectives in the global family of engineers and innovators.</td>
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<td>R466B·Corporate Member Council - Board Meeting</td>
<td>Thu. June 25 2:00 to 3:00 P.M.</td>
<td>All attendees from CMC member companies are welcome and encouraged to attend the annual board meeting. We will be electing our new board members, reporting on the past year’s accomplishments, and planning our future activities.</td>
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<td>F466·INDUSTRY DAY: Preparing Students for Transformative Technology</td>
<td>Fri. June 26 1:00 P.M. to 1:30 P.M.</td>
<td>Megatrends like artificial intelligence, the Internet of Things, and 5G will change profoundly the way future engineers apply theory to applications like Industry 4.0, autonomous vehicles, and health care. How will educators adapt engineering curricula to prepare students for areas that were science fiction just a decade ago? Join a panel of educators, policymakers, and industrial leaders to learn how they recommend enhancing engineering curricula to address the needs of future innovators.</td>
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Schedule subject to change. Please go to [www.asee20.pathable.co](http://www.asee20.pathable.co) for up-to-date information.
ASEE’S VIRTUAL CONFERENCE
Sponsor Technical Sessions

**M399· Using zyBooks to Teach in a COVID-19 and Post-COVID-19 Environment**
*Presented by zyBooks*  
**MONDAY JUNE 22 11:00 TO 11:20 A.M.**

As higher education institutions grapple with the uncertainty of students returning to campus this fall, many instructors are preparing for courses that can seamlessly transition between in-person and online instruction. This talk presents an overview of zyBooks, which are interactive online engineering textbooks proven to increase student confidence in engineering courses. We will explore methods to incentivize student reading, assign auto-graded homework and coding labs, and track student learning for engineering courses.

**T399F·Assessments in the Online Engineering Classroom**
*Presented by Wiley*  
**TUESDAY, JUNE 23 10:40 TO 11:00 A.M.**

Pivoting to online teaching can prove challenging, especially in problem-based engineering courses. Administering engineering homework, projects, and exams in a virtual environment requires a thoughtful approach. Two experienced educators will share their strategies and tips for managing assessment online based on decades of collective experience.

**T299A· Enabling Virtual Classrooms Without Giving Up Hands-on Labs (Or, Save the Disinfectant for the Bathroom, not the Lab)**
*Presented by Analog Devices*  
**TUESDAY, JUNE 23 10:00 TO 10:20 A.M.**

Colleges and universities are suddenly faced with the challenge of adapting nearly all classroom instruction to a virtual setting. Lectures are difficult enough to run online; hands-on lab exercises are orders of magnitude more so. The Analog Devices University Program is an open-source educational platform consisting of freely available laboratory exercises and accompanying low-cost parts kits and test instruments that can be leveraged as hands-on learning at students’ homes. In this session, we will demonstrate how to use free software, low-cost test instruments, and common materials in a variety of experiments spanning multiple disciplines and share some tricks that Analog Devices engineers have developed.

**T399B· Sponsor Technical Session**
*Presented by Liaison*  
**TUESDAY, JUNE 23 11:00 TO 11:20 A.M.**

**T399D· Get Your Simple-to-Use TI-RSLK MAX Robot Fully Built, Tested, and Ready for Learning in Under 20 Minutes**
*Presented by Texas Instruments*  
**TUESDAY, JUNE 23 11:20 TO 11:40 A.M.**

The newest addition to the TI-RSLK product family, the TI-RSLK MAX is user-friendly, can be assembled quickly, and provides hands-on options for teaching embedded systems design. With a solderless building process and updated curriculum to tackle many fundamental and trending topics in engineering, the kit can easily be implemented in large or small classes and is ideal for classes with time constraints, flipped classrooms, virtual distance learning, or limited lab technology. This session will show you how to construct the robotics kit and test the functionality with our TI-RSLK MAX debug application.

**T399E·Online Learning with MATLAB and Simulink**
*Presented by MathWorks*  
**TUESDAY, JUNE 23 11:40 A.M. TO NOON**

Educators are having to adapt their courses to achieve their learning objectives while faced with changing student and university requirements. As part of the transition, educators need to provide hands-on experience through lab-based modules. MathWorks provides several cloud-based tools to enable the creation of flexible teaching and learning plans. In this session, we’ll discuss how these tools can contribute to course development and delivery workflow with potential for immediate use in classes and labs.

Schedule subject to change. Please go to [www.asee20.pathable.co](http://www.asee20.pathable.co) for up-to-date information.
T499·Challenges and Potential Solutions for Engineering Education Posed by the COVID-19 Pandemic

Presented by the University of Maryland

TUESDAY, JUNE 23 1:00 TO 2:00 P.M.

We invite a community discussion, moderated by a panel of leading thinkers, on responding to educational challenges created by the COVID-19 pandemic to continue delivering high-quality educational offerings that meet both course and program outcomes. Topics include providing virtual hands-on experiences such as cornerstone and capstone design team projects; assessment and exam administration; student supports and extracurricular activities; assessment strategies; course design; and technology needs.

Speakers:
Dr. Kerrie A. Douglas, Assistant Professor of Engineering Education, Purdue University
Dr. Laurence J. Jacobs, Professor and Associate Dean for Academic Affairs, College of Engineering, Georgia Institute of Technology
Dr. Joanna Mirecki Millunchick, Arthur F. Thurnau Professor and Associate Dean for Undergraduate Education, College of Engineering, University of Michigan
Dr. Sheri Sheppard, Professor of Mechanical Engineering, Stanford University
Dr. Kenneth T. Kiger, Keystone Professor and Associate Dean for Undergraduate Education, A. James Clark School of Engineering, University of Maryland

W299A· Integrating Coordinate Metrology into Engineering Programs

Presented by ZEISS Industrial Quality Solutions

WEDNESDAY, JUNE 24 10:00 TO 10:20 A.M.

Join the ZEISS academic program team in a discussion of how using coordinate measuring machines in educational institutions can help engineering students understand the importance of quality control in manufacturing. Presentation includes an overview of the need for metrology education for an advanced manufacturing workforce, a demonstration of ZEISS CMM equipment and software, and an overview of the special packages ZEISS offers to educational institutions.

Speaker
Ms. Lauren Van Beek, Academic Program Manager, ZEISS Industrial Quality Solutions

W299B·Sponsor Technical Session

Presented by MSC Software

WEDNESDAY, JUNE 24 10:20 A.M. TO 10:40 A.M.

W399B·Innovation in Engineering Education – Fusing Electromagnetic Simulations with Theory and Experiments in Antenna and Wireless Communication Courses

Presented by Altair

WEDNESDAY, JUNE 24 10:40 TO 11:00 A.M.

With the advent of advanced engineering simulation technology and the availability of powerful, inexpensive computers, engineering education now can include complex real-life problems that enhance students’ analytical skills. During this session, we will present Altair’s advanced electromagnetic simulation tools for antenna design wireless communication courses. We will also present case studies of how electromagnetic simulations are successfully fused with theory and experiments by educators at different universities.

W399C· Hands-on, Project-based Learning with Digital Twins for Mechatronics in Engineering Education and Research

Presented by Altair

WEDNESDAY, JUNE 24 11:00 A.M. TO 11:20 A.M.

In this age of the Internet of Things, Big Data, analytics and mechatronics, it is the multidisciplinary intersections of mechanical, electrical, and control systems that provide the product and experience opportunities the marketplace is seeking for applications ranging from autonomous vehicles to wearable devices. In this technical session, we will demonstrate a comprehensive Mechatronics educational kit to teach and learn model-based development with the highest fidelity digital twin.
W399A· How to Implement Online Hands-on Classes During the Time of COVID-19
Presented by STMicroelectronics
WEDNESDAY, JUNE 24 11:20 TO 11:40 A.M.

The current pandemic is putting our education system under strain, and this creates a greater need to accelerate the implementation of online teaching to ensure the continuity of programs and student engagement. This session will explore different approaches of hands-on, online curricula for IoT, embedded machine learning, low-level firmware programming, and motor control developed by professors William Kaiser (University of California, Los Angeles) and Yifeng Zhu (University of Maine). This content is available on www.st.com/educationalplatforms.

W399D· Prepare Students with Industry-Ready RF/Microwave Skills
Presented by Keysight Technologies
WEDNESDAY, JUNE 24 11:40 A.M. TO NOON

Owing to 5G, wireless communications have evolved rapidly in the past decade and play a significant role in the automotive, Industry 4.0, and IoT ecosystems. Industries demand that future engineers are well-equipped with RF knowledge and skills to hit the ground running from Day One. In this session, you will better understand the skills your students need to be equipped with to effectively design, test, and deploy an RF product in the real world.

F399B· Sponsor Technical Session
Presented by EngineeringUnleashed
FRIDAY, JUNE 26 11:20 TO 11:40 A.M.

R399B· Sponsor Technical Session
Presented by IEEE
THURSDAY, JUNE 25 11:20 TO 11:40 A.M.

R399A· Sponsor Technical Session
Presented by STMicroelectronics
THURSDAY, JUNE 25 11:40 A.M. TO NOON

F399A· Sponsor Technical Session
Presented by Gradescope by Turnitin
FRIDAY, JUNE 26 11:00 TO 11:20 A.M.
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**Host**

**UNIVERSITY OF MARYLAND**

**A. JAMES CLARK SCHOOL OF ENGINEERING**
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<td>ASEE Commission on P-12 Engineering Education</td>
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Fees
The registration fee will be discounted 30 percent from the original rates. Those who have already registered, paid, and plan to attend the online experience will receive a 30 percent refund. Registered attendees will be sent a separate email outlining their options.

Registration Fees

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<tr>
<th>Virtual Conference Rate</th>
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K-12 Teachers
K-12 teachers’ rate of $175 applies to the entire conference. School ID is required.

ASEE Membership
Please be advised that the non-member professional rate does not include ASEE membership. Follow this link https://www.asee.org/about-us/types-of-membership

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2. US $99 for Canadian residents
3. US $114 for residents of all other countries
4. $89 for online membership only

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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 or email us at conferences@asee.org.
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June 25 – 28
BALTIMORE, MARYLAND

2024
June 19 – 22
PORTLAND, OREGON

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information.
M201 - Aerospace Design and Manufacturing (Student Papers)

10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Aerospace Division
Moderators: Sharan Asundi, Old Dominion University; Nadir Yilmaz, Howard University

Educational Benefits of Unmanned Aerial System Design and Interdisciplinary Engineering Opportunities
Logan Walker Graves, Los Alamos National Labs
Dr. Michael C. Hatfield, University of Alaska, Fairbanks

Undergraduate Demonstration of a Hall Effect Thruster: Self-Directed Learning in an Advanced Project Context
Braden K. Oh, Olin College of Engineering
Justin Haruaki Kunimune, Olin College of Engineering
Jonah Spicher, Olin College of Engineering
Lauren Anfenson, Olin College of Engineering
Dr. Rebecca Christianson, Draper Labs

Art in Space: Using Art to Interest K-12 Students in Aerospace Design
Maria Baklund, University of St. Thomas
Miss MiKyla Jean Harjamaki, Playful Learning Lab
Hannah French
Patrick Roche, University of St. Thomas
Mr. Collin John Goldbach, Playful Learning Lab
Cullen Charles Kittams, University of St. Thomas
Molly Roche, University of St. Thomas
Dr. Deborah Besser P.E., University of St. Thomas
Mr. Damian Kulash Jr., OK Go
Dr. Jeff Jalkio, University of St. Thomas
Dr. AnnMarie Thomas, University of St. Thomas

An Engineering Pedagogy for Developing Practical Knowledge and Hands-on Skills Related to 5-axis Milling and Computer-aided Aerospace Parts Manufacturing Using Current Technology
Mr. John Vincent Kronenberger, Oregon Institute of Technology
Dr. David E. Culler, Oregon Institute of Technology
Alexander Max Ferere, Oregon Institute of Technology

M202 - Architectural Engineering Division Technical Session 1

10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsors: Architectural Engineering Division; Construction Engineering Division
Moderator: Christina McCoy, Oklahoma State University

Bringing Building Information Modeling (BIM) into the Process for Building Structure Design Courses
Prof. John J. Phillips, Oklahoma State University
Jenna A. Harbert

A Hybrid Online/Lectures Teaching Model for Mechanics of Structures Courses Involving New Learning Spaces
Prof. Miguel X. Rodriguez-Paz, Tecnológico de Monterrey
Mr. Jorge A. Gonzalez, Tecnológico de Monterrey
Prof. Israel Zamora-Hernandez, Tecnológico de Monterrey
Dr. Gibrán Sayeg-Sánchez, Tecnológico de Monterrey
Prof. Martha Elena Nuñez, Tecnológico de Monterrey

Smart Environments for Assisted Living: A Multidisciplinary Collaboration in Engineering and Architecture Education
Ms. Adriana Rios Santiago, Texas Southmost College
Dr. Anabel Pineda-Briseno, Tecnologico Nacional de Mexico/Instituto Tecnologico de Matamoros
Dr. Jesus A. Gonzalez-Rodriguez, University of Texas Rio Grande Valley
Ing. Uriel Saul Huerta P.E., Tecnologico de Leon

Art, Architecture, and Community: Create Spaces to Highlight Local Talent
Prof. Darrell D. Nickolson, Indiana University Purdue University, Indianapolis
Katie Pruitt

M204 - Educational Interventions and Pedagogy in Biomedical Engineering - June 22nd

10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Biomedical Engineering Division
Moderators: Joe Tranquillo, Bucknell University; Casey Ankeny, Northwestern University

Peer Instruction Can Be as Effective as Lecture-based Instruction in Biomedical Engineering
Dr. Eileen Haase, Johns Hopkins University
Dr. Harry R. Goldberg, Johns Hopkins University

Student Collaboration as a Strategy to Achieve Learning Outcomes in Biomaterials Courses
Dr. Emily Dosmar, Rose-Hulman Institute of Technology
Dr. Patrick Ferro P.E., Gonzaga University

Learning Circulation and Hemodynamics Using an Interactive Simulation Package Through a Graphic User Interface
Dr. Qi Dunsworth, Pennsylvania State University, Erie
Ben Murphy, Pennsylvania State University, Erie
Dr. Yi "Elisa" Wu, Pennsylvania State University, Erie

Benefits of Long-distance Collaboration in Higher Education Institutions to Train Students in Innovation Practices
Mary Pearson, North Dakota State University
Ms. Lauren Singelmann, North Dakota State University
Ryan Striker P.E., North Dakota State University
Mr. Enrique Alvarez Vazquez, North Dakota State University
Ms. Ellen M. Swartz, North Dakota State University

Dr. Yi "Elisa" Wu, Pennsylvania State University, Erie
Ben Murphy, Pennsylvania State University, Erie
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M205 - Chemical Engineering in K-12 and the First Year
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Chemical Engineering Division

Moderators: Margot Vigeant, Bucknell University; Katelyn Dahlke, University of Wisconsin - Madison

Clean Water through Chemical Engineering: Introducing K-12 Students to ChE Using Filtration
Dr. Ashlee N. Ford Versypt, Oklahoma State University
Dr. Daria Khvostichenko, University of Illinois at Urbana-Champaign

First Impressions: Engaging First-Year Undergraduates in Chemical Engineering Design
Tommy George, Harvard University
Alexander Seth Klein
Dr. Kristen B. Wendell, Tufts University

The Design and Impact of a Combined Makerspace, Wet Lab, and Instructional Design Studio for Chemical Engineering Curriculum
Prof. Anthony Butterfield, University of Utah

How We Teach: Chemical Engineering in the First Year
Dr. Laura P Ford, The University of Tulsa
Dr. Janie Brennan, Washington University in St. Louis
Dr. Jennifer Cole, Northwestern University
Dr. Kevin D. Dahm, Rowan University
Prof. Marnie V. Jamieson, University of Alberta
Dr. Lucas James Landherr, Northeastern University
Dr. David L. Silverstein P.E., University of Kentucky
Dr. Bruce K Vaughen P.E., American Institute of Chemical Engineers

Dr. Margot A Vigeant, Bucknell University
Dr. Christy Wheeler West, University of South Alabama
Dr. Stephen Ward Thiel P.E., University of Cincinnati

CACHE/ASEE Survey on Computing in Chemical Engineering
Dr. Robert P. Hesketh, Rowan University
Dr. Margot A Vigeant, Bucknell University
Prof. Martha Grover, Georgia Institute of Technology
Dr. David L. Silverstein P.E., University of Kentucky

M206A - Inquiry, Inclusivity, and Integration
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division

Moderator: Brock Barry, United States Military Academy

This session includes papers on inquiry-based learning, integrated teaching of design, and use of a variety of pedagogical techniques in civil engineering courses.

An Integrated Teaching Method for Design Courses
Dr. Scott A Civjan, University of Massachusetts, Amherst
Student Support, Confidence, Workload, and Video Resources in a New Civil Engineering Graphics Course
Mr. Bradley James Schmid, University of Saskatchewan

Work in Progress: Inquiry-Based Learning in Transportation Engineering
Dr. Ilgin Guler, Pennsylvania State University
Dr. Stephanie Cutler, Pennsylvania State University, University Park
Dr. Sarah E. Zappe, Pennsylvania State University

Inclusive Learning Approach to Teach Concepts of Pavement Management Systems to Seniors and Graduate Students in Civil Engineering
Mr. Harshdutta I Pandya, Rowan University
Dr. Yusuf Mehta P.E., Rowan University
Mr. Andrae Francois, Rowan University Center for Research and Education in Advanced Transportation Systems (CREATEs)

Dr. Dan Offenbacker, Rowan University, Center for Research and Education in Advanced Transportation Engineering Systems (CREATEs)
M206B - Perceptions, Projects, and Practical Approaches
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division
Moderator: Jakob Bruhl, United States Military Academy

This session includes papers on pedagogical practices related to design, project-based learning, and teaching theory in a practical way.

Examining Undergraduate Engineering Students’ Perceptions of Solving an Ill-Structured Problem in Civil Engineering
Secil Akinci-Ceylan, Iowa State University
Dr. Kristen Sara Cetin, Michigan State University
Dr. Benjamin Ahn, Iowa State University of Science and Technology
Dr. Bora Cetin, Michigan State University

Practical approach towards teaching a content intensive subject in higher education
Prof. James Lambrechts P.E., Wentworth Institute of Technology
Dr. Anuja Kamat, Wentworth Institute of Technology
Ron Frattura

Mini-Project Explorations to Develop Steel and Concrete Gravity System Design Skills
Dr. Ryan Solnosky P.E., Pennsylvania State University, University Park

An EML Project on Steel Beam Design
Dr. Seyed Mohammad Seyed Ardakani P.E., Ohio Northern University

M208 - Computers in Education Division Technical Session 1: Topics Related to Engineering
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Computers in Education Division
Moderators: Byul Hur, Texas A&M University; Joshua Hertz, Northeastern University

This session will highlight COED submitted papers that are related to engineering or have engineering themes.

The Use of MATLAB Live as a Technology-enabled Learning Environment for Computational Modeling Activities within a Capstone Engineering Course
Mr. Joseph A. Lyon, Purdue University, West Lafayette
Ms. Aparajita Jaiswal, Purdue University, West Lafayette
Dr. Alejandra J. Magana, Purdue University, West Lafayette

Lessons Learned from Implementing Virtual Reality in an Introductory Engineering Course
Dr. Fadi Castronovo, California State University, East Bay

Dr. Robert Schaffer, Mission College
Ms. Varsha Reddy Kandi

Lessons Learned Using Slack in Engineering Education: An Innovation-based Learning Approach
Mr. Enrique Alvarez Vazquez, North Dakota State University
Mr. Manoel Cortes-Mendez, Georgia Institute of Technology
Ryan Striker P.E., North Dakota State University
Ms. Lauren Singelmann, North Dakota State University
Dr. Dan Ewert
Mary Pearson, North Dakota State University
Ms. Ellen M. Swartz, North Dakota State University

Exploration of Technology-aided Education: Virtual Reality Processing Plant for Chemical Engineering Process Design
Ms. Caeley Ashlyn Joy Gibbs, Queen's University

First-Year Engineering Student Perceptions in Programming Self-Efficacy and the Effectiveness of Associated Pedagogy Delivered via an Introductory, Two-Course Sequence in Engineering
Dr. James E. Lewis, University of Louisville
Dr. Brian Scott Robinson, University of Louisville
Mr. Nicholas Hawkins, University of Louisville

Enhancing 3-D Spatial Skills of Engineering Students Using Augmented Reality
Mr. Ali Sheharyar, Texas A&M University at Qatar
Prof. Arun R. Srinivasa, Texas A&M University
Dr. Eyad Masad

M211 - Cooperative and Experiential Education Division Technical Session 4 - Innovating Engineering Education through Industry and Community Partnerships, Maker Spaces, Competitions, Research Initiatives, and Experiential Education
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Cooperative and Experiential Education Division
Moderators: Christopher Pung, Grand Valley State University; Katherine McConnell, University of Colorado Boulder

This session will focus on innovative engineering education through industry and community engagement/partnerships, maker spaces, competitions, research initiatives, and various forms of experiential education. This live (synchronous delivery) session will include a brief overview from each presenter, followed by an interactive question-and-
answer session that allows for focused audience engagement. Before participating in this session, it is advised that the online technical session content (pre-recorded, asynchronous delivery) be reviewed.

The Community-Engaged College: Grand Valley State University’s Industry and Community Partnership Model
Casey Thelenwood, Grand Valley State University
Dr. Paul D. Plotkowski, Grand Valley State University
Dr. Brent Michael Nowak, Grand Valley State University

Assessment of Cybersecurity Competition Teams as Experiential Education Exercises
Dr. Jeremy Straub, North Dakota State University

Evaluation of the Second Year of an REU Program on Cyber-physical System Cybersecurity
Dr. Jeremy Straub, North Dakota State University

An Informal Learning Program as a Replicable Model for Student-Led, Industry-Supported Experiential Learning
Julia Armstrong, Ohio State University
Meris Mandernach Longmeier, Ohio State University

Maker Spaces for the Multitudes - Strategies to Expand Access and Use of a College Maker Space
Kyle Dukart, University of Minnesota, Twin Cities
Dr. David John Orser, University of Minnesota, Twin Cities
Mr. Ben Guengerich, University of Minnesota - Anderson Student Innovation Labs

Research Experiences for Undergraduates’ Social Programs: A Key Ingredient for Success
Dr. Jeremy Straub, North Dakota State University

M213A - Capstone Design Practices
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Design in Engineering Education Division
Moderators: Bridget Smyser, Northeastern University; Jonathan Kralick, United States Military Academy

Are Creative Capstone Design Projects Successful? Relating Project Creativity to Course Outcomes
Dr. Bridget M. Smyser, Northeastern University
Prof. Andrew Gouldstone, Northeastern University

Implementing Abbreviated Personas into Engineering Education
Major Jonathan Kralick P.E., United States Military Academy
Dr. Barbara A. Karanian, Stanford University

Redesign of Capstone Design for Improving Engineering Students with Multidimensional Capabilities
Dr. Zhinan Zhang, Shanghai Jiao Tong University
Miss Houzhi Liu, Shanghai Jiao Tong University
Dr. Lu Chen, Shanghai Jiao Tong University
Miss Yaxin Huang, Shanghai Jiao Tong University
Jiabin Zhu, Shanghai Jiao Tong University

Work in Progress: Mechanical Engineering Students’ Incorporation of Stakeholder Considerations throughout a Senior Design Course Sequence
Valerie Vanessa Bracho Perez, Florida International University
Anilegna Nunez Abreu, Florida International University
Mr. Ameen Anwar Khan, Florida International University
Indhira Maria Hasbun, Virginia Tech
Dr. Alexandra Coso Strong, Florida International University

M213B - Design Methodologies 1
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Design in Engineering Education Division
Moderators: Aaron Joya, University of Washington; Robert Nagel, James Madison University

Work in Progress: Improving Engineering Students’ Need-finding Abilities
Meagan Flus, University of Waterloo
Mr. Christopher Rennick, University of Waterloo
Dr. Ada Hurst, University of Waterloo

“Where I’ve Been, Where I Am, Where I’m Going”: Exploring Design Awareness through an Undergraduate Student Seminar
Aaron Justin Joya, Georgetown University
Khadijah Jordan, Ms. Miranda Nicole Washington Grace Barar, University of Washington
Alison Gray, University of Washington
Ms. Rylie Sweem
Dr. Cynthia J. Atman, University of Washington

Teaching Conceptual Design to a Heterogeneous Group: A Workshop Method
Dr. Sangarappillai Sivaloganathan, United Arab Emirates University
Prof. Ali H. Al-Marzouqi, United Arab Emirates University
Dr. Essam K. Zaneldin P.E., United Arab Emirates University

A Longitudinal Exploration of Students’ Functional Modeling Abilities
Mr. Henry David Banks, James Madison University
Alexander R. Murphy, Georgia Institute of Technology
Prof. Matt Robert Bohm, Florida Polytechnic University
Dr. Julie S. Linsey, Georgia Institute of Technology
Dr. Robert L. Nagel, James Madison University

**Representations Between Engineering Design and Engineering Analysis**
Hadi Ali, Arizona State University, Polytechnic campus
Dr. Ann F. McKenna, Arizona State University

**Validation of a Mental Model Elicitation Instrument through Deployment of Control Groups in an Undergraduate Engineering Program**
Alexander R. Murphy, Georgia Institute of Technology
Henry David Banks, James Madison University
Dr. Matt Robert Bohm, Florida Polytechnic University
Dr. Robert L. Nagel, James Madison University
Dr. Julie S. Linsey, Georgia Institute of Technology

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**M214A - Student Experiences with Undergraduate Research**
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Vanessa Svihla, University of New Mexico; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

**A Proposed Survey-based, Student-centered Framework for Evaluation of Undergraduate Research Awareness in Minority-serving Institutions**
Dr. Mahmoud Khasawneh, Texas A&M International University
Dr. John C. Kilburn Jr., Texas A&M International University
Dr. Jared Romeo Dmello, Texas A&M International University
Daphne Elizabeth Sanchez, Texas A&M International University
Alicia Segovia, Texas A&M International University

**Work in Progress: Undergraduate Research Experiences Survey (URES) and Engineering Identity**
Dr. Caitlin Donahue Wylie, University of Virginia
Dr. Kathryn A. Neeley, University of Virginia
Dr. Brian P. Helmke, University of Virginia

**Work in Progress: An Undergraduate Theory and Methods of Research Class for Honors Students**
Dr. Joseph H. Holles, University of Wyoming

**Engineering Resilience through Research Mentorship: Manufacturing Pathways to Careers**
Dr. Lara Cristina Perez-Felkner, Florida State University
Ms. Chelsea D. Shore, Florida State University
Dr. Tarik J. Dickins, Florida A&M University
Dr. Mingchia Dawn Yang, Florida A&M University

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**Assessment and Analysis of Use of Self-regulated Learning in Laboratory-based Extracurricular Undergraduate/First-year Graduate Research Projects**
Dr. Wookwon Lee P.E., Gannon University
Dr. Nicholas B. Conklin, Gannon University

**M214B - Student Perceptions of Self-efficacy, Success, and Identity**
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Jennifer Turns, University of Washington; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

**Assess Experiential Learning Outcomes**
Tania K. Morimoto, University of California, San Diego
Prof. Nathan Delson, University of California, San Diego
Dr. Carolyn L. Sandoval, University of California, San Diego

**Work in Progress: What Makes Courses Demanding in Engineering Education? A Combination of Mixed Methods and Grounded Theory Research**
Miss Isabel Hilliger P.E., Pontificia Universidad Católica de Chile
Miss Constanza Melian, Pontificia Universidad Católica de Chile
Miss Javiera Meza, Pontificia Universidad Católica de Chile
Mr. Gonzalo Cortés, Pontificia Universidad Católica de Chile
Dr. Jorge A. Baier, Pontificia Universidad Catholica de Chile

**Student Perceptions of and Learning in Maker Spaces Embedded in Their Undergraduate Engineering Preparation Programs**
Dr. Louis S. Nadelson, University of Central Arkansas
Dr. Idalis Villanueva, Utah State University
Dr. Jana Bouwma-Gearhart, Oregon State University
Ms. Estefany Soto, University of Central Arkansas
Cindy Ann Lenhart, Oregon State University
Kate Youmans, Utah State University
Yoon Ha Choi, Oregon State University

**Expectations in Engineering Programs: Between Social Construction and Internalized Experience**
Mr. Hindolo Michael Kamanda, University of Georgia
Mr. Davis George Anderson Wilson, University of Georgia
Dr. Joachim Walther, University of Georgia
Dr. Nicola W. Sochacka, University of Georgia
Dr. Stephen Secules, Florida International University
Dr. James L. Huff, Harding University
An Exploration of Students’ Engineering Identity Development in a PBL Team Setting
Ms. Juebei Chen, Aalborg University
Prof. Anette Kolmos, Aalborg University
Prof. Xiangyun Du, Qatar University

Developing a More Comprehensive Instrument to Assess the Entrepreneurial Mindset of Engineering Students
Dr. Constanza Miranda, Pontificia Universidad Católica de Chile
Sr. Julián Iñaki Goñi, Pontificia Universidad Católica de Chile
Dr. Bruk T. Berhane, Florida International University
Ms. Trinidad Sotomayor, Pontificia Universidad Católica de Chile

M214C - Faculty and Student Perspective on Instructional Strategies
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: John Tingerthal, Northern Arizona University; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Exploratory Factor Analysis of Approaches to Teaching Inventory (ATI): Use in an Evidence-based Faculty Development Program for Promoting Active Learning Pedagogical Strategies
Kristi Glassmeyer, Arizona State University
Lydia Ross, Arizona State University
Dr. Eugene Judson, Arizona State University
Prof. Stephen J. Krause, Arizona State University
Dr. Lindy Hamilton Mayled, Arizona State University

Student Response to Instructional Practices (StRIP) Survey in Engineering Classrooms: Validating a Spanish Version
Dr. Monica Quezada-Espinoza, Universidad Andres Bello, Chile
Prof. Angeles Dominguez, Tecnologico de Monterrey, Mexico, and Universidad Andres Bello, Chile
Prof. Genaro Zavala, Tecnologico de Monterrey, Mexico, and Universidad Andres Bello, Chile
Dr. Juan Felipe Calderón, Universidad Andres Bello, Chile

Making Improvements: Pedagogical Iterations of Designing a Class Project in a Maker Space
Ms. Roxana Maria Carbonell, University of Texas at Austin
Dr. Audrey Boklage, University of Texas at Austin
Dr. Patricia Clayton, University of Texas at Austin
Dr. Maura Borrego, University of Texas at Austin

What do Undergraduate Engineering Students and Pre-service Teachers Learn by Collaborating and Teaching Engineering and Coding Through Robotics?

Dr. Jennifer Jill Kidd, Old Dominion University
Dr. Krishnanand Kaipa, Old Dominion University
Mr. Samuel J. Sacks, Norfolk Public Schools
Dr. Stacie I. Ringleb, Old Dominion University
Dr. Pilar Pazos, Old Dominion University
Dr. Kristie Gutierrez, Old Dominion University
Dr. Orlando M. Ayala, Old Dominion University
Dr. Lilian Maria de Souza Almeida, Old Dominion University

Work in Progress: A Student-Instructor Survey on Student Use of Unsanctioned Online Resources
Mr. Philip P. Graybill, Pennsylvania State University, University Park
Dr. Catherine G.P. Berdanier, Pennsylvania State University, University Park

CoOrdinated Math-Physics Assessment for Student Success (COMPASS) Assessments on Continuing Math Courses and Attitude Toward Math
Dr. Guangming Yao, Clarkson University
Dr. Kelly Black, University of Georgia
Dr. Michael W. Ramsdell, Clarkson University
Dr. Matthew K. Voigt, San Diego State University
Kalani Kithuliya Rubasinghe Kattadige, Clarkson University
Dr. Wen Li, University of California, Los Angeles

M215A - Curricular Advancements in ECE
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Electrical and Computer Division
Moderators: Jennifer Bonnwell, Milwaukee School of Engineering; Huiling Wang, Jacksonville University

A Change Model Approach: Integrating the Evaluation of Synergistic Departmental Efforts to Transform Engineering Education
Brandi Geisinger, Iowa State University
Arlene de la Mora, Iowa State University
Cori J. Hyde
Dr. Diane T. Rover, Iowa State University

Partner Selection and Group-based Curriculum Design for Engineering Laboratory Courses
Dr. Chad Eric Davis P.E., University of Oklahoma
Dr. Paul Moses, University of Oklahoma

Work in Progress: Leveraging Technology Trends to Develop a Skills-based Approach to Engineering Design
Dr. Shiny Abraham, Seattle University
Dr. Kenneth A. Connor, Rensselaer Polytechnic Institute
M216 - ECCD - Technical Session 1 - Energy & Electrical Engineering
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Energy Conversion and Conservation Division
Moderators: Seyed Mousavinezhad, Idaho State University; Herbert Hess, University of Idaho

Papers presented in this session are related to energy and electrical engineering and their educational aspects.

Building a Cybersecurity Engineering Program? Begin by Cloning Your Computer Engineering Program
Dr. Douglas W. Jacobson, Iowa State University
Dr. Julie Ann Rursch, Iowa State University

M218 - Engineering Design Graphics Division Technical Session 4
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Design Graphics Division
Moderator: Hannah Budinoff, University of California, Berkeley

A potpourri of ideas that will be of interest to design graphics instructors and others with an interest in design graphics instruction.

Challenges of Developing a New Engineering Drawings Course for Civil Engineers
Mr. Bradley James Schmid, University of Saskatchewan

Engineering Application with a Visual Aid and an Experimental Setup
Dr. Nandita Biswas, Washington State University
Mr. David Torick, Washington State University

M221 - Information Literacy in First-year Courses and Co-curricular Experiences
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Libraries Division
Moderators: Julie Arendt, Virginia Commonwealth University; Ken Carriiveau, Baylor University

Promoting Engineering Research Early - A Case Study of Research Question Formulation in a First-year Engineering Course
Ms. Joanne Dera, New Jersey Institute of Technology
Dr. Ashish D. Borgaonkar, New Jersey Institute of Technology
Dr. Davida Scharf, New Jersey Institute of Technology
Dr. Jaskirat Sodhi, New Jersey Institute of Technology

A First-year Engineering Information Literacy Workshop to Increase Student Awareness of Research Databases
Ms. Evie Cordell, Northeastern University
Alissa P. Link Cilfone, Northeastern University
Dr. Susan F. Freeman, Northeastern University
Dr. Richard Whalen, Northeastern University
Ms. Brooke Davis Williams, Northeastern University

Work in Progress: Using a Second Intervention to Continue Improving Information Literacy Outcomes in a First-year
Design Class

Brianna B. Buljung, Colorado School of Mines
Leslie Light, Colorado School of Mines

Resilience Within and Resilience Without: Mindfulness and Sustainability Programming Using an Embedded Engineering Librarian Approach

Ms. Catherine Woodworth Wong, Merrimack College
Dr. Cynthia Helen Carlson P.E., Merrimack College

Designing and Evaluating Co-curricular Information Literacy Sessions for Undergraduate Engineering Researchers

Shelby J. Hallman, North Carolina State University
Bertha P. Chang, North Carolina State University

M223A - ET Pedagogy I
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Technology Division
Moderator: Elaine Cooney, Indiana University - Purdue University Indianapolis

Experimental Testing of the Proton Change Membrane (PEM) Hydrogen Fuel Cell Performance with Nanographene Oxide

Dr. Hazem Tawfik, State University of New York
Yeong Ryu, State University of New York

Energy Consumption Trends for AC Systems in a Typical House

Dr. Maher Shehadi, Purdue Polytechnic Institute

Refrigeration Cycle Educational Training Unit Development

Dr. Maher Shehadi, Purdue Polytechnic Institute

Using a Toaster Oven for a Transient Heat Transfer Lab

Mr. Robert Edwards, Pennsylvania State University
Mr. Fredrick A. Nitterright, Pennsylvania State University
Ms. LeeAnn Marie Reynolds, Pennsylvania State University

M224 - ENT Division Technical Session: EM Across the Curriculum I
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Entrepreneurship & Engineering Innovation Division
Moderator: Jason Forsyth, James Madison University

Implementing Entrepreneurial Mindset Learning (EML) in a Timber Design Course

Dr. Seyed Mohammad Seyed Ardakani, Ohio Northern University

Incorporating an Entrepreneurial Mindset Competition into a Structural Analysis Course

Dr. Seyed Mohammad Seyed Ardakani, Ohio Northern University

Integrating Entrepreneurial Mindset in a Multidisciplinary Course on Engineering Design and Technical Communication

Dr. Kevin D. Dahm, Rowan University
Dr. Scott Streiner, Rowan University
Dr. Cheryl A. Bodnar, Rowan University
Dr. Kaitlin Mallouk, Rowan University
Mr. Bruce Oestreich, Rowan University
Dr. Ted Howell, Rowan University
Dr. Jennifer Tole, Rowan University

Work in Progress: Adopting the Entrepreneurial Mindset in an Upper-level Engineering Electromagnetics Course

Dr. Matthew Garrett Young, Arkansas Tech University

Work in Progress: A Mixed-method Longitudinal Study to Assess Mindset Development in an Entrepreneurial Engineering Curriculum

Prof. Heidi Morano, Lawrence Technological University
Prof. Susan Henson, Lawrence Technological University
Matthew L. Cole, Lawrence Technological University

M225 - Emphasizing Communication and the Humanities in Environmental Engineering
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Environmental Engineering Division
Moderators: Charles Sprouse, Benedictine College; Andrew Pfluger, United States Military Academy; Fethiye Ozis, Northern Arizona University

Integration of Environmental Humanities Modules into the Environmental Engineering Classroom

Dr. Sarah K. Bauer, Rowan University

Machine-assisted Analysis of Communication in Environmental Engineering

Dr. Roman Taraban, Texas Tech University
Mr. David Robledo, Texas Tech University
Dr. Francesco V. Donato, Texas Tech University
Dr. Ryan C. Campbell, Texas Tech University
Dr. Jeong-Hee Kim, Texas Tech University
Dr. Danny D. Reible, Texas Tech University
Dr. Chongzheng Na, Texas Tech University

Technical Communications in an Environmental Engineering Curriculum: A Framework for Analysis and Continual Improvement

Mr. Caleb James McCollum, United States Military Academy
M226 - Experimentation and Laboratory-oriented Studies Division Technical Session 1
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Experimentation and Laboratory-Oriented Studies Division
Moderator: Sevile Mannickarottu, University of Pennsylvania

A Reproducible Solution for Implementing Online Laboratory Systems Through Inexpensive and Open-source Technology
Dr. Philip Jackson, University of Florida
Mr. Joshua Rudaitis, University of Florida

A Project-based Online Experimentation Course
Prof. Ahmet Can Sabuncu, Worcester Polytechnic Institute
Prof. John M. Sullivan Jr., Worcester Polytechnic Institute

Redesigning an Experimentation Course with PBL Pedagogy to Support Accreditation in China
Dr. Lijun Zhang, Beijing Institute of Technology
Dr. Dongxiao Wang, Beijing Institute of Technology
Dr. Xiaofeng Tang, Ohio State University
Prof. Zhonglian Zhang, Beijing Institute of Technology
Prof. Hai Lin, Beijing Institute of Technology
Dr. Ying Wang

Pair-to-Pair Peer Learning
Dr. Nebojsa I. Jaksic, Colorado State University, Pueblo

M227 - First-Year Programs: Maker Spaces in the First Year
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division
Moderators: Kaitlin Malloz, Rowan University; Jack Bringardner, New York University Tandon School of Engineering

Makers and makerspace usage in the first year.

Addressing First-Year Interest in Engineering via a Makerspace-based Introduction to Engineering Course
Dr. Brian Scott Robinson, University of Louisville
Dr. James E. Lewis, University of Louisville
Mr. Nicholas Hawkins, University of Louisville
Ms. Teresa Lee Tinnell, University of Louisville

Developing Technical Self-efficacy through a Maker-inspired Design Project
Dr. Jennifer S Mullin, UC Davis

Employment of Active Learning Pedagogy Throughout a Maker-Space-Based, First-Year Introduction to Engineering Course
Mr. Nicholas Hawkins, University of Louisville
Dr. James E. Lewis, University of Louisville
Dr. Brian Scott Robinson, University of Louisville

Results of Integrating a Maker Space into a First-Year Engineering Course
Dr. Stephanie M Gillespie, University of New Haven
Dr. Goli Nossoni, University of New Haven

M228 - Growing and Maintaining Graduate Enrollment
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Graduate Studies Division
Moderators: Jeffrey Fergus, Auburn University; La'Tonia Stiner-Jones, Ohio State University

Dramatically Growing a Graduate Program: A Seed Investment
Dr. Shannon Barker, University of Virginia
Dr. Amy Clobes, University of Virginia
Dr. Jasmine D. Crenshaw, University of Virginia

A Systematized Literature Review of the Factors that Predict the Retention of Racially Minoritized Students in STEM Graduate Degree Programs
Miss Fantasi Nicole Curry, Purdue University, West Lafayette
Prof. Jennifer DeBoer, Purdue University, West Lafayette

Work in Progress: Increasing Communication Avenues Between Mechanical Engineering Doctoral Students, Faculty, and Administration
Adrienne K. Scott, University of Colorado, Boulder
Dr. Madalyn D. Kern, University of Colorado, Boulder
Dr. Julie E. Steinbrenner, University of Colorado, Boulder

M229 - Industrial Engineering Division Technical Session 1
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Industrial Engineering Division
Moderator: Lisa Bosman, Purdue University at West Lafayette

Assessing Instructional Effectiveness and Understanding Factors that Contribute to Student Performance in an Engineering Statistics Course: An Exploratory Study
Dr. James Burns, Western Michigan University
Mrs. Enas Aref, Western Michigan University
Mr. Mohammad Majd, Western Michigan University
Creating a Community of Practice for Operations Research by Co-creating a High-impact Executive Education Program in India
Dr. Venugopalan Kovaichelvan, TVS Institute for Quality and Leadership, TVS Motor Company Ltd.
Dr. Abhijit Deshmukh, Purdue University, West Lafayette
Dr. Patrick A. Brunese, Purdue University, West Lafayette

Incorporating Divergent Thinking Skills Development into a Project-based Course in Industrial and Systems Engineering
Prof. Elif Akcali, University of Florida
Prof. Wayne C.W. Giang, University of Florida
Ms. McKenzie Landrum, University of Florida

Applying Artificial Intelligence to the Beer Game
Dr. Lisa Bosman, Purdue University, West Lafayette
Dr. Asaakiran Madamanchi, Purdue University, West Lafayette
Dr. Scott R. Bartholomew, Purdue University, West Lafayette
Vetria L. Byrd, Purdue University, West Lafayette

M258 - Welcome Session
9:30 A.M. - 9:55 A.M.
Sponsor: ASEE Board of Directors
Welcome session featuring ASEE President Stephanie Adams
Musical entertainment provided by Kai Kight, Innovative Musician

M271B - NSF Grantees: RED 1
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderators: Amber Genau, University of Alabama at Birmingham; S. Patrick Walton, Michigan State University
Presentations from groups with NSF "Revolutionizing Engineering Departments" (RED) grants

Developing Changemaking Engineers – Year Five
Dr. Susan M. Lord, University of San Diego
Dr. Rick Olson, University of San Diego
Dr. Chell A. Roberts, University of San Diego
Dr. Caroline Baillie, University of San Diego
Dr. Odesma Onika Dalrymple, University of San Diego
Dr. Leonard A. Perry, University of San Diego

The Impact of an Intensive Design Experience on Self-Efficacy, Valuation of Engineering Design, and Engineering Identity in Undergraduate Engineering Students
Dr. Uzoma M. Monye, North Carolina Agricultural and Technical State University
Dr. Tobin N. Walton, North Carolina Agricultural and Technical State University

Dr. Stephen B. Knisley, North Carolina Agricultural and Technical State University

Revolution in CBE: Sustainability and Barriers
Dr. Milo Koretsky, Oregon State University
Dr. Susan Bobbitt Nolen, University of Washington
Michelle Kay Bothwell, Oregon State University
Dr. Devlin Montfort, Oregon State University
Dr. Susannah C. Davis, Oregon State University
Dr. Christine Kelly, Oregon State University

Engineering with Engineers: Fostering Engineering Identity through Industry Immersion
Dr. Yen-Lin Han, Seattle University
Dr. Kathleen E. Cook, Seattle University
Dr. Gregory Mason P.E., Seattle University
Dr. Teodora Rutar Shuman, Seattle University
Dr. Jennifer A. Turns, University of Washington

The RED Teams Start-Up Session: Leveraging Research with Practice for Success in Academic Change
Dr. Julia M. Williams, Rose-Hulman Institute of Technology
Dr. Sriram Mohan, Rose-Hulman Institute of Technology
Dr. Eva Andrijcic, Rose-Hulman Institute of Technology
Dr. Cara Margherio, University of Washington
Dr. Elizabeth Litzler, University of Washington
Kerice Doten-Snitker, University of Washington

M271 - NSF Grantees: RED 2 / Civil Engineering
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderators: Amber Genau, University of Alabama at Birmingham; Susan Lord, University of San Diego
Presentations from groups with NSF "Revolutionizing Engineering Departments" (RED) grants in civil engineering and other grants related to leadership and workforce development in CEE.

Impacts of Diversity and Inclusion Initiatives in a Civil and Environmental Engineering Department
Mr. Tiago R. Forin, Rowan University
Dr. Stephanie Farrell, Rowan University
Dr. Kauser Jahan P.E., Rowan University
Stephanie Lezotte, Rowan University
Dr. Beena Sukumaran, Rowan University
Prof. Harriet Hartman, Rowan University
Dr. Ralph Alan Dusseau P.E., Rowan University
Theresa F.S. Bruckerhoff, Curriculum Research & Evaluation, Inc.
**ASEE'S VIRTUAL CONFERENCE**  
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#ASEEVC

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<th><strong>M301 - Aerospace Student Projects, Engineering Design and Research</strong></th>
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<td><strong>11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE</strong></td>
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<td><strong>Sponsor:</strong> Aerospace Division</td>
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<tr>
<td><strong>Moderators:</strong> Tracy Yother, Purdue Polytechnic Institute; Nadir Yilmaz, Howard University</td>
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**Drone Construction and Racing for Pre-College Students**
- Dr. Michael C. Hatfield, University of Alaska Fairbanks
- Dr. Catherine F. Cahill, University of Alaska Fairbanks
- Dr. Peter W. Webley, University of Alaska Fairbanks

**Results from the University of Alaska Fairbanks' AIAA Student Club Design, Build, Fly Competition 2019**
- Levi Purdy, University of Alaska Fairbanks
- Dr. Michael C. Hatfield, University of Alaska, Fairbanks
- Michael Radotich

**Lighter-than-air Vehicles as Aerospace-focused Projects in a Mechanical Engineering Capstone Sequence**
- Dr. Wilhelm A. Friess, University of Maine

**Students in Engineering Design Process and Applied Research**
- Dr. Kuldeep S. Rawat, Elizabeth City State University

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<tr>
<th><strong>M302 - Architectural Engineering Division Technical Session 2</strong></th>
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<td><strong>11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE</strong></td>
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<tr>
<td><strong>Sponsors:</strong> Architectural Engineering Division; Construction Engineering Division</td>
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<tr>
<td><strong>Moderator:</strong> Darrell Nickolson, Indiana University - Purdue University Indianapolis</td>
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**Architectural Design as a Way for Civil Engineers to Learn Building Systems and BIM**
- Dr. James B. Pocock, U.S. Air Force Academy
- Dr. Patrick Charles Suermann P.E., Texas A&M University

**Challenges and Opportunities Observed in the Implementation of a New Architectural Engineering Undergraduate Academic Program**
- Prof. Scott Walbridge P.E., University of Waterloo
- Dr. Rania Al-Hammoud P.Eng., University of Waterloo

**Implementing Bluebeam Software in Architectural Engineering Design Courses**
- Michael James Deigert P.E., California Polytechnic State University, San Luis Obispo
- Dr. Anahtid Behrouzi, California Polytechnic State University, San Luis Obispo
- Dr. Pamalee A. Brady, California Polytechnic State University, San Luis Obispo

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<th><strong>M304 - Teaching Interventions in Biomedical Engineering (Works in Progress) - June 22nd</strong></th>
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<tr>
<td><strong>11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE</strong></td>
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<tr>
<td><strong>Sponsor:</strong> Biomedical Engineering Division</td>
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<tr>
<td><strong>Moderators:</strong> Aileen Huang-Saad, University of Michigan; Alexis Ortiz-Rosario, Ohio State University</td>
</tr>
</tbody>
</table>

**Development of a Video Analysis Software for Biomechanics Education**
- Dr. Hirohito Kobayashi, University of Wisconsin, Platteville

**Incorporating Sustainability into a Bioethics Course: A Case Study**
- Dr. Arash Mahboobin, University of Pittsburgh
- Dr. David V.P. Sanchez, University of Pittsburgh

**Switching Modalities: Implications of Online Education in Biomedical Engineering**
- Dr. Vignesh Subbian, University of Arizona
- Mr. Daniel B. Whitaker, University of Arizona

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**WIP: Improving Student Engagement in Undergraduate Bioinformatics Through Research Contributions**
Dr. Jessica Dare Kaufman, Endicott College

**WIP: Direct Incorporation of Research Articles into Undergraduate Biomedical Engineering Courses to Contextualize Complex Topics**
Prof. Mark A. Chapman, University of San Diego  
Dr. G. Bryan Cornwall, University of San Diego

**WIP: Embedded Ethical Inquiry and Reflection in a Biomedical Engineering Curriculum**
Dr. Sharon Miller, Indiana University Purdue University, Indianapolis  
Dr. Steven Higbee, Indiana University Purdue University, Indianapolis  
Prof. Joseph M. Wallace, Indiana University Purdue University, Indianapolis  
Dr. John H. Schild, Indiana University Purdue University, Indianapolis  
Dr. Julie Y. Ji

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**M306A - Before the Capstone: Project-based Experiences Early in the Curriculum**

**Sponsor: Civil Engineering Division**
Moderator: Camilla Saviz, University of the Pacific

This session includes papers describing approaches to project-based learning in freshman and sophomore years of the curriculum.

**Incorporating Life Cycle Assessment in an Introduction to Engineering Course**
Dr. Mary Roth, Lafayette College  
Dr. Haritha Malladi, Lafayette College

**Engaging Civil Engineering Students through a “Capstone-like” Experience in their Sophomore Year**
Dr. Wayne Sarasua, Clemson University  
Dr. Nigel Berkeley Kaye, Clemson University  
Dr. Jennifer Harper Ogle, Clemson University  
Mr. Mehdi Nassim Benaiissa, Clemson University  
Dr. Lisa Benson, Clemson University  
Dr. Bradley J. Putman, Clemson University  
Dr. Aubrie Lynn Pfirman, Lander University

**Modernizing an Introductory Civil Engineering Course with Project-Based Learning**
Dr. John Komlos, Villanova University  
Dr. Stephanie L. Walkup, Villanova University  
Dr. Kevin A. Waters, Villanova University

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**WIP: Peer Mentorship and a 3D Printed Design-Build-Test Project: Enhancing the First Year Civil Engineering Experience**
Dr. Nicholas Andres Brake, Lamar University  
Prof. Thinesh Selvaratnam

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**M306B - Beyond the Capstone: Integrating Authentic Experiences that Promote Learning and Excitement**

**11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor: Civil Engineering Division**
Moderator: Matthew Lovell, Rose-Hulman Institute of Technology

This session includes papers providing insights into the civil engineering capstone experience and introducing ways to go beyond the traditional project-based learning.

**Development and Implementation of a Final Year Civil Engineering Capstone Project – Successes, Lessons Learned, and Path Forward**
Dr. Andrew C. Brown P.E., University of Auckland  
Mr. Hugh Watson Morris, University of Auckland, NZ

**Scaffolding and Assessing Sustainable Design Skills in a Civil Engineering Capstone Design Course**
Dr. Elise Barrella P.E., Wake Forest University  
Dr. Mary Katherine Watson, The Citadel  
Mr. Justyn Daniel Girdner, James Madison University  
Dr. Robin Dawn Anderson, James Madison University

**Beyond the Capstone: National Competition and Community Engagement in a Timber Bridge Senior Project**
Dr. Bin (Brenda) Zhou P.E., Central Connecticut State University  
Sylwia Tanski, Fuss & O'Neill, Inc.

**Civil Engineering Capstone Inventory: Standards of Practice & The ASCE Body of Knowledge**
Dr. Jennifer Retherford P.E., The University of Tennessee at Knoxville  
Dr. Beth Lin Hartmann, Iowa State University  
Dr. Rania Al-Hammoud P.Eng., University of Waterloo  
Dr. George A Hunt P.E., University of Nebraska, Lincoln
M308 - Computers in Education Division Technical Session 2: Teaching and Learning
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Computers in Education Division
Moderators: Robert Avanzato, Pennsylvania State University; Ronald Hayne, The Citadel

General teaching and learning will be the topics of this session. Papers selected fit into one or both of these categories.

**Improving Student Learning through Classroom Engagement**
- Dr. Eddie Davis, SUNY Farmingdale

**Work in Progress: Analysis of the Impact of Office Hours on Graded Course Assessments**
- Natalia Ozymko, University of Illinois at Urbana - Champaign
- Matthew Allan McCarthy, University of Illinois at Urbana - Champaign
- Prof. Wade Fagen-Ulmschneider, University of Illinois at Urbana - Champaign
- Prof. Karin Jensen, University of Illinois at Urbana - Champaign
- Karle Flanagan, University of Illinois at Urbana - Champaign

**Toward a Multi-dimensional Biometric Approach to Quantifying Student Engagement in the STEM Classroom**
- Dr. James Christopher Foreman, University of Louisville
- Dr. Aly Farag, University of Louisville
- Dr. Asem Ali, University of Louisville
- Islam Alkabbany, University of Louisville
- Dr. Marci S. DeCaro, University of Louisville
- Dr. Thomas Tretter, University of Louisville

**Computerized Exam Reviews: In-person and Individualized Feedback to Students after a Computerized Exam**
- Wayne L. Chang, University of Illinois at Urbana - Champaign
- Prof. Matthew West, University of Illinois at Urbana - Champaign
- Prof. Craig Zilles, University of Illinois at Urbana - Champaign
- David Mussulman, University of Illinois at Urbana - Champaign
- Carleen Sacris, University of Illinois at Urbana - Champaign

M311 - Cooperative and Experiential Education Division Technical Session 2 - Development, Assessment, and Impact of Experiential Education
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Cooperative and Experiential Education Division
Moderators: Casey Thelenwood, Grand Valley State University; Katherine McConnell, University of Colorado Boulder

This session will provide a best-practices overview of the development, assessment, and impact of engineering experiential education. This live (synchronous delivery) session will include a brief overview from each presenter, followed by an interactive question-and-answer session that allows for focused audience engagement. Before participating in this session, it is advised that the online technical session content (pre-recorded, asynchronous delivery) be reviewed.

**Developing a Framework for Experiential Learning**
- Dr. John H. Callewaert, University of Michigan
- Dr. Joanna Mirecki Millunchick, University of Michigan
- Cassandra Sue Ellen Woodcock, University of Michigan
- Mr. Kevin Cai Jiang, University of Michigan
- Stacie Edington, University of Michigan

**The Influence of Experiential Learning on Student Professional Development: A Literature Review**
- Beata Johnson, Purdue University at West Lafayette
- Dr. Joyce B. Main, Purdue University at West Lafayette

**Students’ Perception of Collaborative Online International Learning**
- Dr. Philip Appiah-Kubi, University of Dayton
- Ms. Jennifer Nichwitz, University of Dayton

**Longitudinal Study to Develop and Evaluate the Impacts of a “Transformational” Undergraduate ECE Design Program: Study Results and Best Practices Report**
- Dr. Rachael E. Cate, Oregon State University
- Donald Heer, Oregon State University
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M313A - Capstone Pedagogy
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Design in Engineering Education Division
Moderators: Bob Rhoads, Ohio State University; Austin Talley, Texas State University

Work In Progress: Is Our Capstone Mentorship Model Working?
Dr. C. Richard Compeau Jr., Texas State University
Dr. Austin Talley P.E., Texas State University

Evaluating ABET Student Outcome (5) in a Multidisciplinary Capstone Project Sequence
Dr. Nicholas A Baine P.E., Grand Valley State University
Dr. Karl Brakora, Grand Valley State University
Dr. Christopher P. Pung P.E., Grand Valley State University

Collaborative Project-based Learning Capstone for Engineering and Engineering Technology Students
Dr. Andrew P. Ritenour, Western Carolina University
Dr. Chip W. Ferguson, Western Carolina University
Dr. Patrick Gardner, Western Carolina University
Mr. Brett Ronald Banther, Western Carolina University
Dr. Jeffrey L. Ray, Western Carolina University

An Integrated Multi-year Iterative and Service-oriented Capstone Project
Dr. Joyce Blandino P.E., Virginia Military Institute
Col. Jon-Michael Hardin P.E., Virginia Military Institute

Drones for Project-based Learning (PBL) Capstone Design
Dr. Stephen Andrew Wilkerson P.E., York College of Pennsylvania
Dr. Stephen Andrew Gadsden, University of Guelph
Ms. Amy Domenique Gadsden, University of Alberta
Miss Elyse Hill

M313B - Design Methodologies 2
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Elizabeth Starkey, Pennsylvania State University; Kathryn Shroyer, University of Washington

Creating Value in Project-based, Multidisciplinary Design Courses
Mr. Klaus Castrén, Aalto University
Dr. Sine Celik, Aalto University
Dr. Tua A. Björklund, Aalto University Design Factory

Prof. Niina Nurmi, Aalto University, School of Business
Implementing Product Dissection in Virtual Classrooms
Prof. Andrea M. Ragonese, Pennsylvania State University, University Park
Dr. Elizabeth Marie Starkey, Pennsylvania State University, University Park

Developing a Bridging Language: Design Decisions in Informal Making Experiences
Kathryn Elizabeth Shroyer, University of Washington

Prominence of Conceptual Design with Computer-Aided Design Tools for Junior and Senior Product Designers
Mr. Arash Nourimand, University of Toronto
Dr. Alison Olechowski, University of Toronto

The Imminent Educational Paradigm Shift: How Artificial Intelligence will Reframe how we Educate the Next Generation of Engineering Designers
Mr. Cheng Chen, University of Georgia
Mr. Toluwalase Oluwagbemileke Olajoyegbe, University of Georgia
Dr. Beshoy Morkos, University of Georgia

Work in Progress: Assessing Creativity of Alternative Uses Task Responses: A Detailed Procedure
Mr. Amin G. Alhashim, University of Oklahoma
Ms. Megan Marshall, University of Oklahoma
Tess Hartog, University of Oklahoma
Dr. Rafał Jonczyk, Adam Mickiewicz University, Poland, and Pennsylvania State University
Danielle Dickson, Pennsylvania State University
Prof. Janet van Hell, Pennsylvania State University
Dr. Gülen Okudan-Kremer, Iowa State University of Science and Technology
Prof. Janet van Hell, Pennsylvania of Oklahoma

M314A - Alternatives to Traditional Assessment
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Michael Rugh, Texas A&M University; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Whose Grade Is It Anyway?: Transitioning Engineering Courses to an Evidence-based Specifications Grading System
Prof. Todd M. Fernandez, Georgia Institute of Technology
Dr. Kaela M. Martin, Embry-Riddle Aeronautical University
Prof. Richard T. Mangum, Embry-Riddle Aeronautical University
Dr. Cristi L. Bell-Huff, Georgia Institute of Technology
Privileging Learning Over Numbers: Developing an Alternative Student Assessment in Engineering
Dr. Eleazar Marquez, Rice University
Dr. Samuel Garcia Jr., Texas State University

Student-developed Learning Objectives: A Form of Assessment to Enable Professional Growth
Ms. Lauren Singelmann, North Dakota State University
Mr. Enrique Alvarez Vazquez, North Dakota State University
Ms. Ellen M. Swartz, North Dakota State University
Mary Pearson, North Dakota State University
Ryan Striker P.E., North Dakota State University
Dr. Dan Ewert

Leveraging the Force of Formative Assessment and Feedback for Effective Engineering Education
Prof. Junaid Qadir, Information Technology University, Lahore, Pakistan
Dr. Abd-Elhamid M. Taha, Alfaisal University
Prof. Kok-Lim Alvin Yau, Sunway University
Dr. Ing. João Ponciano, University of Glasgow
Dr. Sajjad Hussain, University of Glasgow
Prof. Ala Al-Fuqaha, Hamad Bin Khalifa University
Prof. Muhammad Ali Imran P.E., University of Glasgow

Oral Formative Assessment as a Means to Increasing Total Learning and Engagement in an Engineering University Classroom
Dr. Kristen M. Ward, Arizona State University
Dr. Yingyan Lou, Arizona State University

M314B - Care and Inclusive Teaching
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Elif Miskioglu, Bucknell University; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Practices in Engineering Education
Kenya Z. Mejia, University of Washington
Dr. Jennifer A. Turns, University of Washington

What is Care in Engineering Teaching?
Dr. Jorge A. Baier, Pontificia Universidad Católica de Chile
Miss Isabel Hilliger P.E., Pontificia Universidad Católica de Chile
Mrs. Ximena Hidalgo, Pontificia Universidad Católica de Chile
Miss Constanza Melian, Pontificia Universidad Católica de Chile

Work in Progress: Exploring an Engineering Faculty’s Intention Toward Inclusive Teaching
Memoria Matters, Purdue University at West Lafayette
Dr. Carla B. Zoltowski, Purdue University at West Lafayette
Prof. Patrice Marie Buzzanell, Purdue University at West Lafayette
Dr. Andrew O. Brightman, Purdue University at West Lafayette

M314C - Teaching Assistants, Supplemental Instruction, and Classroom Support
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: John Chen, California Polytechnic State University, San Luis Obispo; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Utilizing Peer Learning Assistants to Improve Student Outcomes in an Introductory ECE Course
Dr. David John Orser, University of Minnesota, Twin Cities
Kyle Dukart, University of Minnesota, Twin Cities
Prof. Changhyun Choi, University of Minnesota, Twin Cities
Frances Wood, University of Minnesota, Twin Cities

The Impact of Teachers’ Interventions on Collaborative Problem Solving Interactions in Undergraduate Engineering Classrooms
Dr. Saadeddine Shehab, University of Illinois at Urbana - Champaign

Work in Progress: Motivations and Outcomes of an Undergraduate Teaching Assistantship Program
Mr. Barukh Ben Rohde, University of Florida
Dr. Elliot P. Douglas, University of Florida

Increased Performance via Supplemental Instruction and Technology in Technical Computing
Dr. Nathan L. Anderson, California State University, Chico

M315 - Assessment of Learning in ECE Courses
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Electrical and Computer Division
Moderators: Jennifer Bonniwell, Milwaukee School of Engineering; Huihui Wang, Jacksonville University

Bidirectional and Collaborative Feedback Between Instructors and Students for Scholarship of Teaching and Learning (SoTL)
Prof. Jinhui Wang, University of South Alabama

Can ABET Assessment Really Be This Simple?
Dr. Claire Lynne McCullough P.E., High Point University
Outcomes-based Assessment Instrument for Engineering Problem-solving Skills
Miss Bahar Memarian, University of Toronto
Dr. Susan McCahan, University of Toronto

Student Performance in Partially Flipped ECE Laboratory Classes
Dr. Ahmed Dallal, University of Pittsburgh
Dr. April Dukes, University of Pittsburgh
Dr. Renee M. Clark, University of Pittsburgh

Work in Progress: A Longitudinal Study of Students’ Conceptual Understanding of Signals and Systems
Caroline Crockett, University of Michigan
Dr. Cynthia J. Finelli, University of Michigan
Dr. Harry Courtney Powell, University of Virginia

Continuous Improvement in Teaching Microprocessor Systems Design: A Review of Efforts in Using Different Tools, Techniques, and Methods to Satisfy Students’ Needs
Prof. Jie Sheng, University of Washington, Tacoma

M315B - Insights for Teaching ECE Courses
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Electrical and Computer Division
Moderators: Jennifer Bonniwell, Milwaukee School of Engineering; Huihui Wang, Jacksonville University

Work in Progress: Building Community, Providing Scholarships, Developing Leaders: Recruiting and Retaining Underrepresented Students in Engineering and Computer Engineering Departments
Mr. Kent A. Crick, Iowa State University
Mr. Matthew T. Seipel, Iowa State University
Dr. Lisa M. Larson Ph.D., Iowa State University
Prof. Mack Shelley, Iowa State University

Incorporating Diversity and Inclusion in the Computing Classroom
Dr. Bridget Benson, California Polytechnic State University, San Luis Obispo
Joseph Callenes, California Polytechnic State University, San Luis Obispo
Dr. Amin Malekmohammadi, California Polytechnic State University, San Luis Obispo

Student Sense of Community Through an Introductory Computer Programming Course Sequence
Dr. Laura K. Alford, University of Michigan
Dr. Amir Kamil, University of Michigan
Dr. Andrew DeOrio, University of Michigan

Not Standing at the Same Starting Line: Investigation of Prior Programming Experience on Student Performance in an Introductory Programming Course in ECE
Ms. Ziyue Li, University of Illinois, Urbana-Champaign
Prof. Yuting W. Chen, University of Illinois, Urbana-Champaign

M315B - Insights for Teaching ECE Courses
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Electrical and Computer Division
Moderators: Jennifer Bonniwell, Milwaukee School of Engineering; Huihui Wang, Jacksonville University

Work in Progress: Building Community, Providing Scholarships, Developing Leaders: Recruiting and Retaining Underrepresented Students in Engineering and Computer Engineering Departments
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Ms. Ziyue Li, University of Illinois, Urbana-Champaign
Prof. Yuting W. Chen, University of Illinois, Urbana-Champaign

M320 - New Media for Ethics Education
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Ethics Division
Moderators: Buse Aktas, Harvard University; Hamid Khan, Our Lady of the Lake University

Science Fiction as an Entry Point for Ethical Frameworks in Engineering and Computer Science Education
Dr. Valerie H. Summet, Rollins College
Prof. Rebecca A. Bates, Minnesota State University, Mankato

Let’s Get Ethical: Incorporating “The Office” and Engaging Practices into an Ethics Module for Capstone Students
Dr. Joshua Gargac, University of Mount Union

A Simulation for Exploring Ethical Situations that Arise from Conflicting Product Goals
Prof. Allen R. White, Rose-Hulman Institute of Technology

M321 - Improving and Understanding Engineering Collections and Publication
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Libraries Division
Moderators: Amanpreet Kaur, University of Pennsylvania; Michael White, Queen’s University

Collecting and Selecting: A Tale of Training and Mentorship
Ms. Angela Henshilwood, University of Toronto
Ms. Cristina Sewerin, University of Toronto
Mrs. Michelle Spence, University of Toronto
Mindy Thuna, University of Toronto
Dr. Tracy Zahradnik, University of Toronto

Ms. Qianjin Zhang, University of Iowa

Improving Access to Standards
Ms. Susan B. Wainscott, University of Nevada, Las Vegas
Mr. Richard J. Zwiercan, University of Nevada, Las Vegas

Using Citation Analysis as a Collections Management Tool
Mr. Paul McMonigle, Pennsylvania State University, University Park
Inter-university Bibliometric Comparison of Research Output within Engineering Departments: A Small-scale Case Study at the University of Central Florida and the University of Miami

Mr. James Sobczak, University of Miami
Mr. Buenaventura Basco, University of Central Florida

M323A - New Directions for ET
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Technology Division
Moderator: Chandra Asthana, Elizabeth City State University

A Systematized Literature Review of Student Learning, Participation, and Engagement Experience in Engineering Massive Open Online Courses (MOOCs)

Mrs. Huma Shaqai, Purdue University

Evaluation of Open Educational Resources (OER) Use in Construction Management Technology Courses

Dr. Michael Shenoda, State University of New York

Public Perception of Engineering Technology: A Literature Review

Dr. Anne M. Lucietto, Purdue University
Ms. Shelly Tan, Purdue University
Liza Ann Russell, Purdue University
Prof. Mary E. Johnson, Purdue University

M323B - Capstone/ET Projects I: Electrical and Computer Focus
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Technology Division
Moderator: Kevin Cook, Montana State University - Bozeman

A Control Systems Course Project Serving as a Bridge to a Capstone Course and Research Projects

Dr. Wei Zhan, Texas A&M University
Dr. Byul Hur, Texas A&M University
Dr. Boong Yeol Ryoo, Texas A&M University

A New Hands-on Laboratory Approach for Teaching Electromagnetic Concepts to Engineering and Engineering Technology Students

Dr. Jay R. Porter, Texas A&M University
Dr. Anthony T. Cahill, Texas A&M University
Prof. Ricardo Eusebi, Texas A&M University

Assessment of Firefighters’ Exposure and Response to a High-intensity Virtual Reality Simulation

Dr. Ulan Dakeev, Sam Houston State University
Dr. Ali Aljaroudi, Sam Houston State University
Dr. Faruk Yildiz, Sam Houston State University
Dr. Reg Recayi Pecen, Sam Houston State University

Introduce Virtual Reality to College Technical Training Programs—Intensified VR Training for Safety and Economic Efficiency

Dr. Xiaoxia Li, Texas A&M University, Kingsville
Dr. Farzin Heidari, Texas A&M University, Kingsville

Upgrading of a Data Communication and Computer Networks Course in Engineering Technology Program

Dr. Murat Kuzlu, Old Dominion University
Dr. Otilia Popescu, Old Dominion University

M324 - ENT Division Technical Session: First-year Experiences
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Entrepreneurship & Engineering Innovation Division; First-Year Programs Division
Moderator: Jason Forsyth, James Madison University

Building Toys for Children by Applying Entrepreneurial-minded Learning and Universal Design Principles

Dr. Scott Streiner, Rowan University
Dr. Cheryl A. Bodnar, Rowan University
Dr. Kaitlin Mallouk, Rowan University
Mr. Bruce Oestreich, Rowan University
Dr. Kevin D. Dahm, Rowan University

First-year Engineering Students’ Interpretation of Curiosity in the Entrepreneurial Mindset Through Reflective Practice

Courtney A. LeMasney, Rowan University
Hayley M. Shuster, Rowan University
Dr. Kaitlin Mallouk, Rowan University

Integration of Entrepreneurial-minded Learning

Dr. Deborah M. Grzybowsk, Ohio State University
Dr. Xiaofeng Tang, Ohio State University
Eunjeong Park, Ohio State University
Alexia Leonard, Ohio State University
Jack DeLano
Dr. Kai Zhao, Florida State University

Student Responses to Active-learning Strategies: A Comparison Between Project-based and Traditional Engineering Programs

Dr. Elizabeth Pluskwik, Minnesota State University, Mankato
Dr. Yuezhou Wang, Minnesota State University, Mankato
M326 - Experimentation and Laboratory-oriented Studies Division Technical Session 6
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Experimentation and Laboratory-Oriented Studies Division
Moderator: Robert Rabb, The Citadel
BYOE: Microelectronic Nonidealities Laboratory Explorations
  Mr. Kip D. Coonley, Duke University
  Mr. Alexander Gregory Culbert, Duke University
  Prof. Aaron Franklin, Duke University
BYOE: A Flexible System for Visualizing Switching Regulator Operation
  Dr. Harry Courtney Powell, University of Virginia
  Kay Hutchinson, University of Virginia
BYOE: Design and Development of a Simple Robotic Arm
  Dr. Iftekhar Ibne Basith, Sam Houston State University
  Mr. Brandon Marroquin, Sam Houston State University
BYOE: SeaKatz - An Underwater Robot
  Dr. Iftekhar Ibne Basith, Sam Houston State University
  Mr. Emanuel A. Sanchez, Sam Houston State University
BYOE: Determining Pressure Inside Thin-walled Vessels Using Strain Measurements
  Prof. Ahmet Can Sabuncu, Worcester Polytechnic Institute
  Mr. Mengqiao Yang, Worcester Polytechnic Institute
  Prof. John M. Sullivan Jr., Worcester Polytechnic Institute

M328 - Pedagogy and Teaching Preparation in Graduate Programs
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Graduate Studies Division
Moderators: Diane Peters, Kettering University; Jeffrey Fergus, Auburn University
Modifications to a Graduate Pedagogy Course to Promote Active Learning and Inclusive Teaching
  Ms. Kara Danielle Fong, University of California, Berkeley
  Dr. Shannon Ciston, Molecular Foundry, Lawrence Berkeley National Laboratory
Peer Presentations as a Student-centered Learning Approach in the Nanotechnology Class
  Prof. Chang Kyoung Choi, Michigan Technological University
  Dr. Nancy B. Barr, Michigan Technological University
Graduate Student Pedagogical Impact Through Development

M330A - Computing and Information Technology Division Technical Session 1
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Computing and Information Technology Division
Moderators: Afsaneh Minaie, Utah Valley University; Xiaojing Yuan, University of Houston, College of Technology (MERGED MEMBERSHIP WITH COE)
This session presents papers on a variety of topics pertaining to computing and information technology.

Deep Learning and Artificial Intelligence: Project Collaboration Across Classes
  Prof. Franz J. Kurfess, California Polytechnic State University, San Luis Obispo
  Prof. Maria Pantoja, California Polytechnic State University, San Luis Obispo
  Dr. Irene Humer, California Polytechnic State University, San Luis Obispo
Leveraging Machine-learning Techniques to Analyze Computing Persistence in Undergraduate Programs
  Leila Zahedi, Florida International University
  Stephanie J. Lunn, Florida International University
  Dr. Samira Pouyanfar, Microsoft
  Dr. Monique S. Ross, Florida International University
  Dr. Matthew W. Ohland, Purdue University, West Lafayette
Attitude Shifts and Transformation During Computer Science and Delivery of a Collaborative Inquiry-focused High School STEM Program
  Dr. Locke Davenport Huyer, University of Toronto
  Neal I. Callaghan, University of Toronto
  Dr. Dawn M. Kilkenny, University of Toronto
  Work in Progress: H-AGEP - A Model to Improve the Preparation and Transition for Hispanic STEM Doctoral Students into Community College Faculty Positions
  Prof. Miguel Velez-Reyes P.E., University of Texas at El Paso
  Dr. Fenot Aklog, Columbia University
  Dr. Dawn M. Horton, University of Massachusetts, Amherst
  Dr. Yajaira Mejia, City College of New York
  Dr. Ivonne Santiago P.E., University of Texas at El Paso
  Prof. Jorge E. Gonzalez, City College of New York
  Dr. Jeff Sivils, El Paso Community College
  Dr. Harry Meeuwsen, University of Texas at El Paso
  Prof. Fred Moshary, City University of New York
  Dr. Joseph Barba, City University of New York
and Engineering Student Internships
Dr. Mia Minnes, University of California, San Diego
Dr. Sheena Ghanbari Serslev, University of California, San Diego
Madison Edwards

Partnership to Prepare Students for Careers in the Emerging Field of Cybersecurity
Dr. James K. Nelson Jr. P.E., Texas A&M University
Dr. Brent L. Donham, Texas A&M University

M330B - Computing and Information Technology Division
Technical Session 2
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Computing and Information Technology Division
Moderators: Muthu Govindaraj, Thomas Jefferson University; Joseph Brobst, Old Dominion University

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

Improving Student Learning and Engagement in Cybersecurity Through Designing and Building Secure Internet of Things (IoT) Systems
Dr. Saeed Al-Haj, Ohio Northern University

Interdisciplinary Cybersecurity Projects Experience: Developing a Market-ready Workforce
Dr. Tamer Omar, California State Polytechnic University, Pomona
Dr. Abdelfattah Amamra, California State Polytechnic University, Pomona
Dr. Kristina Rigden, California State Polytechnic University, Pomona
Dr. Thomas Ketseoglou, California State Polytechnic University, Pomona

Cyber-physical Systems Security Introductory Course for STEM Students
Prof. Sin Ming Loo, Boise State University
Liljana Babinkostova

Cybersecurity Awareness and Training through a Multidisciplinary OSINT Course Project
Alyssa Mendlein, Temple University
Ms. Thuy-Trinh Nguyen, Temple University
Dr. Aunshul Rege, Temple University

M331 - Instrumentation Division
Technical Session 1
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Instrumentation Division
Moderators: Akram Hassain, Purdue University Northwest; Ali Alavizadeh, Purdue University Northwest

Embedded Measurement and Control Applications Utilizing Python on the Pocket BeagleBone
Mr. Stephen A. Strom, Pennsylvania State University
Marius Strom, Saint Francis University

Undergraduate Engineering Students Enhance Novel Instrumentation to Detect the Mach Effect
Dr. Peter Mark Jansson, Bucknell University
Mr. Peter Sawirs Kaladius, Bucknell University

Programmable System-on-Chip (PSoC) Usage in Embedded Programming Courses
Prof. David R. Loker, Pennsylvania State University, Erie
Mr. Stephen A. Strom, Pennsylvania State University, Erie

Design and Development of a Sensor/Actuator Module to Enhance Programmable Logic Controller (PLC) Laboratory Activities
Mr. Brad L. Kicklighter P.E., University of Southern Indiana

Incorporating Visual Components Simulation Software with the Programming Industrial Robots Course
Dr. Maged Mikhail, Purdue University Northwest
Mr. Sandeep Bharti, Purdue University Northwest
Dr. Ali Alavizadeh, Purdue University Northwest

M332 - International Division
Technical Session 7
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: International Division
Moderators: Phillip Sanger, Purdue University at West Lafayette; Nick Safai, Salt Lake Community College
### M333A - Pre-college Engineering Education Division Technical Session 1

**10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor:** Pre-College Engineering Education Division  
**Moderator:** Christina Crawford, Rice University

**A Situative Understanding of the NGSS Science and Engineering Practices**  
Mr. Richard J. Aleong, Purdue University, West Lafayette  
Dr. Robin Adams, Purdue University, West Lafayette

**A Teacher Professional Development Program Using Wireless Communications and NGSS to Enhance STEM Teaching and Learning**  
Mr. Panagiotis Skrimponis, New York University  
Dr. Nikos Makris, University of Thessaly  
Dr. Karen Cheng, Columbia University  
Dr. Jonatan Ostrometzky, Columbia University  
Prof. Zoran Kostic, Columbia University  
Prof. Gil Zussman, Columbia University  
Prof. Thanasis Korakis, New York University  
Dr. Sheila Borges Rajguru, Rutgers - The State University of New Jersey

**Supporting Upper Elementary Students’ Engineering Practices in an Integrated Science and Engineering Unit**  
Miss Sarah Lilly, University of Virginia  
Ms. Anne Marguerite McAlister, University of Virginia  
Dr. Sarah J. Fick, University of Virginia  
Dr. Jennifer L. Chiu, University of Virginia  
Dr. Kevin W. McElhaney, Digital Promise

**Building and Evaluating a Multi-tiered Mentor Program to Introduce Research to High School Women**  
Dr. Katherine C. Chen, Worcester Polytechnic Institute  
Prof. Tiffany Antionette Butler, Worcester Polytechnic Institute  
Ms. Suzanne Sontgerath, Worcester Polytechnic Institute  
Mrs. Ryan Nicole Meadows, Worcester Polytechnic Institute

**High School Youths’ Workplaces as Sites of Engineering Practices**  
Dr. Amy Wilson-Lopez, Utah State University  
Jorge Americo Acosta Feliz

### M333B - Pre-college Engineering Education Division Technical Session 2

**10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor:** Pre-College Engineering Education Division  
**Moderator:** Sandra Nite, Texas A&M University

**Development and Teacher Perceptions of an Avatar-based Performance Task for Elementary Teachers to Practice Post-testing Argumentation Discussions in Engineering Design**  
Pamela S. Lottero-Perdue, Towson University  
Dr. Jamie Mikeska, Educational Testing Service  
Elizabeth Orlandi, Science Education Consultant

**Elementary Students’ Engineering Progress**  
Ms. Elizabeth Ann Moison, Tufts University  
Ms. Karen Miel, Tufts University  
Dr. Merredith D. Portsmore, Tufts University  
Dr. Jungsun Kim

**Examining Shared Understandings of Design Artifacts in Upper-elementary School Engineering**  
Nicole Alexandra Batrouny, Tufts University  
Dr. Kristen B. Wendell, Tufts University  
Dr. Chelsea Andrews, Tufts University  
Dr. Tejaswini S. Dalvi, University of Massachusetts, Boston

**Gender Differences in Gifted Elementary Students’ Decision-making About Renewable Energy: Social Relationships, Values, and Authority**  
Prof. Younkyeong Nam, Pusan National University  
Dr. Jina Yoon, Pusan National University  
Dr. Jeanna Wieselmann, Southern Methodist University

**Taking a Bandsaw to First Grade: Transforming Elementary School Through Hands-on STEAM Education**  
Ms. Madhurima Das, NuVu Studio
M333C - Pre-college Engineering Education Division Technical Session 19
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Martha Cyr, Worcester Polytechnic Institute

Assessing the Effects of a Robotics Workshop with Draw-a-Robot Test
Mr. Abhidipta Mallik, New York University Tandon School of Engineering
Dr. Pooneh Sabouri, New York University Tandon School of Engineering
Dr. Shramana Ghosh, New York University Tandon School of Engineering
Dr. Vikram Kapila, New York University Tandon School of Engineering

Student Perception of Mathematical Modeling Before and After Completing a Two Joint Robot Computer Simulation Task
Mrs. Laurel Johnston, Boise State University
Dr. Noah Salzman, Boise State University

The Formation and Dynamics of Teacher Roles in a Teacher-Student Groupwork during a Robotic Project
Pooneh Sabouri, New York University
Dr. Shramana Ghosh, New York University Tandon School of Engineering
Mr. Abhidipta Mallik, New York University Tandon School of Engineering
Dr. Vikram Kapila, NYU’s Tandon School of Engineering

The Nuts and Bolts of Robotics in K-12 Classrooms: A Literature Synthesis
Tianshi Fu,
Dr. Molly H. Goldstein, University of Illinois at Urbana-Champaign
Prof. Holly M. Golbeck, University of Illinois at Urbana-Champaign

Using Retrospective Surveys to Assess the Impact of Participating in an Afterschool Maker Learning Program on Youth
Dr. Foad Hamidi, University of Maryland, Baltimore County
Ms. Adena Moulton, Digital Harbor Foundation
Shawn Grimes
Stephanie Grimes
Andrew Coy, Digital Harbor Foundation

M333D - Pre-college Engineering Education Division Technical Session 3
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Vikram Kapila, New York University Tandon School of Engineering

What is Engineering? A Comparative Case Study of Elementary Students’ Conceptions of Engineering Across STEM and Non-STEM Schools
Dr. Jeanna R. Wieselmann, Southern Methodist University
Dr. Elizabeth A. Ring-Whalen, St. Catherine University
Dr. Gillian Roehrig, University of Minnesota, Twin Cities

Mr. Zachary Minken, Arcadia University
Dr. Augusto Z. Macalalag Jr., Arcadia University
Ms. Najah Naylor

“Because I’m Not Always Constantly Getting Everything Right”: Gender Differences in Engineering Identity Formation in Elementary Students
Ms. Annmarie Elizabeth Hoch, Tufts University
Ms. Karen Miel, Tufts University
Dr. Meredith D. Portsmore, Tufts University
Dr. Rebecca Deborah Swanson, Tufts University

“I Understand Their Frustrations a Little Bit Better”: Elementary Teachers’ Affective Stances in Engineering in an Online Learning Program
Dr. Meredith D. Portsmore, Tufts University
Jessica Watkins, Vanderbilt University
Dr. Rebecca D. Swanson, Tufts University

CanSat Pico-satellite Building Workshop as an Effective Tool for STEAM Education, A Case Study
Dr. Jorge H. Kurita, Universidad Nacional de Asunción
Dr. Derlis Ortiz Coronel
Lucas Domingo Moreira Bogado, Universidad Nacional de Asunción
Mr. Blas Fernando Vega, Universidad Tecnológica Nacional Unidad de Formación Superior
M333E - Pre-college Engineering Education Division Technical Session 4
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Greg Strimel, Purdue Polytechnic Institute

A Study of Secondary Teachers’ Perceptions of Engineers and Conceptions of Engineering
Emel Cevik, Texas A&M University
Dr. Michael Johnson, Texas A&M University
Dr. Bugrahan Yalvac, Texas A&M University
Jennifer Whitfield, Texas A&M University
Dr. Mathew Kuttolamadom, Texas A&M University
Dr. Jay R. Porter, Texas A&M University
Dr. Joseph A. Morgan, Texas A&M University

Discovery: Differential Student Impact is Evident Within an Inquiry-focused Secondary/Post-secondary Collaborative STEM Program
Neal I. Callaghan, University of Toronto
Mr. Jose Luis Cadavid, University of Toronto
Mr. Huntley H. Chang, University of Toronto
Ms. Ileana Louise Co, University of Toronto
Mr. Nicolas Ivanov, University of Toronto
Ms. Nhien Tran-Nguyen, University of Toronto
Mr. Jonathan Rubianto, University of Toronto
Dr. Locke Davenport Huyer, University of Toronto
Dr. Dawn M. Kilkenny, University of Toronto

Professional Development Activities for Secondary STEM Teachers and Students’ Engineering Content Knowledge and Attitudes
Emel Cevik, Texas A&M University
Dr. Michael Johnson, Texas A&M University
Dr. Bugrahan Yalvac, Texas A&M University
Dr. Jennifer Whitfield, Texas A&M University
Dr. Mathew Kuttolamadom, Texas A&M University
Dr. Jay R. Porter, Texas A&M University
Dr. Joseph A. Morgan, Texas A&M University

K-12 Digital Skills Programs as Preparation for Engineering Study: A Systematic Literature Review
Mrs. Katherine Dornian, University of Calgary
Dr. Mohammad Moshirpour, University of Calgary
Prof. Laleh Behjat P.Eng., University of Calgary

Problem-based Learning in K-12 Engineering Lessons: Supporting and Scaffolding Student Learning

Kimberly Farnsworth, Arizona State University
Dr. Jean S. Larson, Arizona State University

M334A - Identity, Culture, and Socialization
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Liberal Education/Engineering & Society Division
Moderator: Juan Lucena, Colorado School of Mines

Engineering as a Challenging Vocation: How Students Align Personal Values to the Dominant Engineering Discourse
Dr. Joel Alejandro Mejia, University of San Diego
Dr. Diana Chen, University of San Diego
Prof. Mark A. Chapman, University of San Diego

Disciplinary Socialization in First-year STEM Students
Benjamin Goldschneider, Virginia Polytechnic Institute & State University
Dr. Nicole P. Pitterson, Virginia Polytechnic Institute & State University
Dr. Jennifer M. Case, Virginia Polytechnic Institute & State University

The Modalities of Governance in Engineering Education
Dr. Atsushi Akera, Rensselaer Polytechnic Institute
Dr. Soheil Fatehiboroujeni, Purdue University, West Lafayette
Sarah Appelhans, University at Albany-SUNY
Dr. Alan Cheville, Bucknell University
Dr. Jennifer Karlin, Minnesota State University, Mankato
Dr. Donna M. Riley, Purdue University, West Lafayette
Dr. Thomas A. De Pree, Bucknell University
Rafael Julián Burgos-Mirabal, University of Massachusetts- Amherst

Defining First-generation and Low-income Students in Engineering: An Exploration
Dr. Sara A. Atwood, Elizabethtown College
Dr. Shannon Katherine Gilmartin, Stanford University
Dr. Angela Harris, North Carolina State University
Dr. Sheri Sheppard, Stanford University
M334B - Minoritization Processes and Critical Responses
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Liberal Education/Engineering & Society Division
Moderators: Amy Slaton, Drexel University; Justin Hess, Purdue University at West Lafayette

A Review of the State of LGBTQIA+ Student Research in STEM and Engineering Education
Madeleine Jennings, Arizona State University
Dr. Rod D. Roscoe, Arizona State University
Dr. Nadia N. Kellam, Arizona State University
Dr. Suren Jayasuriya, Arizona State University

Campaign Among Engineering Educators
Dr. Ellen Foster, Purdue University, West Lafayette
Dr. Donna M. Riley, Purdue University, West Lafayette

Work in Progress: Building a Safe Queer Community in STEM—It Takes a Village to Support a Village
Dr. Kelly J. Cross, University of Nevada, Reno
Dr. Stephanie Farrell, Rowan University
Dr. Rocío C. Chavela Guerra, American Society for Engineering Education

M335B - Integration of Current Issues into Manufacturing
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Manufacturing Division
Moderator: Irina Ciobanescu Husanu, Drexel University

Applying DOE in Performance Optimization of an Automated Position Control System - A Collaborated Case Study between Two Engineering Technology Courses
Dr. Yuqiu You, Ohio University
Dr. Mustafa Shraim, Ohio University

Preparing the Future Workforce in Advanced Manufacturing: The Case of South Korea
Mr. Sang Hoo Oh, Florida State University
Dr. Marcia A. Mardis, Florida A&M University/Florida State University
Dr. Faye R. Jones, Florida State University

Developing the Industry 4.0 Workforce
Dr. Arif Sirinterlikci, Robert Morris University

The Evolution of Teamwork in the Engineering Workplace from the First Industrial Revolution to Industry 4.0: A Literature Review
Mr. Tahsin Mahmud Chowdhury, Virginia Polytechnic Institute and State University
Dr. Homero Murzi, Virginia Polytechnic Institute and State University

M335A - Instructional technologies - Simulations, VR, Remote Education
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Manufacturing Division
Moderator: Arif Sirinterlikci, Robert Morris University

Exploring the VR-based PBD Programming Approach to Teach Industrial Robotics in Manufacturing Education
Dr. Yi-hsiang Isaac Chang, Illinois State University
Dr. Kevin L. Devine, Illinois State University
Mr. Gunnar Keith Klitzing, Illinois State University

Learning Module of PEM Fuel Cells
Dr. Irina Nicoleta Ciobanescu Husanu, Drexel University
Kevin Frank, Drexel University
Ms. Ayanna Elise Gardner, Drexel University
Dr. Richard Chiou, Drexel University

Embedding Computer Simulation-based Classroom Activities to Enhance the Learning Experience for Manufacturing Systems
Prof. Tzu-Liang Bill Tseng, University of Texas at El Paso
Mr. Md Fashiar Rahman, University of Texas at El Paso

Dr. Richard Chiou, Drexel University
Dr. Ivan Arturo Renteria-Marquez, University of Texas at El Paso
Dr. Aditya Akundi, University of Texas, Rio Grande Valley
Dr. Amit J. Lopes, University of Texas at El Paso
Mr. Jeevarathinam Senthilkumar

Remotely Accessible 3-D Printer for Teaching CNC Programming: Lessons Learned
Dr. Sheng-Jen "Tony" Hsieh, Texas A&M University
Mr. Ryan Cowdrey
Mr. Weston Scott Sleeper
Colin Bray
Prof. Zahed Siddique, University of Oklahoma
Prof. Yingtao Liu, University of Oklahoma

**Promoting Materials Science and Engineering Education Through 3-D Printing Technology**
Dr. Tracy Zhang, Michigan State University
Dr. Robert Allen Bubeck, Michigan State University
Miss Therese Aimei Joffre, H. H. Dow High School
Mr. Logan Patrick McNamara, H. H. Dow High School
Aaron Michael Heydenburg
Prof. Bingbing Li, Central Michigan University

**Engineering Students' Comprehension of Phase Diagram Concepts: An International Sample**
Mr. Oscar Sanchez-Mata, McGill University
Prof. Mathieu Brochu, McGill University
Prof. Genaro Zavala, Tecologico de Monterrey, Mexico and Universidad Andres Bello, Chile

**Learning About Diffusion at Two Levels: Agent-based Microscale and Equation-based Macroscale**
Jacob Kelter, Northwestern University
Prof. Jonathan Daniel Emery, Northwestern University
Prof. Uri Wilensky, Northwestern University

**Demonstration of Shape Memory and Super-elastic Effects of Nitinol Alloys**
Dr. Mohamed Samir Hefzy, The University of Toledo
Prof. Mohammad Elahinia, The University of Toledo
Mr. Ahmadreza Jahadakbar, The University of Toledo
Mrs. Bethany Arn, The University of Toledo
Mohammadreza Nematollahi, The University of Toledo

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**M337A - Mathematics Division Technical Session 4: Assessing Success in Mathematics Education**

**10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor: Mathematics Division**

**Moderators: Amitabha Ghosh, Rochester Institute of Technology (COE); Jeffrey Hieb, University of Louisville**

**WIP: Mathematical Software and Programming Preparation of Undergraduate Engineering Students in Mathematics Courses**
Mrs. Johannah L. Crandall, Washington State University
Dr. Kristin Lesseig, Washington State University

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**Calculus Readiness and Retention Rates for Home-schooled Students in a Four-year Engineering Program**
Dr. Danielle Marie Fredette, Cedarville University

**Self-beliefs of Success for College Calculus Students**
Prof. Rebecca Ann George, University of Houston
Dr. Weihua Fan, University of Houston
Daijiazi Tang, University of Houston

**A Visual and Engaging Approach to Teaching and Learning the Normal Distribution**
Dr. Daniel Raviv, Florida Atlantic University
Mr. Daniel Ryan Barb, Florida Atlantic University

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**M337B - Mathematics Division Technical Session 5: From Functions to Big Data—A Hands-on Challenge**

**11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor: Mathematics Division**

**Moderator: Amitabha Ghosh, Rochester Institute of Technology (COE)**

**Towards Creating Motivationally Supportive Course Structures for Introductory Calculus**
Dr. Paran Rebekah Norton, Clemson University
Dr. Karen A. High, Clemson University
William Bridges, Clemson University

**Applications of Linear Algebra Applied to Big Data Analytics**
Dr. Rajendran Swamidurai, Alabama State University
Dr. Cadavious M. Jones
Dr. Carl Pettis
Dr. Uma Kannan

**Qualitative and Quantitative Analysis of University Students’ Ability to Relate Calculus Knowledge to Function Graphs**
Dr. Emre Tokgoz, Quinnipiac University
Hasan Alp Tekalp
Mrs. Elif Naz Tekalp
Berrak Seren Tekalp, Quinnipiac University

**Turning the Tables on Partial Credit: Computer Aided Exam with Student Reflection for Partial Credit (CAESR4PC)**
Dr. Jeffrey Lloyd Hieb, University of Louisville
Dr. Campbell R. Bego, University of Louisville
M338A - Mechanical Engineering Technical Session: Fluid Mechanics
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Moderator: Maria-Isabel Carnasciali, University of New Haven

This session will focus on concept maps, learning strategies and simulation in fluids.

Evaluation of Evidence-based Teaching Techniques in a Graduate Fluid Dynamics Course
Dr. John Palmore Jr., Virginia Tech

Integration of CFD and EFD for Experiential Learning in Fluid Mechanics
Dr. Quamrul H. Mazumder, University of Michigan, Flint
Mr. Mohammed Aslam, University of Michigan, Flint
Fardeen Mazumder, University of Michigan, Flint

The Rise of Simulations in a Junior-level Fluid Mechanics Course
Dr. Kamau Wright, University of Hartford
Dr. Ivana Milanovic, University of Hartford
Dr. Tom A. Eppes, University of Hartford

Two Approaches to Concept Maps in Undergraduate Fluid Mechanics
Dr. Julie Mendez, Indiana University-Purdue University Columbus
Dr. Jessica Lofton, University of Evansville

M338B - Mechanical Engineering Technical Session: Assessment and Accreditation: Making the Grade!
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Moderator: Matt Gordon, University of Denver

This technical session will focus on assessment and accreditation, with a special emphasis on the new ABET student outcomes. Papers on the use of benchmarking and concept maps will also be presented.

A Continuous Improvement Model to Enhance Academic Quality in Engineering Programs
Prof. J. Asuncion Zarate-Garcia, Tecnologico de Monterrey
Mrs. Ariadna Serrano-Reyes, Tecnologico de Monterrey
Prof. Miguel X. Rodriguez-Paz, Tecnologico de Monterrey
Prof. Israel Zamora-Hernandez

Changes in ABET Criteria: A Framework for Transition with Greater Fidelity in Artifacts Supporting Student Performance
Dr. Thomas W. DeNucci, U.S. Coast Guard Academy
Prof. Elizabeth (Elisha) M.H. Garcia, U.S. Coast Guard Academy

A Faculty-directed Continuous Improvement Regimen with Intentional ABET/SO 1-7 Scaffolding
Dr. Vallorie Peridier, Temple University

Multiple-choice Learning Assessments for Intermediate Mechanical Engineering Courses: Insights from Think-aloud Interviews
Dr. Matthew J. Ford, Cornell University
Dr. Hadas Ritz, Cornell University
Dr. Benjamin Finio, Cornell University
Prof. Elizabeth M. Fisher, Cornell University

Using Benchmarking Methods to Inform Curriculum Changes in Mechanical Engineering Programs
Prof. John Whitefoot, University of Pittsburgh
Dr. Mark David Bedillion, Carnegie Mellon University

M339 - Making Mechanics Courses Fun and More Effective
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanics Division
Moderators: Julian Davis, University of Southern Indiana; Vimal Viswanathan, San Jose State University

Classroom Demonstration Module for Two- and Three-dimensional Force Analysis: The Montessori-based Engineering (MBE) Model
Dr. Anuja Kamat, Wentworth Institute of Technology
Hadi Kazemiroodsari, Wentworth Institute of Technology
Prof. Leonard Anderson, Wentworth Institute of Technology

Feel the Force! An Inquiry-based Approach to Teaching Free-body Diagrams for Rigid-body Analysis
Eric Davishahl, Whatcom Community College
Todd Haskell, Western Washington University
Dr. Lee W. Singleton, Whatcom Community College

WIP: Hands-on Engineering Mechanics with a Three-dimensional Laboratory Unit
Dr. Md Rashedul Hasan Sarker, University of Indianapolis
Dr. Najmus Saqib, University of Indianapolis
Dr. George D. Ricco, University of Indianapolis
Megan Hammond, University of Indianapolis
Mr. Jared Hilt
Mr. James T. Emery II, University of Indianapolis

WIP: Hands-on Wednesday (HOW) - An Introduction to
**Statics Experience**

Prof. Sarah Wodin-Schwartz, Worcester Polytechnic Institute  
Ms. Caitlin A. Keller, Worcester Polytechnic Institute  
Dr. Kimberly LeChasseur, Worcester Polytechnic Institute

**M339B - Assessment Strategies in Mechanics**

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE  
Sponsor: Mechanics Division  
Moderators: Carisa Ramming, Oklahoma State University; Amir Yazdi, Rose-Hulman Institute of Technology

A New Assessment Model, Modified for Use in Dynamics  
Dr. Geoffrey Recktenwald, Michigan State University  
Dr. Tamara Bush, Michigan State University  
Dr. Ron Averill, Michigan State University

Effects of a New Assessment Model on Female and Underrepresented Minority Students  
Dr. Geoffrey Recktenwald, Michigan State University  
Dr. Michele J. Grimm, Michigan State University  
Dr. Ron Averill, Michigan State University  
Sara Roccabianca, Michigan State University

Diagnostic Assessments of Student Attitudes and Approaches to Problem Solving in an Engineering Dynamics Course  
Prof. Ning Fang, Utah State University

A Novel Approach to Mastery-based Assessment in Sophomore-level Mechanics Courses  
Prof. Keith D. Hjelmstad, Arizona State University  
Amie Baisley, University of Florida

**M340 - Minorities in Engineering Division Technical Session 1**

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE  
Sponsor: Minorities in Engineering Division  
Moderator: Trina Fletcher, Florida International University

Using Social Media to Improve Minority Students' Skills When Connecting Courses with Different Educational Modalities  
Dr. Mohamed ElZomor, Florida International University  
Mr. Piyush Pradhananga  
Dr. Arif Mohaimin Sadri, Florida International University

HuskyADAPT: A Project-based Accessible Design Course (Experience)  
Dr. Dianne Grayce Hendricks, University of Washington  
Dr. Anat Caspi P.E., The Taskar Center for Accessible Technology

Dr. Heather A. Feldner, University of Washington  
Ms. Molly Y. Mollica, University of Washington  
Shawn M. Rundell, University of Washington  
Mr. George Zatloka, Design Research Consultant  
Jennifer Mankoff, University of Washington  
Dr. Katherine M. Steele, University of Washington

Disability and Engineering: A Case of “Othering”?  
Stephanie Lezotte, Rowan University  
Prof. Harriet Hartman, Rowan University  
Dr. Stephanie Farrell, Rowan University  
Mr. Tiago R. Forin, Rowan University

**M341 - Multidisciplinary Endeavors: Engineering and Liberal Arts**

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE  
Sponsor: Multidisciplinary Engineering Division  
Moderators: Yogendra Panta, West Virginia University Institute of Technology; Duncan Davis, Northeastern University

This session highlights programs that partner engineering with liberal arts to enhance the development of nontechnical skills in students.

Fostering Reflective Habits and Skills in Graduate Engineering Education via the Arts and Humanities  
Dr. Ryan C. Campbell, Texas Tech University  
Dr. Danny D. Reible, Texas Tech University  
Dr. Roman Taraban, Texas Tech University  
Dr. Jeong-Hee Kim, Texas Tech University  
Dr. Chongzheng Na, Texas Tech University

Electrical, Civil, and Mechanical Engineering  
Dr. David Clippinger, Pennsylvania State University  
Dr. Steven Y. Nozaki, Pennsylvania State University  
Dr. Kathleen Jernquist, United States Coast Guard Academy

Two Student Workshops on Identifying and Resolving Teamwork Conflict  
Dr. Rania Al-Hammoud P.Eng., University of Waterloo  
Ms. Maria Barichello, University of Waterloo  
Mr. Christopher Rennick, University of Waterloo  
Ms. Erin Jobidon, University of Waterloo  
Richard Li, University of Waterloo

WIP: Integrating Writing Throughout the Engineering Curriculum  
Dr. Denise H. Bauer, Methodist University

WIP: Introducing Negotiating Skills in Capstone Course  
Katie Loughmiller, Kansas State University

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
M342 - New Engineering Educators 4: Tips and Tools
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: New Engineering Educators Division
Moderators: Kerry Widder, Milwaukee School of Engineering; Derek Breid, Saint Vincent College
Deploying Intelligent Tutoring Systems (ITS) in the Engineering Classroom
Randy Hugh Brooks, Texas A&M University

Measuring Impact: Student and Instructor Experience Using an Online Queue
David Mussulman, University of Illinois at Urbana-Champaign
Prof. Karin Jensen, University of Illinois at Urbana-Champaign
Dr. Jennifer R. Amos, University of Illinois at Urbana-Champaign
Prof. Lawrence Angrave, University of Illinois at Urbana-Champaign
Karle Flanagan, University of Illinois at Urbana-Champaign
Prof. Wade Fagen-Ulmschneider, University of Illinois at Urbana-Champaign
Natalia Ozymko, University of Illinois at Urbana-Champaign
Rittika Adhikari, University of Illinois at Urbana-Champaign
Jacqueline Osborn, University of Illinois at Urbana-Champaign

Overcoming Non-numerical Challenges in an Engineering Numerical Methods Course
Dr. Ivan Detchev, University of Calgary
Dr. Elena Rangelova, University of Calgary
Ms. Sheng Lun (Christine) Cao, University of Calgary

Using Course Workbooks as a Classroom Supplement
Dr. Nathan John Washuta P.E., The Citadel
Dr. Robert J. Rabb P.E., The Citadel
Dr. Emily Kate Bierman, The Citadel
Dr. Patrick Bass, The Citadel
Dr. Jason Howison, The Citadel
Dr. James Righter, The Citadel

M345 - Engineering Physics and Physics Division Technical Session 1
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Physics and Physics Division
Moderators: Jessica Conry, Arkansas Tech University; Robert Ross, University of Detroit Mercy
Assessment and Applications of the Conversion of Chemical Energy to Mechanical Energy Using Model Rocket Engines
Dr. Hüseyin Sarper P.E., Old Dominion University
Dr. Nebojsa I. Jaksic, Colorado State University, Pueblo
Dr. Ben J. Stuart, Old Dominion University
Dr. Karina Arcaute, Old Dominion University

Comparison of Labortorials and Traditional Physics Labs
Prof. Calvin S. Kalman, Concordia University
Mr. Franco La Braca, Concordia University
Dr. Mandana Sobhanzadeh, Mount Royal University

Fostering Inclusion and Teaching Equity in a Modern Physics for Engineers Course
Dr. Jessica R. Hoehn, University of Colorado, Boulder
Prof. Noah D. Finkelstein, University of Colorado, Boulder

Students’ Abilities to Solve RC Circuits with Cognitive Scaffolding Activities
Prof. Genaro Zavala, Tecnologico de Monterrey and Universidad Andres Bello
Prof. Carlos Eduardo Martinez-Torteya, Tecnologico de Monterrey

M346 - Software Engineering Division Technical Session 2
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Software Engineering Division
Moderators: Robert Hasker, Milwaukee School of Engineering; Walter Schilling, Milwaukee School of Engineering
Experiences of Integrating Learning and Engagement Strategies (LEEs) into Software Engineering Courses
Dr. Peter J. Clarke, Florida International University
Dr. Mandayam Thirunarayanan, Florida International University
Ms. Sai Chaithra Allala, Florida International University
Juan Pablo Sotomayor, Florida International University
Dr. Monique S. Ross, Florida International University

WIP: Lessons Learned from Applying Standards-based Grading to a Software Verification Course
Dr. Walter W. Schilling Jr., Milwaukee School of Engineering

WIP: Teaching a Knowledge Engineering Course Using Active Learning, Gamification, and Scaffolding
  Dr. Bruce R. Maxim, University of Michigan, Dearborn
  Dr. Gail Luera, University of Michigan, Dearborn

WIP: Building a Bridge Between Hackathons and Software Engineering Capstones Through Adaptive Expertise
  Cecilia La Place, Arizona State University
  Dr. Shawn S. Jordan, Arizona State University

Industrializing Your Web Application Development Project
  Dr. Gregory Kulezycki, Virginia Tech
  Dr. Steven Atkinson, Virginia Tech

**M347 - Student Division Technical Session 1**

**11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor: Student Division**

**Moderator: Peter Odom, Purdue University at West Lafayette**

**How to Use Q Methodology in Engineering Education Research**
  Ms. Renee Desing, Ohio State University
  Dr. Rachel Louis Kajfez, Ohio State University

**Paper: Engineering Students’ Perceptions about Female Professors: Insights from the Arabian Gulf**
  Mr. Safin H. Bayes, Texas A&M University at Qatar
  Ms. Jude Aloudeh, Texas A&M University at Qatar
  Dr. Aymen Elsheikh, Texas A&M University at Qatar

**Critical Educational Theory: Applications in Engineering Education**
  Ms. Corin L. Bowen, University of Michigan
  Dr. Aaron W. Johnson, University of Colorado Boulder

**M348 - Systems Engineering Division Technical Session 1**

**11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor: Systems Engineering Division**

**Moderators: Alice Squires, International Council on Systems Engineering; Bryan Mesmer, The University of Alabama in Huntsville**

This virtual session will be a Q&A session with the authors of two papers:

**Treadstone: A Process for Improving Modeling Prowess Using Validation Rules**
  Mr. Michael J. Vinarcik P.E., University of Detroit Mercy

**Modelling the Design Systems Thinking Paradigm**
  Mr. Sabin Gianelloni, University of Illinois at Urbana-Champaign
  Dr. Molly H. Goldstein, University of Illinois at Urbana-Champaign

**M349 - Developing Technological Literacy in Students**

**11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor: Technological and Engineering Literacy/Philosophy of Engineering Division**

**Moderator: Carl Hilgarth**

In this session, the Technological and Engineering Literacy/Philosophy of Engineering (TELPhE) Division explores issues with developing technological and engineering literacy in students. Methods of developing such skills and student attitudes are explored.

**Building Early Elementary Teacher Confidence in Teaching Computer Science Through a Low-Cost, Scalable Research-Practitioner Collaboration**
  Justin Lee Clough, University of Southern California
  Patricia Chaffey, University of Southern California
  Gautam Salhotra, University of Southern California
  Colin G. Cess, University of Southern California
  Rey Pocius, University of Southern California
  Dr. Katie Mills, University of Southern California

**How Do We "Raise" Ethically Minded Computer Students?**
  Dr. Elizabeth Milonas, NYC College of Technology - City University of New York

**Understanding Better Young People’s Views on Technology in Finland**
  Dr. Johanna Kristiina Naukkarinen, Lappeenranta-Lahti University of Technology
  Dr. Hanna Niemelä, Lappeenranta-Lahti University of Technology LUT

**A Perspective on Students’ Autonomy in Learning and Engaging in an Inquiry-based Learning Environment**
  Neelam Prabhu Gaunkar, Iowa State University
  Dr. Mani Mina, Iowa State University of Science and Technology
M350 - 2-Year College Division: Collaboration Between Institutions

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Two-Year College Division

Moderators: Teddy Ivanitzki, American Society for Engineering Education; Dominic Dal Bello, Allan Hancock College

Papers related (but not limited) to collaborations between two or more institutions.

**Multi Institutional Collaboration in Additive Manufacturing: Lessons Learned**

- Michael Littrell, Tennessee Tech University
- Dr. George Chitiyo, Tennessee Tech University
- Dr. Ismail Fidan, Tennessee Tech University
- Ms. Mel Cossette, Edmonds Community College
- Mr. Thomas Singer, Sinclair Community College
- Ed Tackett, University of Louisville

**Evaluating a Multi-Campus Undergraduate Research Program to Improve Retention of 2+2 Engineering Students**

- Dr. Cynthia Howard-Reed, Pennsylvania State University
- Dr. Jennifer X. Wu, Pennsylvania State University
- Mrs. Erin A Hostetler, Pennsylvania State University

**RELLIS: The Transformational Initiative for Collaborative Education and Research Realized**

- Dr. James K. Nelson Jr., Texas A&M University System
- Ms. Karen Buck, The Blinn College District
- Dr. Nancy Shankle Jordan, RELLIS Academic Alliance in The Texas A&M University System
- Dr. Mary Hensley, The Blinn College District

**Early Career and Remote Undergraduate Research Experiences as Catalysts for More Impactful Community College STEM Opportunities**

- Dr. Jared Ashcroft, Pasadena City College
- Prof. Jillian L Blatti, Pasadena City College
- Prof. Marcial Gonzalez, School of Mechanical Engineering, Purdue University
- Ms. Melanie T. Hacopian, California State University, Long Beach
- Pablo D Zavattieri
- Danyal Nicole Pereyda Cave
- Mrs. Isabel Bojanini
- Mr. Esteban Bautista, California State University, Northridge
- Dr. Veronica I. Jaramillo, Pasadena City College

**A Collaborative Framework to Advance Student Degree**

Completion in STEM

- Dr. Ali Zilouchian, Florida Atlantic University
- Dr. Nancy Romance, Florida Atlantic University
- Michael Vitale
- Ms. Annie Laurie Myers
- Ms. Dana Hamadeh

M351 - Women in Engineering Division Technical Session 7

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Women in Engineering Division

Moderators: Denise Wilson, University of Washington; Agnes d’Entremont, University of British Columbia, Vancouver

**Women, Engagement, Stress, and Worry: Do They Have to Go Hand in Hand?**

- Dr. Denise Wilson, University of Washington

**Approaches in Addressing Access and Success among Female Engineering Students at the 2-year College Level**

- Dr. Cynthia Lester, Georgia State University
- Dr. Sahithya Reddivari, Georgia State University
- Ms. Forough Ansari, Georgia State University

**Impact of Humanitarianism on Female Student Participation in Engineering**

- Dr. Adithya Jayakumar, Ohio State University
- Dr. Steven Nozaki, Pennsylvania State University, Behrend College

**The Gender Bias Dynamic Between Students and Female Faculty in the Engineering Classroom Through Autoethnography**

- Dr. Eleanor Leung, York College of Pennsylvania
- Prof. Inci Ruzybayev, York College of Pennsylvania
- Ms. Brandy Maki, Minnesota State University, Mankato

**Investigating the Role of Faculty Gender in Mentoring Female Engineering Students for Success**

- Dr. Kimberly Stillmaker P.E., California State University, Fresno
- Dr. Lalita G Oka, California State University, Fresno
- Jesus Gutierrez Plascencia
- Mrs. Cindy Charlott Schwartz-Doyle, California State University, Fresno
- Ms. Katherine Lor, California State University, Fresno

**Peer Mentoring for Women in STEM**

- Prof. Sinéad C. Mac Namara, Syracuse University
- Ms. Anne E Rauh, Syracuse University
- Dr. Michelle M. Blum, Syracuse University
Dr. Natalie Russo, Syracuse University
Dr. Melissa A. Green, Syracuse University
Prof. Shikha Nangia, Syracuse University

**M352 - Community Engagement Division Technical Session 1**

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Community Engagement Division

**Moderators:** Patrick Sours, The Ohio State University; Ben Bernard, North Dakota State University

**Engagement In Practice: Community Engaged Capstone Design Experience**

Dr. Rachel Koh, Smith College

**Engagement in Practice: Building Community Capacity and Relationships through Rainwater Harvesting Initiatives – Tanzania**

Patrick John Sours, Ohio State University
Dr. Michael J. Hagenberger, Ohio State University

**Engagement in Practice: Learning Applications of MSE for Design of Community Based Shelter for Housing Insecurity**

Dr. Ajay P. Malshe, Purdue University
Dr. Kevin M. Fitzpatrick, University of Arkansas
Dr. Salil Bapat, Purdue University

**Work in Progress: The Role of Student Counselors at Cybersecurity Summer Camps**

Mr. Ben Ralph Bernard, North Dakota State University
Dr. Jeremy Straub, North Dakota State University
Pranay Kumar Marella, Mississippi State University

**M357 - Faculty Development Medley!**

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Faculty Development Division

**Moderators:** LOKESH RAMAMOORTHI, University of Miami; Stephanie Cutler, Pennsylvania State University

Come hear about a medley of projects around faculty development!

**Determinants of Initial Training for Engineering Educators**

Dr. Elizabeth Pluskwik, Minnesota State University, Mankato
Dr. Mani Mina, Iowa State University of Science and Technology
Dr. John Heywood, Trinity College Dublin
Prof. Arnold Neville Pears, Royal Institute of Technology (KTH)

**Examining the Needs of Adjunct Faculty in a Distance Education Framework in Higher Education**

Dr. Federica Robinson-Bryant, Embry-Riddle Aeronautical University - Worldwide
Dr. Narcrisha Norman, Embry-Riddle Aeronautical University - Worldwide
Dr. Yuetong Lin, Embry-Riddle Aeronautical University - Worldwide

**Exploring Literature on How Instructor Feedback Impacts STEM Student Motivation**

Cassie Wallwey, Ohio State University
Dr. Rachel Louis Kajfez, Ohio State University

**The Five I's: A Framework for Supporting Early Career Faculty**

Dr. Jennifer Karlin, Minnesota State University, Mankato
Dr. Allison Godwin, Purdue University at West Lafayette

**M360 - FOCUS ON EXHIBITS: Virtual Showcase**

12:00 P.M. - 1:00 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** ASEE Headquarters

Live interaction with sponsors and exhibitors.

**M371A - NSF Grantees: Faculty Development 1**

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** NSF Grantees Session

**Moderators:** Amber Genau, University of Alabama at Birmingham; Emily Allen, California State University, Los Angeles

Presentations from groups with current NSF funding related to faculty development

**Reflective Faculty Peer Observation in Engineering**

Dr. Heather Dillon, University of Portland
Valerie J. Peterson, University of Portland
Dr. Carolyn McCaffrey James, University of Portland
Prof. Stephanie Anne Salomone, University of Portland
Dr. Tara E. Prestholdt
Dr. Eric Anctil, University of Portland

**An Additive Innovation-Based Faculty Development Program: Methods for Case Study Research**

Hadi Ali, Arizona State University, Polytechnic campus
Rohini Abhyankar, Arizona State University
Dr. Samantha Ruth Brunhaver, Arizona State University, Polytechnic campus
Dr. Jennifer M. Bekki, Arizona State University, Polytechnic campus
Dr. Shawn S. Jordan, Arizona State University, Polytechnic campus
Dr. Micah Lande, South Dakota School of Mines and Technology

**Scrum as a Change Strategy**

Dr. Timothy A. Wilson, Embry-Riddle Aeronautical University - Daytona Beach
Dr. James J. Pembridge, Embry-Riddle Aeronautical University - Daytona Beach
Dr. Massoud Towhidnejad, Embry-Riddle Aeronautical University - Daytona Beach
Dr. Erin Elizabeth Bowen, Embry-Riddle Aeronautical University - Prescott
Mr. Carlos Alberto Castro, Embry-Riddle Aeronautical University - Daytona Beach

**Developing a Model of Professional Agency Toward Change in Engineering Education for Early Career Scholars**

Dr. Courtney June Faber, University of Tennessee at Knoxville
Dr. Walter C. Lee, Virginia Polytechnic Institute and State University
Dr. Alexandra Coso Strong, Florida International University
Dr. Cheryl A. Bodnar, Rowan University
Dr. Courtney S. Smith-Orr, University of North Carolina at Charlotte
Dr. Erin McCave, University of Houston

**Community Building for the NSF PFE: RIEF Program Year 1**

Prof. Karin Jensen, University of Illinois at Urbana - Champaign
Mr. Joseph F. Mirabeli, University of Illinois at Urbana - Champaign
Dr. Kelly J. Cross, University of Nevada, Reno
Dr. Allyson Jo Barlow, University of Nevada, Reno

**Scaling up the SIMPLE Design Model for Faculty Development: Lessons Learned**

Prof. Jill K. Nelson, George Mason University
Dr. Margret Hjalmarsdottir, George Mason University
Prof. Anastasia P. Samaras, George Mason University
Dr. Lori C. Bland, College of William and Mary

**M371B - NSF Grantees: K-12 Session 1**

*11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** NSF Grantees Session

**Moderators:** Amber Genau, University of Alabama at Birmingham; Karen Gilbert, Virginia Polytechnic Institute and State University

Presentations from groups with current NSF funding related to K-12 education and outreach, including teacher training.

**Building Educator Capacity in K-12 Engineering Education**

Dr. Elizabeth Cady, National Academy of Engineering
Mr. Greg Pearson, National Academy of Engineering

**The First Year of an Undergraduate Service Learning Partnership to Enhance Engineering Education and Elementary Pre-Service Teacher Education**

Dr. Stacie I. Ringleb, Old Dominion University
Dr. Jennifer Jill Kidd, Old Dominion University
Dr. Pilar Pazos, Old Dominion University
Dr. Kristie Gutierrez, Old Dominion University
Dr. Orlando M. Ayala, Old Dominion University
Dr. Krishnanand Kaipa, Old Dominion University

**Integrating Asset-based Practices, Engineering, and NGSS: Lessons from Working with Teachers through a Community-focused Approach**

Dr. Joel Alejandro Mejia, University of San Diego
Dr. Alberto Esquinca, San Diego State University
Dr. Vitaliy Popov, University of San Diego
Melissa M. Arana
Mireya Becker Roberto, University of San Diego
Miss Nicole G. Reyes

**Making in the Colonias: Motivating STEM Participation through a Making as Micro-Manufacturing Model**

Mr. Osazuwa John Okundaye Jr., Texas A&M University
Dr. Malini Natarajarathinam, Texas A&M University
Dr. Sharon Lynn Chu, University of Florida
Dr. Mathew Kuttolamadom, Texas A&M University
Prof. Francis Quek, Virginia Polytechnic Institute and State University
Alexander Nicholas Berman, Texas A&M University

**Using Video Diaries to Explore Perceptions of Engineering: A Comparison of Engineers and Educators**

Dr. Rebekah J. Hammack, Montana State University
Dr. Nick Lux, Montana State University
Dr. Paul Gannon, Montana State University
Dr. Brock J. LaMer, Montana State University
Poverty and Guidance: Challenges and Opportunities in Mathematics Preparation for Engineering

Dr. Eliza Gallagher, Clemson University
Anna Marie Vagnozzi, Clemson University
Mrs. Rachel Lanning, Clemson University
Dr. D. Andrew Brown, Clemson University
Dr. Christy Brown, Clemson University
Dr. Kristin Kelly Frady, Clemson University
Dr. Hope Epps Rivers
Julia Machele Brisbane, Virginia Polytechnic Institute and State University
Dr. Michael A. Matthews P.E., University of South Carolina
Dr. Hossein Haj-Hariri, University of South Carolina
Mr. Joseph Murphy, University of California, Los Angeles
Dr. Khushikumari Patel, Clemson University
Dr. Aubrie Lynn Pfirman, Lander University
Dr. Robert J. Rabb P.E., The Citadel
Mr. Richard H Roberts Jr, Florence Darlington Technical College
Dr. Stanley N. Ihekweazu, South Carolina State University
Prof. Ikhalfani Solan, South Carolina State University
Dr. Ronald W. Welch P.E., The Citadel
Dr. Anand K. Gramopadhye, Clemson University

Jennifer Velez, Arizona State University
Dr. James Collofello, Arizona State University
Dr. Kyle D. Squires, Arizona State University

Learning from Engineers to Develop a Model of Disciplinary Literacy in Engineering (Year 3)

Theresa Green, Utah State University
Dr. Angela Minichiello P.E., Utah State University
Dr. Amy Wilson-Lopez, Utah State University
Dr. Christina Marie Hartman, Utah State University
Jared W. Garlick, Utah State University

Diversifying the Engineering Pipeline through Early Engagement of Neurodiverse Learners

Ms. Constance M. Syharat, University of Connecticut
Dr. Alexandra Hain, University of Connecticut
Dr. Arash E. Zaghi, University of Connecticut

Developing a Research Agenda for the Engineering Ambassador Community

Dr. Stacey V. Freeman, Boston University
Dr. Sandra Lina Rodegher, Boston University

M371C - NSF Grantees: K-12 Session 2

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: NSF Grantees Session

Moderators: Amber Genau, University of Alabama at Birmingham; Joseph Brobst, Old Dominion University

Presentations from groups with current NSF funding related to K-12 education and outreach

Gaming Spatial-Skill Development: Building STEM Pathways with the Use of the Minecraft Gaming Platform

Dr. Bryce E. Hughes, Montana State University
Dr. Shannon D. Willoughby
Dr. Brock J. LaMeres, Montana State University
Barrett Frank, Montana State University
Mrs. Elaine Marie Westbrook, Montana State University
Dr. Nick Lux, Montana State University

Does EPICS as a Pre-college Program Foster Engineering Identity Development as Correlated to Doing Engineering?

Ciera Ferrone, Arizona State University
Dr. Tirupalavanam G. Ganesh, Arizona State University

Dr. Lydia Ross, Arizona State University
Prof. Stephen J. Krause, Arizona State University
Prof. Keith D. Hjelmstad, Arizona State University
Dr. Eugene Judson, Arizona State University
Dr. Lindy Hamilton Mayled, Arizona State University
Prof. James A. Middleton, Arizona State University
Prof. Robert J. Culbertson, Arizona State University
Kara L. Hjelmstad, Arizona State University
Sarah Hoyt, Arizona State University
Dr. Claire Honeycutt
Kristi Glassmeyer, Arizona State University

Reducing Student Resistance to Active Learning: Applying Research Results to Faculty Development

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
Lea K. Marlor, University of Michigan
Dr. Cynthia J. Finelli, University of Michigan
Dr. Jenefer Husman, University of Oregon
Madison E. Andrews, University of Texas at Austin
Dr. Maura Borrego, University of Texas at Austin
Laura J. Carroll, University of Michigan
Nicolette Marie DeRosia, University of Oregon
Dr. Matthew Charles Graham
Dr. Michael J. Prince, Bucknell University
Ms. Bobbie Bermudez, University of Oregon

**Integrating Evidence-based Teaching and Learning Practices into the Core Engineering Curriculum: Student Perceptions of the Instructional Practices**

Dr. Gail P. Baxter, Stevens Institute of Technology
Dr. Keith G. Sheppard, Stevens Institute of Technology
Dr. Frank T. Fisher, Stevens Institute of Technology
Dr. Patricia J. Holahan, Stevens Institute of Technology
Dr. Susan Lowes, Teachers College, Columbia University
Ms. Susan S. Metz, Stevens Institute of Technology

**What is Valued and Who is Valued for Promotion? Enacting and Sustaining a Policy that Rewards Multiple Forms of Scholarship**

Dr. Chrysanthe Demetry, Worcester Polytechnic Institute
Prof. Elizabeth Long Lingo, Worcester Polytechnic Institute
Jeanine Lee McHugh Skorinko, Worcester Polytechnic Institute

**Convergent Learning from Divergent Perspectives: An Executive Summary of the Pilot Study**

Mrs. Renee Rigrish Pelan, Ohio State University
Tylesha D. Drayton, Ohio State University
Dr. Rachel Louis Kajfez, Ohio State University
Julia Armstrong, Ohio State University

**M411 - Joint Panel: Innovating Engineering Education to Transform the Future**

1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Cooperative and Experiential Education Division

**Moderators:** Lisa Massi, University of Central Florida; Mary Andrade, University of Louisville

**Speakers:** Dr. Paul D. Plotkowski, Grand Valley State University; Dr. Sandra English, Cleveland State University; Ms. Robin R. Hammond, Arizona State University

Innovation and Design Centers promise to transform engineering education for a new era of product innovation. In addition to serving as an open and accessible space, aided with visual openness, most centers serve as beacons for creativity and provide a collaborative space for members to meet, design, and create. Such centers host student design teams, design-based courses, and information workshops, and are equipped with modern tools/machines to support these programs. The innovation and design centers intend to focus on the increased importance of design in engineering education, which adds unique value to the engineering degree and makes students highly attractive to employers. Today’s engineering students must not only understand engineering fundamentals; they must be able to use that knowledge to solve problems. Most often, these problems involve the design, construction, testing, and use of engineered systems. In addition to the increased need for design skills, a greater number of researchers seek students who can design and fabricate devices that are needed to investigate engineering questions. Innovation and Design Centers also satisfy a thriving extracurricular activity culture that meets the needs of K-12, secondary, post-secondary, and lifelong learners to meet, design, and build. Workshops may also be conducted to provide technical instruction in 3-D printing, computer coding, and solid modeling, and sponsored lectures by design leaders may target a diverse engineering population, from entry-level engineers to lifelong learners. These centers are aimed at transforming engineering curricula so that students learn the entire innovation-to-product development process. Students will receive instruction in the design process and understand how products must be economically manufactured if they are to be viable in the marketplace and add societal value. The result will be future-ready engineers who understand the modern manufacturing process, with an ability to advance the domestic and worldwide economy, solve societal problems, and improve the quality of life. This is a 30-minute live (synchronous) interactive session. Speakers will give a brief introduction and presentation on the mission, vision, values, and goals of local innovation design centers, followed by an opportunity for attendees to discuss topics of interest in a group setting.

**M399 - SPONSOR TECHNICAL SESSION: Using zyBooks to Teach in a Covid- and Post-Covid Environment - Presented by zyBooks**

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Sponsord Sessions

**Moderator:** Nikitha Sambamurthy, Zybooks

**Speaker:** Nikitha Sambamurthy, Ph.D. zyBooks Engineering Content Lead

Description: The coronavirus pandemic has disrupted education around the world. As higher education institutions grapple with the uncertainty of students returning to campus, many instructors are preparing for courses that can seamlessly transition between in-person and online instruction. This talk presents an overview of zyBooks, which are interactive online engineering textbooks proven to increase student confidence in engineering courses. Throughout the talk, we explore methods to incentivize student reading, assign auto-graded homework and coding labs, and track student learning for engineering courses.

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information.
Four electrical and computer engineering (ECE) departments have received grants from the National Science Foundation Revolutionizing Engineering and Computer Science Departments (RED) program since 2015: Colorado State University (2015), Iowa State University (2016), Virginia Tech (2016), and Embry-Riddle Aeronautical University (2019). Each grant is a five-year award with a goal of departmental change and innovation to overcome longstanding issues in undergraduate education and to create more inclusive environments. The focus of RED is on transforming departmental structures and practices and supporting faculty development to improve the middle years experience and the professional formation of engineering students. Overall, NSF has made four rounds of awards for a total of 21 department grantees.

The RED project at CSU has been taking a holistic approach to weave threads on creativity, foundations, and professionalism throughout the curriculum and incorporate knowledge integration activities. At Virginia Tech, there is a new overall program structure designed around base courses and concepts that help students choose subsequent courses that better prepare them for a broader range of careers. The ISU ECE RED project has been developing a collaborative course-design model called an "X-team" that helps instructors engage with research-based pedagogy, design thinking, student identity, and professional development. ERAU is implementing agile methods across the department to change the way faculty and students work, and students will use Scrum in projects throughout the middle two years.

Since 2017, the ECE grantees have presented an ECE Division session to share their work and engage the community. Each session has been organized around different themes, including goals, curricula, change processes, professional formation, and stakeholder communication. Given that RED project teams include education and social science researchers who lead efforts to study change at the departmental level, the theme of this session will be on the research studies in each department. The session will focus on the research questions, the motivation and background for the studies, methods used, key findings thus far, and their implications for other ECE departments. Research briefs will be provided. The session will include presentations from each RED ECE department and time for discussion, questions, and interaction to explore implementing and adapting project strategies more widely in other departments.
A follow up report in 2005, “Educating the Engineer of 2020: Adapting Engineering Education to the New Century,” recommended several changes to engineering education, including accrediting master’s degree programs for the professional engineering degree, exploring new education models, infusing design activities throughout the undergraduate curriculum, encouraging interdisciplinary learning at the undergraduate level, promoting engineering to the public, and rewarding faculty for conducting engineering education research.

Note: This session initially was planned as a precursor to the Interdivisional Town Hall on looking forward to engineering education in 2030, which was cancelled. We plan to have a full panel in conjunction with next year's town hall forum.

M421 - ELD Lightning Talks 1
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Libraries Division
Moderators: Sylvia Jones, Southern Methodist University; Christa Spence, University of Toronto

Attendees will present lightning talks to share research projects and topics in a fun way.

M425 - Innovative Development for Various Faculty Lines
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Environmental Engineering Division; Faculty Development Division
Moderators: Stephanie Cutler, Pennsylvania State University; Azadeh Balhari, University of Colorado Boulder; Fethiye Ozis, Northern Arizona University

Innovative development for tenured/tenure-track faculty and professional faculty (adjunct, non-tenure track, such as teaching and research faculty).

This session is a paper-panel session, where panelists have prepared a paper based on experience/practice/opinion on the topic, but will serve on the panel in lieu of a traditional presentation.

Managing Dual Academic Careers

Dr. Yuting W. Chen, University of Illinois Urbana-Champaign
Dr. Jena Shafai Asgarpoor, University of Nebraska - Lincoln
Dr. Robyn Sandekian, University of Colorado, Boulder
Prof. Jill K Nelson, George Mason University
Dr. Lee Kemp Rynearson, Campbell University
Shannon Bartelt-Hunt P.E., University of Nebraska - Lincoln
Dr. Janet Callahan, Michigan Technological University

As more and more partners desire to take up academic positions, managing dual careers is a matter that has profound impact, both professionally and personally. Despite the rapid growth in engineering programs across the country, securing even just one faculty position is not an easy feat. When it is a dual-career opportunity, ideally this means securing two positions in the same university, which brings its own level of difficulty and complication. This panel brings speakers with a diverse range of experience and an engaged audience together to discuss managing dual academic careers.

M451 - Managing Dual Careers
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Women in Engineering Division; Faculty Development Division; Electrical and Computer Division
Moderators: Yuting Chen, University of Illinois at Urbana - Champaign; Jena Asgarpoor, University of Nebraska - Lincoln

Speakers: Dr. Janet Callahan, Michigan Technological University; Shannon Bartelt-Hunt P.E., University of Nebraska - Lincoln; Prof. Jill K Nelson, George Mason University; Dr. Lee Kemp Rynearson, Campbell University; Dr. Robyn Sandekian, University of Colorado Boulder

Managing Dual Academic Careers

Dr. Yuting W. Chen, University of Illinois Urbana-Champaign
Dr. Jena Shafai Asgarpoor, University of Nebraska - Lincoln
Dr. Robyn Sandekian, University of Colorado, Boulder
Prof. Jill K Nelson, George Mason University
Dr. Lee Kemp Rynearson, Campbell University
Shannon Bartelt-Hunt P.E., University of Nebraska - Lincoln
Dr. Janet Callahan, Michigan Technological University

M458 - MONDAY Keynote Live Question and Answer
2:00 P.M. - 2:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Board of Directors
Moderators: Stephanie Adams, University of Texas at Dallas; American Society for Engineering Education

Speaker: Aldert Kamp

Live question and answer session with TU Delft's Aldert Kamp, moderated by ASEE President Stephanie Adams.
M479 - ABET Session: ABET Conducts Remote Program Accreditation Reviews in 2020 - 2021
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ABET Sponsored Sessions
Moderator: Tom Walker
Speakers: Dr. Joseph L Sussman, ABET; Ms. Jane Emmet, ABET

This session will summarize how best to address ABET accreditation within the context of academic program response to the novel coronavirus COVID-19 pandemic.

ABET’s Chief Accreditation Officer, Dr. Joe Sussman, and Senior Director of Accreditation Operations, Jane Emmet, will discuss modifications to ABET operations and how these modifications will affect program reviews, acknowledging the current delivery changes to academic programs that have affected teaching and learning.

In addition, Dr. Sussman and Ms. Emmet will answer questions regarding how best to prepare for ABET accreditation given the current status of academic program offerings at institutions around the globe.

This session will summarize recent updates, and we especially encourage participation from programs with ABET visits planned for Fall 2020. Please bring your ABET leaders to this session.

M560B - COVID-19 Campus Response - Featuring Engineering and Engineering Technology Deans - Presented by the University of Maryland
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters
Moderator: Darryll Pines, University of Maryland College Park

COVID-19 Campus Response - Featuring Engineering and Engineering Technology Deans - Presented by the University of Maryland

M658 - ASEE Finance Town Hall & General Body Meeting
4:00 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Board of Directors
Moderators: Doug Tougaw, Valparaiso University; Joseph Dillon, ASEE

U660 - ASEE DIVISION MIXER Virtual Showcase
4:30 P.M. - 5:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters

Join us in our virtual showcase of ASEE Divisions.

GREET THE STARS AND ASEE 101! New Members Orientation and How to Get Involved with ASEE
3:30 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters
Moderators: Gary Steffen, Purdue University Fort Wayne; American Society for Engineering Education

GREET THE STARS AND ASEE 101! New Members Orientation and How to Get Involved with ASEE
T201 - Student Success, Learning Strategies, and Retention in the Aerospace Industry

10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Aerospace Division

Moderators: Mary Johnson, Purdue University at West Lafayette; Michael Hatfield, University of Alaska Fairbanks

An Archival-based Flipped Classroom Implementation for Enhancing the Performance of Academically Struggling Students

Dr. Sharanabasaweshwara Asundi, Old Dominion University

Innovative Learning Strategies to Engage Students Cognitively

Dr. Chadia A. Aji, Tuskegee University
Dr. M. Javed Khan, Tuskegee University
Dr. Ana M. Tameru, Tuskegee University

Tolerance of Ambiguity, Development of Cognitive Models, and Engineering Identity

Dr. M. Javed Khan, Tuskegee University
Dr. Chadia A. Aji, Tuskegee University

Factors that Affect Retention and Satisfaction Among Newly Hired Aerospace Engineers

Lucas Davis, Iowa State University
Dr. Benjamin Ahn, Iowa State University
Ms. Yun Dong, Iowa State University
Mr. Ravonte Nievez Campbell, Virginia Tech

T202 - Architectural Engineering Division Technical Session 3

10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsors: Architectural Engineering Division; Construction Engineering Division

Moderator: James Pocock, United States Air Force Academy Summer Scholarship Project: Designing and Building a Multipurpose Micro-farm Structure as a Pedagogical Strategy for Architectural Engineering Technology Students

Mr. Eugene Kwak, Farmingdale State College, State University of New York

The Outer Space Also Needs Architects

Dr. Sudarshan Krishnan, University of Illinois at Urbana-Champaign

Imparting the Values of Energy Simulation Toward Net Zero Plus Status

Dr. Mohamed ElZomor, Florida International University
Prof. Omar Youssef, University of Arizona

Miss Sara Ghaemi, University of Arizona
Mrs. Tasbeeh Alaqtum, University of Arizona

Engaging Students Through Concrete Beam Fabrication

Prof. Christina McCoy, Oklahoma State University
Prof. John J. Phillips, Oklahoma State University

T204 - Intro to Biomedical Engineering and Vertically Integrated Curriculum (Works in Progress) - June 23rd

10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Biomedical Engineering Division

Moderators: Conrad Zapanta, Carnegie Mellon University; Ann Saterbak, Duke University

WIP: A Vertically-integrated, Project-focused Approach to Undergraduate Biomedical Engineering Education

Dr. Amber L. Doiron, University of Vermont
Dr. Jason H.T. Bates, University of Vermont
Prof. Ryan S. McGinnis, University of Vermont
Dr. Juan Jose Uriarte, University of Vermont
Niccolo M. Fiorentino, University of Vermont
Dr. Jeff Frolik, University of Vermont
Prof. Rachael A Oldinski

WIP: Student and Faculty Perceptions of Rotating Faculty Facilitators for Introductory Biomedical Engineering Problem-based Learning

Dr. Sara L. Arena, Virginia Polytechnic Institute and State University
Dr. Melissa C. Kenny, Wake Forest University
Dr. Andre Albert Muelenaer, Virginia Polytechnic Institute and State University
Prof. Yong Woo Lee, Virginia Polytechnic Institute and State University
Dr. Pamela Jean VandeVord, Virginia Polytechnic Institute and State University
Dr. Christopher Arena, Virginia Polytechnic Institute and State University

WIP: Incorporating Interactive Modules Related to Cell Culture and Plasmid Design into Introduction to Biomedical Engineering

Dr. Rosalyn Delia Abbott, Carnegie Mellon University
Dr. Conrad M. Zapanta, Carnegie Mellon University
Dr. Michael Cameron Melville, Carnegie Mellon University
Steven Moore, Carnegie Mellon University

WIP: Engaging Early-career Students in Bioengineering with Student-specific Content
ASEE’S VIRTUAL CONFERENCE
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Dr. Erika M. Pliner, University of Pittsburgh
Dr. April Dukes, University of Pittsburgh
Dr. Kurt E. Beschorner, University of Pittsburgh
Dr. Arash Mahboobin, University of Pittsburgh

A Vertically Integrated Design Program Using Peer Education
Dr. Ross Aaron Petrella, University of North Carolina and North Carolina State University Joint Department of Biomedical Engineering
Dr. Haticce O. Ozturk, North Carolina State University at Raleigh
Dr. Lianne Cartee, University of North Carolina and North Carolina State University Joint Department of Biomedical Engineering
Dr. Devin K. Hubbard, University of North Carolina and North Carolina State University Joint Department of Biomedical Engineering
Dr. Kenneth Donnelly, University of North Carolina at Chapel Hill
David A. Zaharoff, University of North Carolina and North Carolina State University Joint Department of Biomedical Engineering
George T. Ligler, University of North Carolina and North Carolina State University Joint Department of Biomedical Engineering

WIP. Building a Learning Continuum: Forging Connections Across a Bioengineering Curriculum for Improved Student Learning
Dr. Sabrina Jedlicka, Lehigh University
Prof. Eugene Thomas Pashuck, Lehigh University
Dr. Susan F. Perry, Lehigh University

T205 - Course Design, Course Projects, and Student Perceptions in Chemical Engineering
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Chemical Engineering Division
Moderators: Anthony Butterfield, University of Utah; LiLu Funkenbusch, University of Florida

Can Students Self-Generate Appropriately Targeted Feedback on Their Own Solutions in a Problem-Solving Context?
Prof. Carl R. F. Lund, University at Buffalo, SUNY

Putting Course Design Principles to Practice: Creation of an Elective on Vaccines and Immunoeengineering
Prof. Joshua A Enszer, University of Delaware
Prof. Catherine A Fromen, University of Delaware

Aligning the Chemical Engineering Curriculum to a Common Problem-solving Strategy
Prof. Nicolas Hudon, Queen's University

Dr. Louise Meunier, Queen's University

How Much Does Student Perception of Course Attributes Impact Student Motivation?
Dr. Margot A Vigeant, Bucknell University
Dr. Amy F. Golightly, Bucknell University

By Students for Students: Using Course Projects to Create Learning Materials for Future Classes
Dr. Lucas James Landherr, Northeastern University

T206 - Key Educational & Professional Issues of Strategic Importance to the Civil Engineering Profession - and ASCE - Part 1
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division
Moderators: Thomas Lenox, American Society of Civil Engineers; Leslie Nolen, American Society of Civil Engineers

This session will explore key issues related to the identity and licensure of civil engineers and civil engineering educators.

Licensure Requirements for Teaching Civil Engineering Design Courses in the United States
Dr. Brian J. Swenty, University of Evansville
Dr. Matthew Swenty, Virginia Military Institute

The Engineer of 2020 as of 2020
Dr. Brock E. Barry, U.S. Military Academy
Stephanie Slocum, Engineers Rising LLC

Countering Threats to Licensure with ASCE’s Engineer Tomorrow Initiative
Mr. Bradley Aldrich, American Society of Civil Engineers
Mr. Kenneth H. Rosenfield, American Society of Civil Engineers
Ms. Marlee A. Walton, Iowa State University of Science and Technology
Ms. Jennifer Hofmann, American Society of Civil Engineers

Lessons Learned from the Implementation of Board Certification in the Medical Profession
Dr. Decker B Hains, Western Michigan University
Dr. Stephen J. Ressler, U.S. Military Academy
Dr. Thomas A. Lenox, American Society of Civil Engineers

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
T208 - Computers in Education Division Technical Session 9: Pedagogical Tools

10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Computers in Education Division

Moderators: Joe Allen, University of California, Riverside; Alisa Gilmore, University of Nebraska - Lincoln

This session will highlight COED submitted papers that are related to the utilization of specialized pedagogical tools.

Using a Pedagogical Agent to Support Students Learning to Program

Dylan Keifer Finch, Virginia Tech
Prof. Stephen H. Edwards, Virginia Tech

PNW-SLOPE – A New Educational Tool for Geotechnical Engineers

Thiago Fernandes Leao, Purdue University Northwest
Prof. Jiliang Li, Purdue University Northwest
Dr. Jinyuan Zhai, Minnesota State University, Mankato

groupe, an Open-source Tool for Creating Optimal Student Teams

Dr. Joshua L. Hertz, Northeastern University
Dr. Susan F. Freeman, Northeastern University

GraphVisual: Design and Evaluation of a Web-based Visualization Tool for Teaching and Learning Graph Visualization

Martin Imre, University of Notre Dame
Miss Wenqing Chang, Xi'an Jiaotong University
Miss Shuzhan Wang, Beijing University of Posts and Telecommunications
Dr. Christine P. Trinter, University of Notre Dame
Dr. Chaoli Wang, University of Notre Dame

Use of Computational Tools for Structural Analysis and Design Modification of Automobile Seat-rail Structures under Various Operating Conditions

Prof. Raghuv Echempati, Kettering University
Santhosh Sivan Kathiresan, Kettering University

T213A - Maker Spaces in Design Education

10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Design in Engineering Education Division

Moderators: Astrid Layton, Texas A&M University; Zahed Siddique, University of Oklahoma

Using a Modularity Analysis to Determine Tool and Student Roles within Maker Spaces

Mr. Colton Daniel Brehm, Texas A&M University
Dr. Julie S. Linsey, Georgia Institute of Technology
Dr. Astrid Layton, Texas A&M University

A Learner- and Equity-Centered Approach to Maker Spaces

Dr. Carolyn Keller, University of Wisconsin, Platteville
Dr. Jodi F. Prosise, University of Wisconsin, Platteville
Dr. Philip J. Parker P.E., University of Wisconsin, Platteville

Interdisciplinary Mini-mester Course on Rapid Prototyping for Product Design

Dr. Amit Shashikant Jariwala, Georgia Institute of Technology
Ms. Jenny Wang, Georgia Institute of Technology
Mr. J. Auston Ferrarer, Georgia Institute of Technology
Ms. Gabrielle E. Lonsberry, Georgia Institute of Technology
Kentez Lanier Craig, Georgia Institute of Technology

Understanding a Maker Space as a Community of Practice

Chieloka Mbaezue, Stanford University
Eric Reynolds Brubaker, Stanford University
Dr. Sheri Sheppard, Stanford University

Application of 3-D CAD and 3-D Printing to RET Program to Enrich Engineering Design Education

Dr. Xinyu Liu, Lamar University
Prof. Xuejun Fan, Lamar University
Prof. Julia Yoo, Lamar University
Dr. Nicholas Andres Brake, Lamar University
Dr. Jiang Zhou, Lamar University
Dr. Xianchang Li, Lamar University
Dr. Dorothy Sisk, Lamar University
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T213B - Design Mental Frameworks
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Design in Engineering Education Division
Moderators: Corey Schimpf, The Concord Consortium; Kris Jaeger-Helton, Northeastern University
Reflection in Time: Using Data Visualization to Identify Student Reflection Modes in Design
  Dr. Corey T. Schimpf, Concord Consortium
  Dr. Molly H. Goldstein, University of Illinois at Urbana-Champaign
  Dr. Charles Xie

Engineering Students’ Epistemological Thinking in the Context of Senior Design Projects
  Miss Qiushi Li, Shanghai Jiaotong University
  Jiabin Zhu, Shanghai Jiao Tong University

Considering People: An Exploratory Investigation of Engineering Student Ideation
  Ms. Laura R. Murphy, University of Michigan
  Dr. Shanna R. Daly, University of Michigan
  Dr. Colleen M. Seifert, University of Michigan
  Eytan Adar, University of Michigan
  Sophia Brueckner, University of Michigan

Work in Progress: Quantifying Learning by Reflecting on Doing in an Engineering Design, Build, and Test Course
  Mrs. Shan Peng, University of Oklahoma
  Dr. Zhenjun Ming, University of Oklahoma
  Prof. Zahed Siddique, University of Oklahoma
  Dr. Janet Katherine Allen, University of Oklahoma
  Prof. Farrokh Mistree, University of Oklahoma
  Dr. Brian Sanders, Embry-Riddle Aeronautical University
  Dr. Mark Douglas Miller, Embry-Riddle Aeronautical University

Communication Tools for Engineering Educators Conducting Class Projects with Dispersed Students
  Mr. Michael Roger Straus, North Dakota State University
  Mr. Stanley Shie Ng, University of North Dakota

Developing an Instrument to Measure Online Engineering Undergraduate Students’ Learning Experiences and Intentions to Persist
  Ms. Eunsil Lee, Arizona State University
  Dr. Samantha Ruth Brunhaver, Arizona State University
  Dr. Jennifer M. Bekki, Arizona State University

E-learning and Assessment in the Cloud: Engineering Courses
  Dr. Stefanos Papanikolaou, West Virginia University

Learner Analytics in Engineering Education: A Detailed Account of Practices Used in the Cleaning and Manipulation of Learning Management System Data from Online Undergraduate Engineering Courses
  Mr. Javeed Kittur, Arizona State University
  Dr. Jennifer M. Bekki, Arizona State University
  Dr. Samantha Ruth Brunhaver, Arizona State University

T214B - Postgraduate Pathways and Experiences
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Lizabeth Schlemer, California Polytechnic State University, San Luis Obispo; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Exploring the Early Career Pathways of Degree Holders from Biomedical, Environmental, and Interdisciplinary/Multidisciplinary Engineering
  Ms. Jacqueline Rohde, Purdue University, West Lafayette
  Jared France, Purdue University, West Lafayette
  Ms. Brianna Benedict, Purdue University, West Lafayette
  Dr. Allison Godwin, Purdue University, West Lafayette

Work In Progress: Experts’ Perceptions of Engineering Intuition
  Dr. Elif Miskioğlu, Bucknell University
  Dr. Kaela M. Martin, Embry-Riddle Aeronautical University
  Dr. Adam R. Carberry, Arizona State University

Communication Expectations to Industry Realities
  Dr. Sarah A. Wilson, University of Kentucky
  Dr. Renee Kaufmann, University of Kentucky

T214A - Teaching and Learning in Online Environments
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Elizabeth Milonas, New York City College of Technology; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Assessment of Learning Effectiveness in Online and Face-to-Face Learning Environment for Engineering Education
  Dr. Prabodh Panindre, New York University
  Dr. Richard S. Thorsen, New York University

Incorporation of Virtual Learning Environments for Online STEM Activities
  Stefan Kleinke, Embry-Riddle Aeronautical University
  Dr. Prabodh Panindre, New York University
  Dr. Richard S. Thorsen, New York University

Communication Tools for Engineering Educators Conducting Class Projects with Dispersed Students
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Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
ASEE’S VIRTUAL CONFERENCE
TUESDAY, JUNE 23 SESSIONS
#ASEEVC

Work in Progress: Novel Ethnographic Approaches for Investigating Engineering Practice
- Prof. Brent K. Jesiek, Purdue University, West Lafayette
- Dr. Aditya Johri, George Mason University
- Dr. Cory Brozina, Youngstown State University
- Dr. Russell Korte, George Washington University

Work In Progress: Investigating the Experiences that Develop Competence for Newly Hired Engineers in an Electric Power Company
- Dr. Russell Korte, George Washington University
- Prof. Saniya LeBlanc, George Washington University

Imbedding Industry Expectations for Professional Communication into Undergraduate Engineering Curricula
- Dr. Jacob Allen Cress, University of Dayton
- Dr. Patrick W. Thomas, University of Dayton

T215 - Capstone, Undergraduate Research, and Projects in ECE
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Electrical and Computer Division
Moderators: Jennifer Bonniwell, Milwaukee School of Engineering; Huihui Wang, Jacksonville University

Crayowulf: A Multidisciplinary Capstone Project
- Prof. Joel C. Adams, Calvin University
- Mr. Noah Pirrotta, Medallion Instrumentation Systems
- Prof. Mark Michmerhuizen, Calvin University
- Mr. Philip Michael Holmes, Mayo Clinic Graduate School of Biomedical Sciences
- Mr. Peter Oostema, Carnegie Mellon University
- Mr. Benjamin Kastner, Churchill Navigation

Quality Assurance of Capstone Senior Design Projects: A Case Study
- Mr. Ahmed Abul Hussain, Prince Mohammad bin Fahd University
- Dr. Nizar Tayem, Texas A&M University
- Dr. Chedly B. Yahya, Prince Mohammad bin Fahd University
- Dr. Sadiq A. Alhuwaidi, Prince Mohammad bin Fahd University
- Prof. Jamal Nayfeh, Prince Mohammad bin Fahd University

Undergraduate Research: Deep Learning-based Plant Classifiers and Their Real-life Research Applications
- Dr. Deng Cao, Central State University
- Dr. Cadance Lowell, Central State University
- Dr. Craig M. Schluttenhofer, Central State University
- Dr. Augustus Morris, Central State University
- Mr. Austin R. Erdman, Central State University

Tory Johnson
Mr. Jeffrey D. Taylor Jr., Central State University

An Integrated Mixed-signal Circuit Design Course Project
- Dr. Ying Lin, Western Washington University
- Steve Sandelin

An Electronics Lab Project: Tutorial and Design of Printed Circuit Board "Big Blinky"
- Dr. Rod Blaine Foist, California Baptist University
- Dr. John Butler, California Baptist University
- Mr. Gibson Fleming, California Baptist University

T216 - ECCD - Technical Session 2 - Solar Energy
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Energy Conversion and Conservation Division
Moderators: Ted Song, John Brown University; Robert Kerestes, University of Pittsburgh

Papers presented in this session are related to Solar Energy and its educational aspects.

Enlightened Education: Solar Engineering Design to Energize School Facilities
- Dr. Kenneth A. Walz, Madison Area Technical College
- Mr. Joel B. Shoemaker, Madison Area Technical College
- Steven Michael Ansorge, Madison Area Technical College
- Mr. Adam Gusse, Sunvest Solar, Inc
- Nicholas J. Hylla, Midwest Renewable Energy Association

Photovoltaic Solar Grill
- Mrs. Brittany Weber, Renewable Energy Society
- Miss Katelyn Renee Dunnagan, Renewable Energy Society
- Dr. Matthew Aldeman, Illinois State University

Prototype Automated Solar Tracking with Power Generation System
- Dr. Saeed Sean Monemi, California State Polytechnic University Pomona

Mitigation of Solar Photovoltaic Production Variability with Geographical Aggregation
- Mr. Bennet Thomas Krull, Illinois State University
- Dr. Matthew Aldeman, Illinois State University
- Dr. Jin Ho Jo, Illinois State University

The Scaled Omni-directional Solar Tracking Unit
- Dr. Saeed Sean Monemi, California State Polytechnic University Pomona
T220 - Research on Engineering Ethics Education and Practice
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Moderator: Alison Kerr, The University of Tulsa

Health Stress and Support System Narratives of Engineering Students
Dr. Greg Rulifson P.E., U.S. Agency for International Development
Dr. Angela R. Bielefeldt, University of Colorado Boulder

Mapping Concepts Engineering Students in China Use to Think about Ethics
Dr. Rockwell Franklin Clancy III, University of Michigan-Shanghai Jiao Tong University Joint Institute
Dr. Charlemagne Manuel, University of Michigan Shanghai Jiao Tong University Joint Institute
Dr. Yan Ge, Shanghai Jiao Tong University
Richard James Clancy, University of Colorado Boulder

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, CYS Structural Engineers Inc.
Dr. Chris Swan, Tufts University
Dr. Daniel Knight, University of Colorado Boulder

Experiencing Ethical Engineering Practice
Ms. Dayoung Kim, Purdue University, West Lafayette
Dr. Justin L. Hess, Purdue University, West Lafayette
Dr. Nicholas D. Fila, Iowa State University

Innovation for the Engaged Librarian
Ms. Marian G. Armour-Gemmen, West Virginia University

Using Visual Ethnography for Space Studies
Prof. Pauline Melgoza, Texas A&M University
Prof. Tina M. Budzise-Weaver, Texas A&M University
Dr. Sarel Lavy, Texas A&M University
Miss Tiyamike Kunje

If You Build It, They Will Come: A Case Study of How FSU Libraries Grew Engineering Services Through Targeted Rebranding and Outreach for a Multi-institution College of Engineering
Denise Amanda Wetzel, Florida A&M University/Florida State University
Kelly Grove, Florida A&M University/Florida State University

T221 - Engineering Librarian Collaborations in the Library, on Campus, and Beyond
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Moderators: Sarah Over, University of Maryland College Park; Margaret Phillips, Purdue University at West Lafayette

No Library, No Problem: Engineering Solutions to Library Challenges
Cari Lyle, University of Southern California

Hey, You Got Business in My Engineering!: Collaborating to Support Entrepreneurship Research
Ms. Kelly Giles, James Madison University Libraries
Ms. Elizabeth Price, James Madison University Libraries

Using SenseMaker® to Examine Student Experiences in Engineering: A Discussion of the Affordances and Limitations of this Novel Research Approach
Dr. Nicola W. Sochacka, University of Georgia
Mr. Christian Michael Culloty, University of Georgia
Jacob Hopkins
Mrs. Julie R. Harrell, University of Georgia
Dr. Joachim Walther, University of Georgia

Work In Progress: A Systematic Review Describing Impacts on Engineering Undergraduates Who Participate in Outreach
Dr. Joanna K. Garner, Old Dominion University
Prof. Karen A. Thole, Pennsylvania State University, University Park
Mr. Michael Alley, Pennsylvania State University, University Park

T234 - Novel Strategies for Studying Liberal Education
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Moderators: Amy Slaton, Drexel University; Justin Hess, Purdue University at West Lafayette

Engineering Creativity: Ideas from the Visual Arts for Engineering Programs
Lt. Col. Jakob C. Bruhl, United States Military Academy
Prof. Win Gilbert Bruhl, University of Arkansas, Little Rock

The Double Bind of Constructionism: A Case Study on the Barriers for Constructionist Learning in Pre-college Engineering Education
Dr. Michael Lachney, Michigan State University
Madison C. Allen, Michigan State University
Briana P. Green, Michigan State University

Using SenseMaker® to Examine Student Experiences in Engineering: A Discussion of the Affordances and Limitations of this Novel Research Approach
Dr. Nicola W. Sochacka, University of Georgia
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Prof. Karen A. Thole, Pennsylvania State University, University Park
Mr. Michael Alley, Pennsylvania State University, University Park
T238A - Mechanical Engineering Technical Session: Outreach and Retention

10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Mechanical Engineering Division
Moderator: Matt Gordon, University of Denver

This session will provide insight and approaches on how to best recruit and retain mechanical engineering students. Outreach activities are also presented.

Enhancing Middle/High School Female Students' Self-confidence and Motivation in Pursuing STEM Careers through Increasing Diversity in Engineering And Labor-force (IDEAL) Outreach Summer Program
- Dr. Nina Robson, California State University, Fullerton
- Allison Serrano
- Mr. Axel Alvarez Loya, California State University, Fullerton
- Nikol Miojevic
- Kimberly Krystal Lopez-Zepeda
- Dr. Madeline E. Rasche

Identifying NSF S-STEM Sponsored Program Activities that Have a Positive Impact on Mechanical Engineering S-STEM Scholars
- Dr. Liang Zhu, University of Maryland, Baltimore County
- Jamie R. Gurganus, University of Maryland, Baltimore County
- Dr. Charles D. Eggleton, University of Maryland, Baltimore County
- Dr. Ronghui Ma, University of Marylad County, Baltimore County
- Prof. Timmie Topoleski, University of Maryland, Baltimore County
- Deepa Madan, University of Maryland, Baltimore County

Student Success in Mechanical Engineering: Utilizing Data to Understand Success for Underrepresented Groups
- Dr. Molly McVey, University of Kansas
- Dr. Carl W. Luchies, University of Kansas
- Dr. Sara E. Wilson, University of Kansas
- Dr. Lorin P. Maletsky, University of Kansas
- Dr. Lin Liu, University of Kansas

The Portia Hypothesis: Mechanical Engineering Student Perceptions of Qualifications
- Dr. Leigh S. McCue, George Mason University

T238B - Mechanical Engineering Technical Session: Labs & Projects - New Opportunities

10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Mechanical Engineering Division
Moderator: Rungun Nathan, Pennsylvania State University, Berks Campus

This technical session includes various labs and projects developed to improve instruction and student learning.

An Integrated Thermal Science MATLAB® Project
- Dr. Tom Eldredge, Liberty University
- Dr. John H. Jones, Liberty University

Cantilever Beam Experiment
- Dr. Gloria Guohua Ma, Wentworth Institute of Technology
- Prof. Siben Dasgupta, Wentworth Institute of Technology
- Prof. Anthony William Duva, Wentworth Institute of Technology

Electric Ceiling Hoist: A Semester Project with Competing Forces to Enhance Student Learning in Machine Design
- Dr. Dennis O'Connor, California State University, Chico

Foundation Mechatronics Laboratory Course for Mechanical Engineering Students
- Dr. Khalifa H. Harib, United Arab Emirates University
- Dr. Sangarappillai Sivaloganathan, United Arab Emirates University
- Mrs. Rihab Kamal M. Hamza, United Arab Emirates University
- Mr. Muthanna Ahmed Aziz, United Arab Emirates University

Structuring a Mechatronics Open Design Project to Reinforce Mechanical Engineering Concepts and Design Skills
- Dr. Camilo Ordonez, Florida A&M University/Florida State University
- Tomas Fajardo, Florida A&M University/Florida State University
- Mr. Shayne Kelly McConomy, Florida A&M University/Florida State University
- Mr. Joshua James Blank, Florida A&M University/Florida State University

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
T239 - Concept Inventories in Mechanics
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanics Division
Moderators: Amir Yazdi, Rose-Hulman Institute of Technology; Devin Berg, University of Wisconsin-Stout
Modification of a Physics Rotational Kinematics Concept Inventory for use with Engineering Dynamics Students
Dr. Ann Reimers, University of Virginia
Mr. Stefen Beeler-Duden, University of Virginia
The Dynamics Concept Inventory (DCI) – The Past, Present, and Future
Dr. Phillip Cornwell, Rose-Hulman Institute of Technology
Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo
WIP: Large-scale Development and Deployment of Concept Questions in Statics
Prof. Carisa H. Ramming, Oklahoma State University
Prof. Christopher Papadopoulos, University of Puerto Rico, Mayaguez Campus
Eric Davishahli, Whatcom Community College
Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo
Prof. Sinéad C. MacNamara, Syracuse University
Dr. Meredith Silberstein, Cornell University
Prof. Joan V. Dannenhoffer P.E., Syracuse University
WIP: Implementation of a Dynamics Concept Inventory – Before and After a Dynamics Class
Dr. Julian Ly Davis, University of Southern Indiana
Dr. Sara L. Arena, Virginia Tech

Prof. Mark McKenney, Southern Illinois University, Edwardsville
Matt Johnson
Prof. Sharon Locke
Ms. Ann Vogel, iBIO Institute
Colin Wilson, Southern Illinois University
Dr. Georgia Bracey, Southern Illinois University, Edwardsville

Toward an Understanding of the Effect on Summer Programming on Early Engineering Student Outcomes
Elizabeth A. Sanders, University of Michigan
Dr. Molly H. Goldstein, University of Illinois at Urbana-Champaign
Mrs. Gretchen M. Forman, University of Illinois at Urbana-Champaign

T240 - Minorities in Engineering Division Technical Session 6
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Minorities in Engineering Division
Moderators: Rochelle Williams, Association for Women in Science; Christopher Carr, George Mason University
Developing Meaningful Studies of Student Success with Equity in Mind: Considering Context (Experience Report)
Dr. Sarah Hug, University of Colorado, Boulder
Dr. Wendy Chi, University of Colorado, Boulder
Program for Minority Girls (Research to Practice-Diversity)
Ms. Henriette D. Burns, Southern Illinois University, Edwardsville

Dr. Kristie Gutierrez, Old Dominion University
Dr. Stacie I. Ringleb, Old Dominion University
Dr. Orlando M. Ayala, Old Dominion University
Dr. Kristie Gutierrez, Old Dominion University
Dr. Krishnanand Kaipa, Old Dominion University

Managing an Outreach Consortium for Developing a Pipeline of Skilled Workforce Through Advanced Manufacturing
Dr. Ahmed Cherif Megri, North Carolina A&T State University

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
Dr. Sameer Hamoush, North Carolina A&T State University

Urban Universities and Community Revitalization Efforts: Opportunities for Student Engagement and Education

Dr. Fouad H. Fouad, University of Alabama at Birmingham
Miss Paula Alvarez Pino
Prof. Andrew J. Sullivan, University of Alabama at Birmingham
Dr. Mona N. Fouad, University of Alabama at Birmingham

WIP: Investigating Student Growth Through a Multidisciplinary Qualifying Project of an Interactive Ball Wall Display to Support Pre-K STEAM Learning at a Community Early Education and Care Center

Ms. Jessica Anne Rosewitz P.E., Worcester Polytechnic Institute
Dr. Katherine C. Chen, Worcester Polytechnic Institute

Mr. Hossein Ebrahiminejad, Purdue University, West Lafayette
Dr. George D. Ricco, University of Indianapolis
Dr. Matthew W. Ohland, Purdue University, West Lafayette

T247 - Student Division Technical Session 2
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Student Division
Moderator: Alison Kerr, The University of Tulsa

I Graduated, Now What? An Overview of the Academic Engineering Education Research Job Field and Search Process

Dr. Erin J. McCave, University of Houston
Dr. Cheryl A. Bodnar, Rowan University
Dr. Courtney S. Smith-Orr, University of North Carolina at Charlotte
Dr. Alexandra Coso Strong, Florida International University
Dr. Walter C. Lee, Virginia Tech
Dr. Courtney June Faber, University of Tennessee at Knoxville

How to Be a Graduate Student (Before I Forget): A Collection of Experiential Wisdom

Dr. Stephen Secules, Florida International University

Student Perspectives on Navigating Engineering Pathways

Dr. Atsushi Akeru, Rensselaer Polytechnic Institute
Dr. Soheil Fatehboroujeni, Purdue University, West Lafayette
Sarah Appelhans, University at Albany-SUNY
Joerene Acerrador Aviles, Rensselaer Polytechnic Institute
Eva Dibong
Beatrice Mendiola, Rensselaer Polytechnic Institute
Ms. Michelle Murray, Rensselaer Polytechnic Institute
Melissa Shuey, Rensselaer Polytechnic Institute
Marta Tsyndra, Rensselaer Polytechnic Institute
Makayla Wahaus, Rensselaer Polytechnic Institute

Switching into and out of Engineering: Trends and Patterns (Work-In-Progress)
Prof. Carl O. Hilgarth

**Whither Engineering and Technological Literacy? Cui Bono 2**
Prof. John Heywood, Trinity College Dublin

**MESA Center Promoting Technical Literacy**
Dr. Dan G. Dimitriu, San Antonio College

**Engineering R & D**
Joseph F. Camean P.E., U.S. Coast Guard Academy

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**T250 - 2-Year College Division: Students and the Pipeline**

**10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor:** Two-Year College Division

**Moderators:** Carl Whitesel, South Mountain Community College; Dominic Dal Bello, Allan Hancock College

Papers related (but not limited) to two-year college students, activities, and pathways.

**“It’s Not About Making Money, but it Kind of is About Making Money”: How Socio-economic Status Influences Science and Engineering Identity for Community College Students in an S-STEM Program**
Dr. Sarah Rodriguez
Mr. Brian Le, Iowa State University
Maria L. Espino M.A, Iowa State University of Science and Technology

**The Motivation of Low-Income Engineering Transfer Students that Influences Choosing and Pursuing a Baccalaureate Degree Attainment in Engineering**
Leo Salgado, University of California, Irvine
Dr. Sharnnia Artis, University of California, Irvine
Ms. Hye Rin Lee, University of California, Irvine
Prof. Lorenzo Valdevit, University of California, Irvine

**Women on the Two-year Transfer Pathway in Engineering**
Dr. Emily Knaphus-Soran, University of Washington
Dr. Roberta Rincon, Society of Women Engineers
Alexandra Schaefer, University of Washington

**Strengthening the Pipeline from High School to Community College to University in Rural Underserved Communities through a Collaborative Videoconferencing Infrastructure**
Dr. Philip J Lunsford II P.E., East Carolina University
Dr. John Pickard, East Carolina University
Prof. Jimmy Bill Linn, East Carolina University
Mrs. Jennifer James, Innovation Early College High School at Pitt County Schools

**Transfer Students in Undergraduate Engineering**
Prof. Harriet Hartman, Rowan University

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**T252 - Community Engagement Division Technical Session 6**

**10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor:** Community Engagement Division

**Moderators:** Angela Bielefeldt, University of Colorado Boulder; Joan Schuman, Missouri University of Science and Technology

**Assessing Grassroots Engineering Applications in Brazil**
Dr. Cristiano Cordeiro Cruz, Aeronautics Technological Institute

**Brazilian Grassroots Engineer’s Education: Achievements, Flaws, and Challenges**
Dr. Cristiano Cordeiro Cruz, Aeronautics Technological Institute

**Effect of Letter Exchange Program on Student Development, Persistence, and Interest in Civil Engineering**
Dr. Julie Fogarty, California State University, Sacramento
Dr. Nathan E Canney P.E., CYS Structural Engineers Inc.
Dr. Benjamin V Fell P.E., California State University, Sacramento

**Evaluating the Impact of Training on Increasing Cross Culture Competency**
Dr. Joan B. Schuman, Missouri University of Science and Technology

**Undergraduate Students Benefits from Involvement in K-12 Outreach**
Dr. Angela R. Bielefeldt, University of Colorado, Boulder
Dr. Greg Rulifson P.E., USAID

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**T257A - Evidence-based Practices in Faculty Development**

**10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor:** Faculty Development Division

**Moderator:** Laila Guessous, Oakland University

Ever wonder how faculty developers do what they do? Come learn about some evidence-based practices in faculty development!

**Analyzing Student Achievement to Measure the Effectiveness of Active Learning Strategies in the Engineering Classroom**
Sarah Hoyt, Arizona State University
Dr. Lindy Hamilton Mayled, Arizona State University
Dr. Eugene Judson, Arizona State University
Prof. Stephen J. Krause, Arizona State University
ASEE’S VIRTUAL CONFERENCE
TUESDAY, JUNE 23 SESSIONS

Kara L. Hjelmstad, Arizona State University
Prof. Keith D. Hjelmstad, Arizona State University
Lydia Ross, Arizona State University
Prof. Robert J. Culbertson
Prof. James A. Middleton, Arizona State University
Dr. Claire Fletcher Honeycutt, Arizona State University
Ke Liu, Arizona State University

Faculty Development Mini-modules on Evidence-based Inclusive Teaching and Mentoring Practices in Engineering
Dr. Sarah Ilkhanipour Rooney, University of Delaware
Prof. Joshua A. Enszer, University of Delaware
Dr. Julia A. Maresca, University of Delaware
Dr. S. Ismat Shah, University of Delaware
Prof. Sheldon Allister Hewlett, University of Delaware
Prof. Jenni M. Buckley, University of Delaware

International Faculty Professional Development: Utilizing Hybrid Environments to Deepen Learning and Grow Community
Dr. Mary Slowinski, College of the Canyons
Mrs. Gabrielle P. Temple
Dr. Kenneth Walz, Madison Area Technical College

T257B - Faculty Development Research
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Faculty Development Division
Moderators: Sunay Palsole, Texas A&M University; Stephanie Cutler, Pennsylvania State University

What’s new in faculty development research? Come find out!
Extending Faculty Development through a Sustainable Community of Practice
Sarah Hoyt, Arizona State University
Dr. Lindy Hamilton Mayled, Arizona State University
Prof. Stephen J. Krause, Arizona State University
Prof. Keith D. Hjelmstad, Arizona State University
Kara L. Hjelmstad, Arizona State University
Dr. Claire Fletcher Honeycutt, Arizona State University
Dr. Eugene Judson, Arizona State University
Lydia Ross, Arizona State University
Prof. James A. Middleton, Arizona State University
Prof. Robert J. Culbertson, Arizona State University
Ke Liu, Arizona State University

Improving Automated Group Assignments in an Academic Setting
Prof. Petra Bonfert-Taylor, Dartmouth College
Mr. Christopher Miller, Dartmouth College

Optimizing Student-Faculty Rapport for the Engineering Classrooms: Dimensioning the Behaviors that Matter
Dr. Fethiye Ozis P.E., Northern Arizona University
Dr. Kyle Nathan Winfree, Northern Arizona University

The Role of Teaching Self-Efficacy in Electrical and Computer Engineering Faculty Teaching Satisfaction
Mr. Kent A. Crick, Iowa State University
Elise A. Frickey, Iowa State University
Dr. Lisa M. Larson Ph.D., Iowa State University of Science and Technology
Prof. Mack Shelley, Iowa State University of Science and Technology

T271 - NSF Grantees: Diversity 1
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderator: Doris Espiritu, Wilbur Wright College- One of the City Colleges of Chicago

Presentations from groups with current NSF-funded projects focused on understanding and supporting diverse populations within engineering.

(Mis)match of Students’ Country of Origin and the Impact of Collaborative Learning in Computer Science
Prof. Nicholas A. Bowman, University of Iowa
Lindsay Jarratt, University of Iowa
Dr. KC Culver, University of Southern California
Dr. Alberto Segre, University of Iowa

Recruiting More U.S. Women into Engineering Based on Stories from Morocco
Prof. Rani W. Sullivan, Mississippi State University
Miss Soundouss Sassi, Mississippi State University
Dr. Mahnas Jean Mohammadi-Aragh, Mississippi State University

Does Stereotype Threat Affect Creative Thinking in Female Engineering Students? A Behavioral and Neurocognitive Study
Dr. Rafał Jonczyk, Adam Mickiewicz University, Poland, and Pennsylvania State University
Ms. Yushuang Liu, Pennsylvania State University
Dr. Danielle S. Dickson, Pennsylvania State University
Dr. Gül E. Okudan-Kremer, Iowa State University of Science and Technology
Prof. Zahed Siddique, University of Oklahoma
Prof. Janet van Hell, Pennsylvania State University

Reimagining Energy Year 2: Integrating CSPs into Course Development
Prof. Gordon D. Hoople, University of San Diego
Dr. Joel Alejandro Mejia, University of San Diego
Dr. Diana Chen, University of San Diego
Dr. Susan M. Lord, University of San Diego
Madeline Nelson

Communities Support Engineering as a College Major Choice
Stacey L. Vaziri, Virginia Polytechnic Institute and State University
Dr. Marie C. Paretti, Virginia Polytechnic Institute and State University
Dr. Jacob R. Grohs, Virginia Polytechnic Institute and State University
Dr. Liesl M. Baum, Virginia Polytechnic Institute and State University
Dr. Marlena McGlothlin Lester, Virginia Polytechnic Institute and State University
Dr. Phyllis Leary Newbill, Virginia Polytechnic Institute and State University

T271B - NSF Grantees: Diversity 2
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderator: Teresa Cutright, The University of Akron

Presentations from groups with current NSF-funded projects focused on understanding and supporting diverse populations within engineering, particularly African Americans.

Explaining Choice, Persistence, and Attrition of Black Students in Electrical, Computer, and Mechanical Engineering: Award# EEC-1734347, Grantee Session - Year 2
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

Insights from a Systematic Literature Review on the Role of Professional Organizations in Supporting Black Engineering Students’ Persistence
Dr. Jeremi S. London, Virginia Tech
Dr. Brooke Charae Coley, Arizona State University, Polytechnic campus
Julia Machele Brisbane, Virginia Tech
Natali Huggins, Virginia Tech
Ms. Karen Gilbert, Virginia Tech

Initial Impact of an Experiment-centric Teaching Approach in Several STEM Disciplines
Dr. Jumoke ‘Kemi’ Ladeji-Osias, Morgan State University
Dr. Oludare Adegbola Owolabi P.E., Morgan State University
Dr. Krishna Bista, Morgan State University
Dr. Uttam Gaulee
Ayodeji B. Wemida, Morgan State University
Dr. Steve Efe, Morgan State University
Dr. Akinyele Oni, Morgan State University
Dr. Adedayo Aroibi, Morgan State University
Ms. Caroline Gathigia Ndirangu, Morgan State University
Ms. Emmanuel Olamidotun Olanyewaju, Morgan state university
Dr. Seong Lee, Morgan State University
Mr. Oludayo Samuel Alamu, Morgan State University
Dr. Mehdi Shokouhian, Morgan State University
Ms. Sotonye Ikiriko, Morgan State University
Dr. Antony Kinyua, Morgan State University

A Tale of Two Universities: An Intersectional Approach to Examining Microaggressions among Undergraduate Engineering Students at an HBCU and a PWI
Meghan Berger, North Carolina A&T State University
Dr. Stephanie Luster-Teasley, North Carolina A&T State University
Dr. Cristina Poleacovschi, Iowa State University
Dr. Kalynda Chivon Smith, North Carolina A&T State University
Dr. Scott Grant Feinstein
Dr. Gloria Jones-Johnson, Iowa State University
Luis Gonzalez-Diaz

The Inclusive Engineering Consortium Stakeholders’ Workshop
Dr. John C. Kelly, North Carolina A&T State University
Dr. Mohamed F. Chouikha, Prairie View A&M University
Dr. Craig J. Scott, Morgan State University
Dr. Kenneth A. Connor, Rensselaer Polytechnic Institute
Dr. Demetris Geddis, Hampton University
Dr. Mandoye Ndoye, Tuskegee University
Dr. Shiny Abraham, Seattle University
Prof. Miguel Velez-Reyes P.E., University of Texas at El Paso
Dr. Pamela Leigh-Mack, Virginia State University
Dr. Saleh Zein-Sabatto, Tennessee State University
Dr. Raziq Yaqub, Alabama A&M University
T299A - SPONSOR TECHNICAL SESSION: Enabling Virtual Classroom Without Giving Up Hands-on Labs (Or, Save the Disinfectant for the Bathroom, not the Lab) Presented by Analog Devices

10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions
Moderators: Mark Thoren, Analog Devices, Inc.; Robin Getz, Analog Devices, Inc.

Colleges and Universities are suddenly faced with the challenge of adapting nearly all classroom instruction to an online, virtual setting. Lectures are difficult enough to run online; hands-on lab exercises are orders of magnitude more so. The Analog Devices University Program is an open-source educational platform consisting of freely available laboratory exercises and accompanying low-cost parts kits and test instruments that can be leveraged as hands-on learning is forced off campus and onto the student’s kitchen table.

In this session, we will demonstrate how to use free software, low-cost test instruments, and common materials in a variety of experiments spanning multiple disciplines including Electrical Engineering, Mechanical Engineering, Computer Science, Embedded Systems (Arduino, Raspberry Pi), and Physics.

We will also share some tricks that Analog Devices engineers have.

T301 - Laboratory Courses and Programming in the Aerospace Curriculum

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Aerospace Division
Moderators: Michael Hatfield, University of Alaska Fairbanks; Nadir Yilmaz, Howard University

The Implementation of Virtual Labs in Aerospace Structures Education

Waterloo Tsutsui, Purdue University at West Lafayette
Mr. Ruben D. Lopez-Parra P.E., Purdue University at West Lafayette
Prof. Genisson Silva Coutinho, Instituto Federal de Educação, Ciência e Tecnologia da Bahia
Dr. Alberto W. Mello, Embry-Riddle Aeronautical University
Prof. Michael David Sangid, Purdue University
Prof. Tamara J. Moore, Purdue University at West Lafayette

Lifelong Learning in an Aircraft Engine Systems Laboratory Course

Prof. Mary E. Johnson Ph.D., Purdue Polytechnic Institute
Dr. Tracy L. Yother, Purdue University - Purdue Polytechnic Lafayette

Establishment of an Aerospace Engineering Laboratory to Foster Education and Research

Dr. Adeel Khalid, Kennesaw State University

Assessment of Programming Prerequisites and Interventions for Student Success in an Aerospace Curriculum

Dr. Kathryn Anne Wingate, University of Colorado at Boulder
Dr. Aaron W. Johnson, University of Colorado Boulder
Miss Lyndsay Rose Ruane
Dennis Akos
T304 - Biomedical Engineers and Professional Development - June 23rd
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Biomedical Engineering Division
Moderators: Richard Goldberg, University of North Carolina at Chapel Hill; Sarah Rooney, University of Delaware

Understanding Identity among Biomedical Engineering Students and Professionals
Mr. Emmett Jacob Springer
Dr. Aileen Huang-Saad, University of Michigan

Clinician-engineer Career Bias and Its Relationship to Engineering Design Self-efficacy among Biomedical Engineering Undergraduates
Dr. William H. Guilford, University of Virginia

The Value of Co-curricular Experiences: Perspectives of Third-year Biomedical Engineering Students
Cassandra Sue Ellen Woodcock, University of Michigan
Dr. Aileen Huang-Saad, University of Michigan
Dr. Shanna R. Daly, University of Michigan
Dr. Lisa R. Lattuca, University of Michigan

Spicing Up Instruction of Professional Topics in Biomedical Engineering
Dr. Jeffrey A. LaMack, Milwaukee School of Engineering
Dr. Icaro dos Santos, Milwaukee School of Engineering
Dr. Larry Fennigkoh P.E., Milwaukee School of Engineering
Dr. Olga Imas, Milwaukee School of Engineering
Dr. Charles S. Tritt, Milwaukee School of Engineering

Comparison of Job Market and Employer Interest in Undergraduate Engineering Students: An Exploratory Analysis
Dr. Alexis Ortiz-Rosario, Ohio State University
Dr. Nathan Hyungsok Choe, Ohio State University
Amena Shermadou, Ohio State University
Dr. David A. Delaine, Ohio State University
Tanya M. Nocera, Ohio State University

T305 - Work in Progress: Assessment, Evaluation and Hands-on Activities
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Chemical Engineering Division
Moderators: David Silverstein, University of Kentucky; Sheena Reeves, Prairie View A&M University

Work in Progress: The Development and Applied Use of Crash Course Engineering Videos for Formal and Informal Learning
Dr. Lucas James Landherr, Northeastern University
Ms. Nicole Joy Sweeney, Complexly

Work in Progress: A Delphi Study of Skills and Competencies for the Hydrocarbon Industry
Dr. Jennifer Cole, Northwestern University
Dr. Allison Godwin, Purdue University at West Lafayette
Ms. Jacqueline Ann Rohde, Purdue University at West Lafayette

Chemical Engineering Students' Emotions towards Biology
Dr. Justin F. Shaffer, Colorado School of Mines
Mr. Jordan Lopez, Colorado School of Mines
Alexander Luther Ellis, Colorado School of Mines

Work in Progress: Fostering a Chemical Engineering Mindset through Hands-on Activities
Dr. Julianne Vernon, Vanderbilt University
Mr. Matthew Rogers, Vanderbilt University
Mr. Benjamin Joseph Saba
Mr. Yin Huang

T306 - Key Educational & Professional Issues of Strategic Importance to the Civil Engineering Profession - and ASCE - Part 2
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division
Moderators: Thomas Lenox, American Society of Civil Engineers; Leslie Nolen, American Society of Civil Engineers

This session will explore key issues related to the planning of the civil engineering body of knowledge, accreditation, and program assessment.

Criteria 3 and 5 Implementation: How Are People Actually Doing It?
Dr. Allen C. Estes, California Polytechnic State University, San Luis Obispo
Lessons Learned in Developing the Civil Engineering Body of Knowledge, Third Edition  
Dr. Decker B. Hains P.E., Western Michigan University  
Dr. Kenneth J. Fridley, University of Alabama  
Ms. Leslie Nolen, American Society of Civil Engineers

Toward Continuous Improvement of EAC/ABET Criteria 3 and 5  
Dr. Norb Delatte P.E., Oklahoma State University  
Dr. Stephen J. Ressler P.E., United States Military Academy  
Dr. Audra N. Morse P.E., Michigan Technological University  
Dr. Camilla M. Saviz P.E., University of the Pacific  
Dr. Brock E. Barry P.E., U.S. Military Academy

Is it Time for ASCE to Withdraw from ABET?  
Prof. Stephen J. Ressler, U.S. Military Academy  
Dr. Thomas A. Lenox, American Society of Civil Engineers

T308 - Computers in Education Division Technical Session 3: Digital Learning Part I  
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE  
Sponsor: Computers in Education Division  
Moderators: Mourya Reddy Narasareddygari, North Dakota State University; Joe Allen, University of California, Riverside  
This session will be one of two sessions dealing with papers related to digital learning.  
**Integrating Role-playing Gamification into Programming Activities to Increase Student Engagement**  
Mr. Zhiyi Li  
Prof. Stephen H. Edwards, Virginia Tech

**Work in Progress: Using Jupyter Notebooks to Climb Bloom’s Taxonomy in Thermodynamics**  
Prof. Bryan Weber, University of Connecticut

**Embedded System Education Curriculum Using TI SimpleLink Microcontrollers in Engineering Technology**  
Dr. Byul Hur, Texas A&M University  
Dr. Ana Elisa P. Goulart, Texas A&M University  
Dr. Logan Porter, Texas A&M University  
Dr. Nripendra Sarker, Texas A&M University  
Mr. Mike Willey, Texas A&M University

**Infusing Raspberry Pi in the Computer Science Curriculum for Enhanced Learning**  
Dr. Fitratullah Khan, University of Texas, Rio Grande Valley  
Dr. Mahmoud K. Quweider, University of Texas, Rio Grande Valley  
Dr. Ala Qubbaj, University of Texas, Rio Grande Valley

Dr. Emmett Tomai, University of Texas, Rio Grande Valley  
Lei Xu, University of Texas, Rio Grande Valley  
Dr. Liyu Zhang, University of Texas, Rio Grande Valley  
Dr. Hansheng Lei

T313A - Best In DEED  
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE  
Sponsor: Design in Engineering Education Division  
Moderators: Robert Nagel, James Madison University; Jessica Kuczenski, Santa Clara University  
3-D Design in Art and Engineering: An Interdisciplinary Experiment  
Dr. Robert T. Bailey P.E., Loyola University Maryland  
Billy Friebel, Loyola University Maryland

**Exploring the Influence of Gender Composition and Activity Structure on Engineering Teams’ Ideation Effectiveness**  
Mr. Eric Cuellar, California Polytechnic State University, San Luis Obispo  
Dr. Benjamin David Lutz, California Polytechnic State University, San Luis Obispo  
Dominick Trageser  
Dr. Ricardo Cruz-Lozano, California Polytechnic State University, San Luis Obispo

**Problem Reframing and Empathy Manifestation in the Innovation Process**  
Mrs. Eunhye Kim, Purdue University at West Lafayette  
Dr. Senay Purzer, Purdue University at West Lafayette  
Carolina Vivas-Valencia, Purdue University at West Lafayette  
Dr. Lindsey B. Payne, Purdue University at West Lafayette  
Dr. Nan Kong, Purdue University at West Lafayette

**Whom Are We Serving? An Exploration of Student Demographics in a Large Engineering Design Projects Ecosystem**  
Prof. 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
T314A - Sense of Belonging and Diversity in Engineering Programs, Courses, and Teams
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division

Moderators: Renata Reveleo, The University of Illinois at Chicago; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Work in Progress: Intersection of Race and Gender on Experiences of Undergraduate Engineering Students of Color in Positional Leadership Roles
   Prof. Carmen M. Lilley, University of Illinois at Chicago

Work in Progress: Cultural Diversity and Teamwork Effectiveness: A Systematized Literature Review
   Mr. Siqing Wei, Purdue University, West Lafayette
   Dr. Wei Zakharov, Purdue University, West Lafayette
   Dr. Matthew W. Ohland, Purdue University, West Lafayette
   Dr. Lan Jin, Purdue University, West Lafayette
   Dr. Daniel M. Ferguson, Purdue University, West Lafayette

Work in Progress: An Exploration of the In/Authentic Experiences of Engineers
   Gretchen A. Dietz, University of Florida
   Dr. Elliot P. Douglas, University of Florida
   Erica D. McCray, University of Florida

Work in Progress: Investigating the Impact of Engineering Identity, Belonging, and Career Commitment on Early Postsecondary Outcomes
   Dr. Sandra Marie Way, New Mexico State University
   Dr. Stephanie M. Arnett, New Mexico State University
   Jeremy J. Brown, New Mexico State University
   Miquela K. Gorham
   Miss Lorissa Humble, New Mexico State University

Belonging in Engineering
   Mr. Robert M. O’Hara, Clemson University
   Candice Bolding, Clemson University
   Dr. Jennifer Harper Ogle, Clemson University
   Dr. Lisa Benson, Clemson University
   Mrs. Rachel Lanning, Clemson University

T314B - Instruments and Methods for Studying Student Experiences and Outcomes
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division

Moderators: Nadia Kellam, Arizona State University; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Developing the ESLS - Engineering Students Learning Strategies Instrument
   Dr. Sreyoshi Bhaduri, McGraw-Hill
   Dr. Michelle Soledad, Virginia Polytechnic Institute and State University
   Dr. Holly M. Matusovich, Virginia Polytechnic Institute and State University

Examining the Structural Validity of the CD-RISC Among Engineering Students
   Mr. Adurangba Victor Oje, University of Georgia
   Dr. Nathaniel Hunsu, University of Georgia
   Dr. Peter H. Carnell, University of Georgia

Blended Phenomenography: An Alternative to Investigate Learning
   Dr. John Mendoza-Garcia, University of Florida
   Dr. Monica E. Cardella, Purdue University, West Lafayette
   Dr. William "Bill" C. Oakes, Purdue University, West Lafayette

Exemplars of Integration in Engineering Education’s Use of Mixed Methods Research
   Dr. David Reeping, Virginia Polytechnic Institute and State University
   Dr. Cherie D. Edwards, Virginia Commonwealth University

Streamlining the Process of Evaluating the Education and Diversity Impacts across Engineering Research Centers
   Mr. Zhen Zhao, Arizona State University
   Dr. Adam R. Carberry, Arizona State University
   Dr. Alison Cook-Davis, Arizona State University
   Dr. Jean S. Larson, Arizona State University
   Dr. Michelle Jordan, Arizona State University
   Wendy M. Barnard, Arizona State University
   Dr. Megan O'Donnell, Arizona State University
   Dr. Wilhelmina C. Savenye, Arizona State University

The Use of 3-D Printing in Behavioral Research – A Proposal for the Interaction Between Engineers and Experimental Psychologists
   Dr. Hitesh D. Vora, Oklahoma State University
   Dr. Charles Ira Abramson, Oklahoma State University
T315 - Embedded Systems and Cybersecurity in ECE
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Electrical and Computer Division
Moderators: Jennifer Bonniwell, Milwaukee School of Engineering; Huihui Wang, Jacksonville University

Hands-on Cybersecurity Curriculum Using a Modular Training Kit
Mr. Asmit De, Pennsylvania State University
Mr. Mohammad Nasim Imtiaz Khan, Pennsylvania State University
Mr. Karthikeyan Nagarajan, Pennsylvania State University
Mr. Abdullah Ash Saki, Pennsylvania State University
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
Dr. Swaroop Ghosh, Pennsylvania State University
Dr. Kathleen M. Hill, Pennsylvania State University
Dr. Annmarie Ward

Work in Progress: A Case Study in an Undergraduate Security Project
Mr. Garry Ingles
Prof. Aaron Carpenter, Wentworth Institute of Technology

Integration of C Programming and IoT in a Raspberry Pi-controlled Robot Car in a Freshmen/Sophomore Engineering Core Class
Dr. Shaghayegh Abbasi, University of San Diego
Dr. Ernest M. Kim, University of San Diego

A Hands-on Introduction to Embedded Systems & IoT
Dr. James Peyton Jones, Villanova University

Microprocessor Design Learning
Mr. Dominic Zucchini, Missouri University of Science and Technology
Mr. Justin Chau, Missouri University of Science and Technology
Mr. Matthew Neal Mutarelli, Missouri University of Science and Technology and Missouri State University
Dr. Rohit Dua, Missouri University of Science and Technology

T316 - ECCD Technical Session 3: Energy and Multidisciplinary
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Energy Conversion and Conservation Division
Moderators: Matt Aldeman, Illinois State University; Robert Kerestes, University of Pittsburgh

Papers presented in this session are related to energy and multidisciplinary methods and their educational aspects.

Development of a Multidisciplinary Renewable Energy Laboratory for Research and Education
Prof. Jacques Belanger, California Polytechnic State University, San Luis Obispo
Dr. Andrew Davol, California Polytechnic State University, San Luis Obispo
Miss Huy Anh Duong, California Polytechnic State University, San Luis Obispo
Trent Hamilton

A Multidisciplinary Undergraduate Course in Energy Engineering
Dr. Radian G. Belu, Southern University and A&M College
Dr. Fred Lacy, Southern University and A&M College

An Educational Tool to Optimize the Consumption of Primary Energy in Thermal-based Distributed Energy Systems
Dr. Joana Marques Melo, Purdue University, West Lafayette
Dr. Cynthia Howard-Reed, Pennsylvania State University, University Park
Dr. Catherine G.P. Berdanier, Pennsylvania State University, University Park

Experimental Vehicles Program Improves Student Performance Through Energy Conversion and Conservation with Hands-on Learning
Dr. Saeed D. Foroudastan, Middle Tennessee State University

Implementation of the Question Formulation Technique as a Teaching Strategy in Renewable Energy Engineering Education
Dr. Claudia Torres Garibay, Oregon Institute of Technology
Jessica Kerby, Oregon Institute of Technology
Mr. Andrew Powers Minigan, Right Question Institute
T318 - Engineering Design Graphics Division Technical Session 1

11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Design Graphics Division
Moderator: Lulu Sun, Embry-Riddle Aeronautical University - Daytona Beach

Advocates on behalf of broadening participation in engineering and engineering technology.

A Simple Method for Allowing Students to Improve Their 3-D Visualization Skills
  Dr. Dan G. Dimitriu, San Antonio College
  Miss Dana Corrina Dimitriu, University of Texas at San Antonio

Engineering Graphics in a Community College Setting: Challenges and Opportunities
  Dr. Hannah Dawes Budinoff, Pima Community College

Longitudinal Analysis of Spatial Ability over an Undergraduate Engineering Degree Program
  Dr. Maxine Fontaine, Stevens Institute of Technology
  Dr. Alexander John De Rosa, Stevens Institute of Technology

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T320 - Assessing Ethics Learning

11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Ethics Division
Moderators: Dick Apronti, Angelo State University; Xiaofeng Tang, The Ohio State University

Using Qualitative Data to Further Examine Flagged Items from the Engineering Ethics Reasoning Instrument (EERI)
  Peter Wesley Odom, Purdue University, West Lafayette

Assessment of the Impact of Civil Engineering Design Problems for Promoting Ethical Decisions
  Dr. Jagadish Torlapati, Rowan University
  Dr. Sarah K. Bauer, Rowan University
  Prof. Cheng Zhu, Rowan University

Measuring Curriculum Effectiveness for Developing Principled Leaders in an Undergraduate Engineering Program
  Dr. David S. Greenburg, The Citadel
  Dr. Robert J. Rabb P.E., The Citadel

Variations in Reflections as a Method for Teaching and Assessment of Engineering Ethics
  Dr. Angela R. Bielefeldt, University of Colorado, Boulder
  Dr. Madeline Polmear, University of Florida
  Dr. Chris Swan, Tufts University
  Dr. Daniel Knight, University of Colorado Boulder
  Dr. Nathan E. Canney

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T323A - Capstone/ET Projects III - Mechanical and Manufacturing Focus

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Technology Division
Moderator: Mohammad Uddin, East Tennessee State University

Actively Engaging Project-based Learning Through a Mini Maker Faire in an Engineering Technology Program
  Dr. Wei Zhan, Texas A&M University
  Dr. Byul Hur, Texas A&M University
  Dr. Yonghui Wang, Prairie View A&M University
  Dr. Suxia Cui, Prairie View A&M University
  Dr. Bugrahan Yalvac, Texas A&M University

Adoption of Additive Manufacturing Certifications and Metal Additive Manufacturing by Technology Programs
  Dr. Ranjeet Agarwala, East Carolina University
  Dr. Robert A. Chin, East Carolina University

Design a Class Infusion Project of ASME Geometric Dimensioning and Tolerancing Standard
  Dr. Cheng Y. Lin P.E., Old Dominion University
  Dr. Hamid Eisazadeh, Old Dominion University
  Dr. Alok K. Verma P.E., Old Dominion University
  Mr. Nathan John Luetke, Old Dominion University

Rapid Manufacturing of Critical Industrial Parts: A Method Based on Reverse Engineering, Rapid Prototyping, and Coordinate Metrology
  Dr. Immanuel Edinbarough P.E., University of Texas Rio Grande Valley
  Dr. Aditya Akundi, University of Texas Rio Grande Valley

Warehouse Workforce Preparedness in the Wake of Industry 4.0: A Systematic Literature Review
  Dr. Lei Xie, Texas State University
  Dr. Malini Natarajarathinam, Texas A&M University
  Dr. Michael Johnson, Texas A&M University
**T323B - Capstone/ET Projects II - General**

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor: Engineering Technology Division**

**Moderator: John Irwin, Michigan Technological University**

This session features capstone projects and/or general projects related to engineering technology education.

**A Multi-major Senior Design Experience**

- Dr. Avimanyu Sahoo, Oklahoma State University
- Dr. Aaron Alexander, Oklahoma State University
- Dr. Jeeyeon Hahn, Oklahoma State University

**Designed Beam Deflections Lab Project**

- Dr. Wei Vian, Purdue University, West Lafayette
- Prof. Nancy L. Denton P.E., Purdue University, West Lafayette

**Industrial Wire Cutting Machine: A Senior Capstone Design Project**

- Dr. Austin B. Asgill P.E., Kennesaw State University
- Mr. Jorge Luis Portillo Rodriguez
- Rebeca Feregrino Rodriguez, Kennesaw State University

**Leveraging the Capstone Design Project to Foster Entrepreneurship and Address Real-world Problems**

- Dr. Austin B. Asgill P.E., Kennesaw State University

**Student Learning Outcomes Through Senior Capstone Experience**

- Prof. Adel Salama P.E., Austin Peay State University
- Dr. Chin-Zue Chen, Austin Peay State University

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**T324 - ENT Division Technical Session: Creativity and Innovation**

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor: Entrepreneurship & Engineering Innovation Division**

**Moderators: Nassif Rayess, University of Detroit Mercy; Jason Forsyth, James Madison University**

**Analyzing Innovative Behavior Outcomes of Early-career Engineering Graduates**

- Mr. Simon Jakob Barth, Stanford University
- Dr. Sheri Sheppard, Stanford University
- Dr. Shannon Katherine Gilmartin, Stanford University

**Challenge Me, Disagree with Me: Why Gendered Perceptions to Student Stories of Motivation Enhance Creative Approaches in Engineering**

- Prof. Mona Eskandari, University of California, Riverside

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**T325 - A Focus on Sustainability**

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor: Environmental Engineering Division**

**Moderators: Denise Wilson, University of Washington; Drew McAvoy, University of Cincinnati; David Sanchez, University of Pittsburgh**

**Work in Progress: An Exploratory Study of the Sustainability Mindset Through a Citizen Science Project in a Vulnerable Latinx Community**

- Dr. Azadeh Bolhari P.E., Angelo State University
- Dr. Daniel Ivan Castaneda, James Madison University
- Dr. Kenneth Stewart, Angelo State University

**Study of the Impact of the University on Sustainability in Far West Texas**

- Mr. Anand Raj, University of Texas at El Paso
- Dr. Peter Golding, University of Texas at El Paso
ASEE'S VIRTUAL CONFERENCE
TUESDAY, JUNE 23 SESSIONS

Dr. Diane Elisa Golding, University of Texas at El Paso
Dr. Scott A. Starks, University of Texas at El Paso
Dr. Luis Perez, University of Texas at El Paso
Dr. Luis Rene Contreras Sapien, University of Texas at El Paso
Mrs. Suzan Aranda Luna, University of Texas at El Paso

Mixed Method Approach to Evaluate Sustainability Thinking Among the Next Generation of Civil and Environmental Engineers
Dr. Fethiye Ozis P.E., Northern Arizona University
Ms. Nihal Sarikaya, Northern Arizona University
Prof. Roy St. Laurent, Northern Arizona University
Miss Daniel'le April DeVoss, Northern Arizona University

Environmental Sustainability and Electronics: High School Teacher Development Through Summer Research Experiences
Dr. Inez Hua, Purdue University, West Lafayette
Dr. Monica E. Cardella, Purdue University, West Lafayette

T326 - Experimentation and Laboratory-oriented Studies Division Technical Session 2
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Experimentation and Laboratory-Oriented Studies Division
Moderators: Harry Powell, University of Virginia; Sean Maw, University of Saskatchewan

Student Participation in Formula SAE Design, Fabrication, and Testing as Capstone Experience
Joshua Pierson, University of Georgia
Dr. John M. Mativo, University of Georgia
Edwin Chiu, University of Georgia
Dr. Mark Trudgen, University of Georgia
Dr. Christopher Herring, University of Georgia

Developing a Virtual Reality Module to Improve the Student Learning Experience in an Additive Manufacturing Curriculum
Prof. Jing Zhang, Indiana University Purdue University, Indianapolis
Mr. Glorio Singui
Mr. Shambhuraj Hansraj Wadhule
Mr. Chauncey Eugene Frend
Mr. Tejesh Charles Dube, Indiana University Purdue University, Indianapolis
Mr. Michael Golub, Indiana University Purdue University, Indianapolis

Under the Hood of a Bio-makerspace: Automating Lab Operations
Mr. Michael G. Patterson, University of Pennsylvania
Carolyne H. Godon, University of Pennsylvania
Dr. LeAnn Dourte Segovia, University of Pennsylvania
Sevile Mannickarottu, University of Pennsylvania

PLC Training in a First-year Electrical Engineering Program
Dr. Cyrus Habibi P.E., University of Wisconsin, Platteville
Darius Fieschko, University of Wisconsin, Platteville

Work in Progress: A Modular Course on Sensors, Instrumentation, and Measurement: Supporting a Diversity of Learners’ Agency of Self-direction
Dr. Brian D. Storey, Franklin W. Olin College of Engineering
Dr. Bradley A. Minch, Franklin W. Olin College of Engineering
Dr. Linda Vanasupa, Franklin W. Olin College of Engineering

T327A - First-year Programs: Retention and Bridge Programs #1
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division
Moderators: Kaitlin Mallouk, Rowan University; Rachel McCord, University of Tennessee at Knoxville

Improving Persistence and Success for At-risk STEM Students Through a Summer Intervention Program at a Hispanic-serving Institution
Dr. Melissa Danforth, California State University, Bakersfield
Dr. Charles Lam, California State University, Bakersfield
Dr. Ronald Hughes, California State University, Bakersfield

Work in Progress: Impacting Engineering First-year Student Retention Through a Nonconventional Engineering Learning Community
Dr. Sonia M. Bartolomei-Suarez, University of Puerto Rico, Mayaguez Campus
Dr. Manuel A. Jimenez, University of Puerto Rico, Mayaguez Campus
Dr. Luisa Guillemard, University of Puerto Rico, Mayaguez Campus
Prof. Oscar Marcelo Suarez, University of Puerto Rico, Mayaguez Campus
Dr. Aidsa I. Santiago-Román, University of Puerto Rico, Mayaguez Campus
Dr. Nayda G. Santiago, University of Puerto Rico, Mayaguez Campus
Dr. Carla Lopez del Puerto, University of Puerto Rico, Mayaguez Campus
Dr. Pedro O. Quintero, University of Puerto Rico, Mayaguez Campus
Prof. Nelson Cardona-Martinez, University of Puerto Rico,
Student Retention Barriers in a Chemical Engineering Program
Dr. Marina Miletic, University of New Mexico
Dr. Abhaya K. Datye, 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. Pil Kang, University of New Mexico
Prof. Sang M. Han, University of New Mexico
Dr. Yan Chen, University of New Mexico
Ms. Catherine Anne Hubka, University of New Mexico

Non-engineering Students: Year 2
Dr. Kamau Wright, University of Hartford

Piloting an Innovative Bridge Camp at a Tribal College to Improve the Transition from High School to College
Dr. Scott Martin Hanson, North Dakota Established Program to Stimulate Competitive Research (EPSCoR)
Dr. Austin James Allard, Turtle Mountain Community College
Dr. Robert V. Pieri, North Dakota State University
Dr. Paula Jean Comeau, North Dakota State University; North Dakota State College of Science
Ms. Megan Even, North Dakota Established Program to Stimulate Competitive Research
Daniel John Luecke, North Dakota State University
Dr. Jean Ostrom-Blonigen, North Dakota Established Program to Stimulate Competitive Research
Dr. Kelly A. Rusch, North Dakota EPSCoR and North Dakota State University

Design Study Abroad Course
Dr. Ordel Brown, Northwestern University
Dr. Susanna C. Calkins, Northwestern University
Dr. Lisa M. Davidson, Northwestern University

Exploring Perceptions of Disciplines Using Arts-informed Methods
Matthew B. James, Virginia Tech
Dr. Homero Murzi, Virginia Tech
Dr. Jason Forsyth, James Madison University
Dr. Lilianny Virguez, University of Florida
Dr. Pamela L. Dickrell, University of Florida

First-year Engineering Students and Their Perceptions of Academic Progress
Dr. Michael Elmore P.E., Binghamton University
Dr. Peter J. Partell, Binghamton University
Mrs. Meghan Crist, Binghamton University

First-year Engineering Experience from the Rural Student’s Perspective
Ms. Joanne Kay Beckwith, University of Michigan
Laura Hirshfield, University of Michigan

T327B - First-year Programs: Student Perceptions and Perspectives
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division
Moderators: Robin Hensel, West Virginia University; Mirna Mattijik, Colorado School of Mines

Learn about first-year students’ perceptions and perspectives.

Student Perceptions of First-year Engineering Justice Curriculum
Dr. Devin R. Berg, University of Wisconsin-Stout
Dr. Tina Lee, University of Wisconsin-Stout
Dr. Elizabeth Anne Buchanan, University of Wisconsin-Stout

Critical Learning Community in a First-year Engineering

T327C - First-Year Programs: Retention & Bridge Programs #2
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division
Moderators: Robert Schaffer, Mission College; Marina Miletic

Learn about successful retention and bridge programs.

Is High School GPA a Useful Tool for Identifying At-risk Students in First-Year Engineering?
Dr. Aysa Galbraith, University of Arkansas
Mrs. Leslie Bartsch Massey, University of Arkansas

Work in Progress: The RISE Seminar and the Influence it Has on Underrepresented Students in STEM
Dr. Ellise M. LaMotte, Tufts University

Learning Communities: Impact on Retention of First-year Students
Dr. Maryam Darbeheshti, University of Colorado Denver
William Schupbach, University of Colorado Denver
Ariel Cervantes Lafuente
Prof. Tom Altman, University of Colorado Denver
Prof. Katherine Goodman, University of Colorado Denver
Dr. Michael S. Jacobson, University of Colorado Denver
Shani O’Brien, University of Colorado Denver

Assessing a Summer Engineering Math and Projects
ASEE’S VIRTUAL CONFERENCE
TUESDAY, JUNE 23 SESSIONS

Bootcamp to Improve Retention and Graduation Rates in Engineering and Computer Science
Dr. Zahrasadat Alavi, California State University, Chico
Dr. Kathleen Meehan, California State University, Chico
Dr. Kevin Buffardi, California State University, Chico
Dr. Webster R. Johnson, California State University, Chico
Dr. Joseph Greene, California State University, Chico

Integrated Closed-Loop Learning Analytics Scheme in a First-Year Engineering Course
Dr. Andrew Charles Bartolini, University of Notre Dame
Mr. Carson Lee Running, University of Notre Dame
Xiaojing Duan, University of Notre Dame
Dr. G. Alex Ambrose, University of Notre Dame

T328A - Preparation for Graduate Research
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Graduate Studies Division
Moderators: Charles Pierce, University of South Carolina; Jeffrey Fergus, Auburn University

Design Activity Worksheets for Developing Research Questions
Dr. Vetria Byrd, Purdue University, West Lafayette
Dr. Jorge D. Camba, Purdue University, West Lafayette

Work in Progress: A Problem-based Curriculum in Support of Structured Learning Experiences to Prepare Ph.D. Candidates for Independent Research
Dr. Stephanie Cutler, Pennsylvania State University
Ms. Yu Xia, Pennsylvania State University
Dr. Cliff J. Lissenden, Pennsylvania State University
Prof. Francesco Costanzo, Pennsylvania State University
Dr. Bruce Gluckman, Pennsylvania State University
Dr. Thomas A. Litzinger, Pennsylvania State University

Validation of an Instrument to Measure Science, Engineering, and Mathematics Graduate Students’ Mental Health (Work in Progress)
Ms. Sarah Jane Bork, University of Michigan
Dr. Joi-Lynn Mondisa, University of Michigan

T328B - Mental Health of Graduate Students
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Graduate Studies Division
Moderators: Yogendra Panta, West Virginia University Institute of Technology; Jeffrey Fergus, Auburn University

Examining the Effects of STEM Climate on the Mental Health of Graduate Women from Diverse Racial/Ethnic Backgrounds
Ms. Amanda C. Arnold, Arizona State University
Dr. Kerrie G. Wilkins-Yel, University of Massachusetts Boston
Dr. Jennifer M. Bekki, Arizona State University
Madison Natarajan, University of Massachusetts Boston
Dr. Ashley K. Randall, Arizona State University
Roxanna Francies, Arizona State University
Chinwendu Elyse Okwu, University of Pittsburgh

T330A - Computing and Information Technology Division Technical Session 9
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Computing and Information Technology Division
Moderators: Stephen Edwards, Virginia Polytechnic Institute and State University; Zhaoshuo Jiang, San Francisco State University

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

From Degree to Chief Information Security Officer (CISO): A Framework for Consideration
Dr. Wendi M. Kappers, Embry-Riddle Aeronautical University, Daytona Beach
Dr. Martha Nanette Harrell, Arkansas Tech University
ASEE’S VIRTUAL CONFERENCE
TUESDAY, JUNE 23 SESSIONS  #ASEEVC

Dr. Mudasser Fraz Wyne, National University
Mrs. Catrina Ann Shanas
Ms. Ashley Pratt, National University
Ms. Sophie Nguyen, County of Los Angeles

Work in Progress: Augmented Reality System for Vehicle Health Diagnostics and Maintenance
Prof. Yuzhong Shen, Old Dominion University
Dr. Anthony W. Dean, Old Dominion University
Jayson Carl Alberto Kreger
Dr. Rafael Landaeta, Old Dominion University

Carlo Simulations
Dr. Mohammad Rafiq Muqri, DeVry University, Pomona

T330B - Computing and Information Technology Division Technical Session 3
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Computing and Information Technology Division
Moderators: Elizabeth Milonas, New York City College of Technology; Qingxue Zhang, Indiana University - Purdue University Indianapolis

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

Incorporating Practical Computing Skills into a Supplemental CS2 Problem-solving Course
Prof. Margaret Ellis, Virginia Tech
Dr. Catherine T. Amelink, Virginia Tech
Prof. Stephen H. Edwards, Virginia Tech
Dr. Clifford A. Shaffer, Virginia Tech

Undergraduate Summer Research in High-performance Computing with Engineering Applications: An Experience Report
Dr. Daqing Hou, Clarkson University
Dr. Yu Liu, Clarkson University

An Initial Look into the Computer Science and Cybersecurity Pathways Project for Career and Technical Education Curricula
Dr. Vukica M. Jovanovic, Old Dominion University
Dr. Murat Kuzu, Old Dominion University
Dr. Otilia Popescu, Old Dominion University
Mr. Abdul Rahman Badawi, Old Dominion University
Deborah Kay Marshall, Norfolk Public Schools
Salih Sarp, Old Dominion University
Mrs. Spyridoula Tsouganatou, Old Dominion University
Dr. Petros J. Katsioloudis, Old Dominion University

Dr. Linda Vahala, Old Dominion University
Prof. Hongyi Michael Wu, Old Dominion University

Evaluating the Effectiveness of Lab Practice in the Context of Prior Programming Experience in an Introductory Programming Course
Caleb James O’Malley, University of Florida
Ashish Aggarwal, University of Florida

T333A - Pre-college Engineering Education Division Technical Session 16
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Foad Hamidi, University of Maryland Baltimore County

Implementation of a Spatial Skills Curriculum in Grade 7: Analysis of the Teachers’ Concerns
Ms. Camille Msall, Northwestern University
Dr. Grace Panther, University of Nebraska, Lincoln

New Mexico PREP Academy from 2016-2019
Jacqueline A. Zeiber, New Mexico State University
Prof. Tamara Elise Stimatze, New Mexico State University
Dr. Patricia A. Sullivan, New Mexico State University
Dr. Steven J. Stochaj, New Mexico State University
Prof. Luis Antonio Vázquez

Preparing High School Students to Succeed in STEM Fields via an Early College Experience
Dr. Kathryn Schulte Grahame, Northeastern University
Dr. Christos Zahopoulos, Northeastern University
Ms. Rajini Jesudason, Northeastern University

Reinventing the InVenture Prize: Transforming a Year-long Invention Program into a Week-long University-based Summer Program
Ms. Katherine Leigh Boice, Georgia Institute of Technology
Mr. Christopher J. Cappelli, Georgia Institute of Technology
Dr. Meltem Alemdar, Georgia Institute of Technology
Ms. Jasmine N. Patel, Georgia Institute of Technology
Dr. Roxanne A. Moore, Georgia Institute of Technology

The Effect of Summer Engineering Camps on Students’ Interest in STEM
Ms. Jessica Marie Faber, Wartburg College
Luke G. Grzech, Wartburg College
Murad Musa Mahmoud, Wartburg College
Prof. Kurt Henry Becker, Utah State University

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information.
T333B - Pre-college Engineering Education Division Technical Session 17
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Pamela Lottero-Perdue, Towson University

Kindergartners’ Engagement in an Epistemic Practice of Engineering: Persisting and Learning from Failure
Pamela S. Lottero-Perdue, Towson University
Dr. Ming Tomayko, Towson University

Development of Views About the Nature of Engineering Knowledge Questionnaire
Allison Antink-Meyer, Illinois State University
Dr. Ryan A. Brown, Illinois State University

Coordinated Outreach: A Model of STEAM Outreach Efforts
Wendy Roldan, University of Washington
Ms. Taryn Shalini Bipat, University of Washington
Jessica Carr, University of Washington
Elena Agapie, University of Washington
Andrew Davidson, University of Washington
Dr. Jennifer A. Turns, University of Washington

Empathy, Engineering, and Girls
Dr. Deborah Besser P.E., University of St. Thomas
Ms. Karin Brown, University of St. Thomas
Ms. Alison Haugh, University of St. Thomas
Mrs. Tami Brass, University of St. Thomas and St. Paul Academy and Summit School
Rebecca Ann Leininger, University of St. Thomas
Dr. AnnMarie Thomas, University of St. Thomas

Role of Engagement in Predicting Sixth-grade Students’ Performance in an Integrated STEM Life Sciences Unit
Saira Anwar, Purdue University, West Lafayette
Dr. Muhsin Menekse, Purdue University, West Lafayette
Siddika Selcen Guzey, Purdue University, West Lafayette
Ms. Valarie L. Bogan, Purdue University, West Lafayette
Mrs. Marla Jane Glover, Purdue University, West Lafayette
Shelbi C. Smeathers, Purdue University, West Lafayette
Utkuhan Genc, Purdue University, West Lafayette
Prof. Lynn A. Bryan, Purdue University, West Lafayette

T333C - Pre-college Engineering Education Division Technical Session 18
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Katherine Shirey

Using Nintendo Switch Development Environment to Teach Computer Game Programming and Virtual Reality
Dr. Arif Sirinterlikci, Robert Morris University
Dr. John M. Mativo, University of Georgia
Mr. Johnny Thien Pham, Robert Morris University

Authentic Learning Environment with Flight Simulation Technology
Dr. Chadia A. Aji, Tuskegee University
Dr. M. Javed Khan, Tuskegee University

Work in Progress: Code + Chords: Targeting Self-efficacy in Music Technology
Alyssa Marie Eggersgluss, Playful Learning Lab
Dr. AnnMarie Thomas, University of St. Thomas
Dr. Deborah Besser P.E., University of St. Thomas
Rachel Farah, University of St. Thomas
Ms. Emma Michelle Monson, University of St. Thomas
Ms. Krista Schumacher, University of St. Thomas
Dr. Jeff Jalkio, University of St. Thomas

Using Music Videos to Inspire Engineering
Ms. Krista Schumacher, University of St. Thomas
Molly Roche, University of St. Thomas
Esmée Julia Verschoor, Playful Learning Lab
Hannah French
Alyssa Marie Eggersgluss, Playful Learning Lab
MiKyla Jean Harjamaki, Playful Learning Lab
Mary Fagot
Dr. Deborah Besser P.E., University of St. Thomas
Dr. Jeff Jalkio, University of St. Thomas
Dr. AnnMarie Thomas, University of St. Thomas
Mr. Collin John Goldbach, Playful Learning Lab
Mr. Damian Kulash
Aby Bensen, University of St. Thomas
T334A - Technical Courses and Liberal Education
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Liberal Education/Engineering & Society Division
Moderator: Judith Norback, Georgia Institute of Technology
An Emancipatory Teaching Practice in a Technical Course: A Layered Account of Designing Circuits Laboratory Instructions for a Diversity of Learners
Dr. Linda Vanasupa, Franklin W. Olin College of Engineering
Dr. Lizabeth T. Schlemer, California Polytechnic State University, San Luis Obispo
Dr. Yevgeniya V. Zastavker, Franklin W. Olin College of Engineering
Designing an Engineering Computer Instructional Laboratory: Working with the Panopticon
Dr. Shehla Arif, University of Mount Union
The Challenge of Preparing iGen Students for Engineering and Computer Science
Dr. Kenneth W. Van Treuren, Baylor University
Dr. William M. Jordan, Baylor University
Ms. Cynthia C. Fry, Baylor University
WIP: Reflection to Promote Development of Presentation Skills in a Technical Communication Course
Dr. Dianne Grayce Hendricks, University of Washington
Mary-Colleen Jenkins
Ms. Tina Loucks-Jaret

T334B - Creating a Supportive and Nurturing Academic Culture
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Liberal Education/Engineering & Society Division
Moderator: Kathryn Neeley, University of Virginia
Contemplative Practices as a Way of Creating Inclusive Environments in Engineering Education: A Story of One Physics Foundation Experience for Engineers
Dr. Madhvi Jayalakshmi Venkatesh, Harvard Medical School; Prakriti Dance; Franklin W. Olin College of Engineering
Dr. Yevgeniya V. Zastavker, Franklin W. Olin College of Engineering
Eleanor Berke, Boston Public Schools
Jimena Bermejo
David Freeman, Franklin W. Olin College of Engineering
Ms. Abigail M. Fry
Alex L. Hindelang

Work in Progress: A Qualitative Study of Mentorship, Training Needs, and Community for New Engineering Education Researchers
Mr. Joseph F. Mirabelli, University of Illinois at Urbana-Champaign
Ms. Allyson Jo Barlow, University of Nevada, Reno
Ms. Mia Ko, University of Illinois at Urbana-Champaign
Dr. Kelly J. Cross, University of Nevada, Reno
Prof. Karin Jensen, University of Illinois at Urbana-Champaign

Work in Progress: Identifying Factors that Impact Student Experience of Engineering Stress Culture
Mr. Joseph Francis Mirabelli, University of Illinois at Urbana-Champaign
Andrea J. Kunze, University of Illinois at Urbana-Champaign
Ms. Julianna Ge, Purdue University, West Lafayette
Dr. Kelly J. Cross, University of Nevada, Reno
Prof. Karin Jensen, University of Illinois at Urbana-Champaign

T335 - Green Energy Manufacturing and Sustainable Energy Management
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Manufacturing Division; Energy Conversion and Conservation Division
Moderator: Tzu-Liang Tseng, University of Texas at El Paso
Joint session of Manufacturing Division with Energy Conversion Division.
Project-based Learning with Implementation of Virtual Reality for Green Energy Manufacturing Education
Dr. Richard Chiou, Drexel University
Toshika Fegade, Drexel University
Ms. Yu-Chieh (Jamie) Wu, Drexel University
Prof. Tzu-Liang Bill Tseng, University of Texas at El Paso
Dr. Michael G. Mauk, Drexel University
Dr. Irina Nicoleta Ciobanescu Husanu, Drexel University
Dr. Jung-Uk Lim, Liberty University
Dr. Kyung K. Bae, Liberty University
Dr. Hector E. Medina, Liberty University

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
T336 - Materials Division Technical Session 1
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Materials Division
Moderators: Amber Genau, University of Alabama at Birmingham; Lessa Grunenfelder, University of Southern California

A Significant Learning Approach for Materials Education
Dr. Sayyad Zahid Qamar P.E., Sultan Qaboos University
Dr. Majid Al-Maharbi, Sultan Qaboos University
Mr. Josiah Cherian Chekotu, Dublin City University

Enhancing Student Appreciation for Materials Science: Integration of Domain-specific Project-based Learning in an Introductory Materials Science Course
Dr. Siddha Pimputkar, Lehigh University
Dr. Gregory Mark Skutches, Lehigh University
Dr. Sabrina Starr Jedlicka, Lehigh University

Enhancing Instruction by Uncovering Instructor Blind Spots from Muddiest Point Reflections in Introductory Materials Classes
Prof. Stephen J. Krause, Arizona State University
Sarah Hoyt, Arizona State University

Use of a Low-cost, Open-source Universal Mechanical Testing Machine in an Introductory Materials Science Course
Miss Xinyue (Crystal) Liu, University of Toronto
Mr. Simo Pajovic, Massachusetts Institute of Technology
Mr. Cheuk Yin Larry Kei, University of Toronto
Dr. Yasaman Delaviz, York University
Dr. Scott D. Ramsay, University of Toronto

WIP: Integration of Mechanical Properties of Materials in an Undergraduate Course on Manufacturing Processes for Both Mechanical and Industrial Engineering Students
Dr. Jayanta K. Banerjee, University of Puerto Rico, Mayaguez Campus

T337 - Mathematics Division Technical Session 1: Best Practices in Engineering Math Education
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mathematics Division
Moderator: Amitabha Ghosh, Rochester Institute of Technology (COE)

Exposing Undergraduate Engineering Students to Nonlinear Differential Equations Using a Practical Approach in Project-based Learning Environments
Dr. Günter Bischof, Joanneum University of Applied Sciences
Mr. Maximilian Brauchart, Joanneum University of Applied Sciences
Mr. Patrick Jenni, Joanneum University of Applied Sciences
Mr. Jeremias Pirker, Joanneum University of Applied Sciences
Mr. Julian Sachslehner, Joanneum University of Applied Sciences
Mr. Christian J. Steinmann, Joanneum University of Applied Sciences
Mr. Tobias Markus Zörweg, Joanneum University of Applied Sciences

Lessons from a Lower-division Mathematics Co-teaching Sequence
Dr. Charles Lam, California State University, Bakersfield
Dr. Melissa Danforth, California State University, Bakersfield
Dr. Ronald Hughes, California State University, Bakersfield

The Use of Computer Programming in a Secondary Mathematics Class
JaCoya Thompson, Northwestern University
Dr. Sally P.W. Wu, Northwestern University
Mr. Jacob Mills, Evanston Township High School

Elements of Good Problem-solving Tasks in Thinking Classrooms
Mr. Nathaniel Rossi, Arizona State University
Dr. Adam R. Carberry, Arizona State University
Dr. Scott Adamson, Chandler-Gilbert Community College

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
T338A - Mechanical Engineering Technical Session: The Art of Education
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Moderator: Thomas DeNucci, United States Coast Guard Academy

This technical session focuses on mechanical engineering as an educational program. Papers on course sequencing, writing in the discipline, and student well-being will be presented.

A Three-course Laboratory Sequence in Mechanical Engineering as a Framework for Writing in the Discipline
Dr. Maria-Isabel Carnasciali, University of New Haven
Dr. Eric A. Dieckman, University of New Haven
Dr. Ismail I. Orabi, University of New Haven
Dr. Samuel D. Daniels P.E., University of New Haven

A Total Quality Management Tool for Experiential Engineering Education
Dr. Nicholas DiZinno, New York University
Ms. Yona Jean-Pierre, New York University

A Three-course Laboratory Sequence in Mechanical Engineering as a Framework for Writing in the Discipline
Dr. Maria-Isabel Carnasciali, University of New Haven
Dr. Eric A. Dieckman, University of New Haven
Dr. Ismail I. Orabi, University of New Haven
Dr. Samuel D. Daniels P.E., University of New Haven

An Undergraduate Hands-on Approach to Microfabrication Applied Learning Towards Developing a Silicon-based Microfluidic Pressure Sensor Array
Mr. Alexander Bryan Bailey, Alfred State College
Mr. Trevor S. Michelson, State University of New York, Alfred State
Prof. Reza Rashidi, State University of New York, Alfred State

Engineering Application Projects for Teaching Engineering Mathematics and Numerical Methods
Prof. Shengyong Zhang, Purdue University Northwest
Prof. Alain S. Togbe, Purdue University Northwest

Project-based Smart Systems Module for Early-stage Mechanical Engineering Students
Jennifer Lynne Tennison, Saint Louis University
Dr. Jenna L. Gorlewicz, Saint Louis University
Dr. Sridhar S. Condoor, Saint Louis University

T338B - Mechanical Engineering Technical Session: Team/Project-based Pedagogy and Approaches
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Moderator: Anna Howard, North Carolina State University at Raleigh

This technical session will specifically focus on team- and project-based pedagogy in mechanical engineering.

Toward Interdisciplinary Teamwork in Japan: Developing Team-based Learning Experience and Its Assessment
Prof. Daigo Misaki, Kogakuin University
Miss Xiao Ge, Stanford University

An Interdisciplinary Project-based Service Learning and Action Research Project with Mechanical Engineering and Speech-language Pathology Students
Dr. James D. Carrico, University of Mary
Dr. Javad Anjum, University of Mary
Ms. Audra Anjum, Ohio University

Engineering Application Projects for Teaching Engineering Mathematics and Numerical Methods
Prof. Shengyong Zhang, Purdue University Northwest
Prof. Alain S. Togbe, Purdue University Northwest

Project-based Smart Systems Module for Early-stage Mechanical Engineering Students
Jennifer Lynne Tennison, Saint Louis University
Dr. Jenna L. Gorlewicz, Saint Louis University
Dr. Sridhar S. Condoor, Saint Louis University

T338C - Mechanical Engineering Technical Session: Dynamics I
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Moderator: Ronald Adrezin, United States Coast Guard Academy

This session includes a variety of topics that all share dynamics in common. From projects to pedagogy and coordinate systems to student anxiety, there is something for everyone.

A Cross-cohort Dynamics Project Study
Dr. Kamyar Ghavam, University of Waterloo
Dr. Homeyra Pourmohammadali, University of Waterloo
Mr. Lucas Botelho, University of Waterloo

Teaching Dynamics Using a Flipped Classroom Blended Approach
Dr. Sudeshna Pal, University of Central Florida
Dr. Anchalee Ngampornchai

An IMU for You and I
Dr. Andrew R. Sloboda, Bucknell University

WIP: The Predictive Power of Engineering Undergraduate Students’ Academic Self-efficacy and Test Anxiety for Their Academic Performance in a Dynamics Course

Dr. Andrew R. Sloboda, Bucknell University
Daeyeoul Lee, Purdue University, West Lafayette
Prof. Jeffrey F. Rhoads, Purdue University, West Lafayette
Dr. Edward J. Berger, Purdue University, West Lafayette
Prof. Jennifer DeBoer, Purdue University, West Lafayette

**T338D - Mechanical Engineering Technical Session: Potpourri**

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor: Mechanical Engineering Division**

**Moderator: Richard Freeman, United States Coast Guard Academy**

This will be a fabulous session with papers on ethics, perceptions of pre-/post-tenure requirements, and professional standards and exams. Don't miss it!

- **Developing Student Professional Development Skills in Lifelong Learning and Engineering Standards**
  - Dr. Quamrul H. Mazumder, University of Michigan, Flint
  - Mingye Chen, University of Michigan, Flint
  - Sunzia Sultana, University of Michigan, Flint

- **Generation-Z Learning Approaches to Improve Performance in the Fundamentals of Engineering Exam**
  - Dr. John Crepeau P.E., University of Idaho, Moscow
  - Dr. Barry Willis, University of Idaho, Moscow
  - Dr. Sean Quallen, University of Idaho, Moscow
  - Dr. Steven W. Beyerlein, University of Idaho
  - Mr. Dan Cordon, University of Idaho, Moscow
  - Dr. Terence Soule, University of Idaho
  - Mr. P.K. Northcutt II, University of Idaho
  - Ms. Terri A. Gaffney, University of Idaho
  - Mr. Jeffrey Kimberling, University of Idaho
  - Mrs. Angela C. Shears, University of Idaho
  - Ann Miller, University of Idaho

- **Pre- and Post-tenure: Perceptions of Requirements and Impediments for Mechanical Engineering and Mechanical Engineering Technology Faculty**
  - Dr. Benjamin B. Wheatley, Bucknell University
  - Dr. Elif Miskioglu, Bucknell University
  - Dr. Eliana Christou, University of North Carolina at Charlotte
  - Dr. Nicholas Tymvios, Bucknell University

- **Students Taking Action on Engineering Ethics**
  - Dr. Heather E. Dillon, University of Portland
  - Jeffrey Matthew Welch, University of Portland
  - Dr. Nicole Ralston, University of Portland
  - Rebecca D. Levison, University of Portland

**T339 - Grading and Feedback Models in Mechanics**

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor: Mechanics Division**

**Moderators: Vimal Viswanathan, San Jose State University; Julian Davis, University of Southern Indiana**

- **Replacing Graded Homework Assignments in Statics**
  - Prof. Charles S. White, Norwich University

- **Objective Scoring Partial Credits by Tracking Failure Cascade in Mechanics Problem Solving**
  - Dr. Andrew Dongjin Kim, Georgia State University

- **WIP: A Study of the Effect of Graded Homework in an Engineering Mechanics Course**
  - Dr. Robert O'Neill P.E., Florida Gulf Coast University
  - Dr. Ashraf Badir P.E., Florida Gulf Coast University
  - Dr. Galen I. Papkov, Florida Gulf Coast University
  - Dr. Jiehong Liao, Florida Gulf Coast University
  - Dr. Long Duy Nguyen P.E., Florida Gulf Coast University

- **The Role of Timely Actionable Student Feedback in Improving Instruction and Student Learning in Engineering Courses**
  - Dr. Petros Sideris, Texas A&M University
  - Dr. Maria Koliou, Texas A&M University

**T340A - Minorities in Engineering Division Technical Session 7**

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor: Minorities in Engineering Division**

**Moderators: Christopher Carr, George Mason University; Samara Boyle,**

- **Using Classroom Activities to Integrate Concepts of Diverse Thinking and Teamwork into Engineering Design (Experience)**
  - Dr. Breigh Nonte Roszelle, University of Denver
  - Dr. Ronald R. DeLyser, University of Denver
  - Dr. Goncalo Martins, University of Denver
  - Dr. Christina Paguyo, University of Denver

- **Catalyzing Institutional Change by Implementing a Faculty Development Program for Culturally Responsive Pedagogy at an HSI**
  - Dr. William A. Kitch, Angelo State University
  - Dr. Andrea L. Robledo, Angelo State University

- **Strategies for Increasing Enrollment, Retention, and Graduation in Two Baccalaureate Degree STEM Programs: Mechanical Engineering Technology (MET) and Safety Management (SM)**

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
Dr. A. Mehran Shahhosseini, Indiana State University
Dr. Farman A. Moayed, Indiana State University
Dr. Alister McLeod, Indiana State University

T340B - Minorities in Engineering Division Technical Session 2
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Minorities in Engineering Division
Moderators: Jeremi London, Virginia Polytechnic Institute and State University; Christopher Carr, George Mason University

Student Education and Engagement at a Minority Institution
Dr. Ning Zhang, Central State University
Dr. Cadance Lowell, Central State University
Dr. Xiaofang Wei, Central State University
Dr. Desheng Liu, Ohio State University

Pre-engineering Collaboration as a Tool to Facilitate Decolonization of Native American Students
Dr. Robert V. Pieri, North Dakota State University
Dr. Austin James Allard, Turtle Mountain Community College
Teri Ann Allery
Ann Vallie, Nueta Hidatsa Sahnish College
Dr. Bradley Bowen, Virginia Tech
Mr. Karl Haefner
Mrs. Lori Nelson, Nueta Hidatsa Sahnish College
Danny Luecke
Mr. Michael Maloy Parker, Cankdeska Cikana Community College

Success Expectations of Low-income Academically Talented Students in Engineering: A Preliminary Study at a Hispanic-serving Institution
Dr. Aidsa I. Santiago-Román, University of Puerto Rico, Mayaguez Campus
Dr. Manuel A. Jimenez, University of Puerto Rico, Mayaguez Campus
Dr. Luisa Guillemand, University of Puerto Rico, Mayaguez Campus
Dr. Sonia M. Bartolomei-Suarez, University of Puerto Rico, Mayaguez Campus
Prof. Oscar Marcelo Suarez, University of Puerto Rico, Mayaguez Campus
Prof. Nelson Cardona-Martinez, University of Puerto Rico, Mayaguez Campus
Dr. Carla López del Puerto, University of Puerto Rico, Mayaguez Campus
Dr. Nayda G. Santiago, University of Puerto Rico, Mayaguez Campus

Dr. Pedro O. Quintero, University of Puerto Rico, Mayaguez Campus
Dr. Anidza Valentin-Rodriguez, University of Puerto Rico, Mayaguez Campus

Improving STEM Education for Lower-division College Students at HSI by Utilizing Relevant Sociocultural and Academic Experiences: First-year Results from ASSURE-US Project
Dr. Jidong Huang, California State University, Fullerton
Dr. Sudarshan T. Kurwadkar, California State University, Fullerton
Dr. Doima Bein, California State University, Fullerton
Dr. Yu Bai, California State University, Fullerton
Dr. Salvador Mayoral, California State University, Fullerton

T341 - Mechatronics and Robotics I
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Multidisciplinary Engineering Division
Moderators: Nima Lotfi, Southern Illinois University Edwardsville; Luis Rodriguez, Milwaukee School of Engineering

This session highlights efforts to define and expand the diverse field of mechatronics and robotics. It is one of two sessions devoted to the topic; discussion between authors and attendees is anticipated.

Diversity and Inclusion in Mechatronics and Robotics Engineering Education
Dr. Christopher Pannier, University of Michigan-Dearborn
Dr. Carlotta A. Berry, Rose-Hulman Institute of Technology
Dr. Melissa Morris, Embry-Riddle Aeronautical University
Dr. Xiaopeng Zhao, University of Tennessee, Knoxville

Mechatronics and Robotics Education: Standardizing Foundational Key Concepts
Dr. Kevin Stanley McFall, Kennesaw State University
Dr. Kevin Huang, Trinity College
Hunter B. Gilbert, Louisiana State University
Prof. Musa K. Jouaneh, University of Rhode Island
Dr. He Bai, Oklahoma State University
Dr. David M. Auslander, University of California, Berkeley

STRIDER (Semi-autonomous Tracking Robot with Instrumentation for Data-acquisition and Environmental Research): Pitfalls and Successes of a Vertically Integrated Experiential Learning Project Spanning Multiple Years
Mr. Brandon Miles Gardner, University of Maryland, Eastern Shore
Dr. Abhijit Nagchoudhuri, University of Maryland, Eastern Shore
Mr. Jesu Raj Pandya, University of Maryland, Eastern Shore
TUESDAY, JUNE 23 SESSIONS

Mr. Rakesh Joshi, University of Maryland, Eastern Shore
Mr. Fredrick Landon Bickle, University of Maryland, Eastern Shore
Dr. Mark E. Williams, University of Maryland, Eastern Shore

Practical Skills for Students in Mechatronics and Robotics Education
Dr. Carlotta A. Berry, Rose-Hulman Institute of Technology
Prof. Michael A. Gennert, Worcester Polytechnic Institute
Dr. Rebecca Marie Reck, Kettering University

T344 - Ocean and Marine Engineering Division: Best Paper Technical Session
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Ocean and Marine Division
Moderators: Vukica Jovanovic, Old Dominion University; Lynn Albers, Hofstra University

An Open-source Autonomous Vessel for Maritime Research
Dr. Robert Kidd, State University of New York

Using Student-faculty Collaborative Lectures to Teach High-level Hydrodynamics Concepts
Dr. Laura K. Alford, University of Michigan
Mr. James A. Coller, University of Michigan
Dr. Robin Fowler, University of Michigan

T346 - Software Engineering Division Technical Session 1
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Software Engineering Division
Moderators: Robert Hasker, Milwaukee School of Engineering; Peter Clarke, Florida International University

A Course as Ecosystem: Melding Teaching, Research, and Practice
Dr. Edward F. Gehringer, North Carolina State University

Improving Student Learning Through Required Exposure to Other Students' Code via Discussion Boards
Dr. Kyle D. Feuz, Weber State University
Dr. Linda DuHadway, Weber State University
Dr. Hugo Edilberto Valle, Weber State University
Dr. Richard C. Fry, Weber State University
Prof. Kim Marie Murphy, Weber State University

Teaching the Culture of Quality from the Ground Up: Novice-tailored Quality Improvement for Scratch Programmers
Dr. Eli Tilevich, Virginia Tech
Dr. Simin Hall, Virginia Tech

Mr. Peeratham Techapalokul, Virginia Tech

Introduction of Software Engineering Concepts for Electrical and Computer Engineering Students and Applications to Senior Projects
Dr. Danielle Marie Fredette, Cedarville University
Nathan Jessurun, University of Florida

Applying Slack to Help Teach Computer Science and Computer Engineering Courses
Dr. Chao Chen, Purdue University, Fort Wayne
Dr. Zesheng Chen, Purdue University, Fort Wayne

T347A - Student Division Technical Session 4
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Student Division
Moderators: Joel Schneider, Stanford University; Stephany Santos, University of Connecticut

Work in Progress: The Impact of XXXXX’s Student Council on the Grand Challenge Scholars Program
Ms. Rachel Figard, North Carolina State University
Mr. Pippin Payne, North Carolina State University

Paper: Bringing Science Education and Research together to REACT
Alyssa Travitz, University of Michigan
Ayse Muniz, The University of Michigan
Joanne Kay Beckwith, University of Michigan
Rose K. Cersonsky, University of Michigan

Student Success Impacts in Communication and Professional Networking Contexts
Dr. Alyson Grace Eggleston, The Citadel
Dr. Robert J. Rabb P.E., The Citadel

Hands-on Engineering Experience, a Liberal Arts Case
Dr. Niloofer Kamran, Cornell College
Mr. Qingbao Wang, Cornell College
Mr. Andy Grove
William Nitschke Dragon II, Cornell College

Unlocking the Creativity Potential
Dr. Robert M. Brooks, Temple University
Mr. Sangram Shinde, Department of Mechanical Engineering, Jazan University, Jazan KSA

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
T347B - Student Division Technical Session 5
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Student Division
Moderator: Kathryn Shroyer, University of Washington
Augmented Reality for Education (Diversity)
- Mr. Nima Shahab Shahmir, West Virginia University Institute of Technology
- Dr. Sanish Rai, West Virginia University Institute of Technology
The Effectiveness of TRIZ from the Perspective of Comprehensive Benefits of Technological Innovation
- Prof. Wei Yao, School of Public Affairs, Zhejiang University
- Dr. Chu Zhaowei, ZheJiang University
- Dr. Hu Shunshun, Zhejiang University
- Mr. Bifeng Zhang, Zhejiang University
Paper: Exploring How Undergraduate Chemical Engineering Students Spend Their Time Inside and Outside of the Classroom (WIP)
- Alaa Abdalla, Virginia Tech
- Dr. Nicole P. Pitterson, Virginia Tech
- Dr. Jennifer "Jenni" M Case, Virginia Tech
A Systematized Review of the Students’ Upbringing Influence on their Spatial Reasoning
- Mr. Hassan Ali Al Yagoub, Purdue University, West Lafayette

T351A - Women in Engineering Division Technical Session 8
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Women in Engineering Division
Moderators: Robyn Sandekian, University of Colorado Boulder; Robin Andreassen, University of Delaware
Points of Departure. Understanding Gender Differences in Faculty Turnover Intentions at University of X
- Dr. Robin O. Andreassen, University of Delaware
- Dr. Shawna Vican, University of Delaware
- Prof. Yvette A. Jackson, University of Massachusetts Dartmouth
Interventions in Faculty Recruiting, Screening, and Hiring Processes Enable Greater Engineering Faculty Diversity
- Dr. Robyn Sandekian, University of Colorado, Boulder
- Dr. JoAnn Silverstein P.E., University of Colorado Boulder
- Dr. Beverley Louie, University of Colorado, Boulder
Using Data to Mitigate Bias in Engineering Faculty Career Outcomes
- Dr. Beverley Louie, University of Colorado Boulder, College of Engineering & Applied Science
- Dr. JoAnn Silverstein, University of Colorado, Boulder
- Dr. Robyn Sandekian, University of Colorado Boulder
Mentoring Among African-American Women in the Engineering Academy
- Jocelyn LaChelle Jackson, University of Michigan
- Dr. Jeremi S London, Virginia Polytechnic Institute and State University
- Crystal M. Pee
- Dr. Joi-Lynn Mondisa, University of Michigan
- Dr. Stephanie G. Adams, University of Texas at Dallas
Improved Metric for Identifying Female Faculty Representation in Engineering Departments
- Dr. Jennifer Retherford P.E., The University of Tennessee at Knoxville
- Dr. Sarah J. Mobley P.E., The University of Tennessee at Knoxville
- Dr. Kristen N. Wyckoff, The University of Tennessee at Knoxville
"I'm Not Good at Math," She Said
- Prof. Astrid K. Northrup P.E., Northwest College
- Dr. Andrea Carneal Burrows, University of Wyoming

T351B - Women in Engineering Division Technical Session 10
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Women in Engineering Division
Moderators: Astrid Northrup, Northwest College, Powell WY; Sandra Eksioglu, University of Arkansas
Women Enrolled in Engineering Programs: Their Interests and Goals
- Ms. Katherine L Walters, University of Georgia
- Dr. John M. Mativo, University of Georgia
- Dr. Uduak Zenas George, San Diego State University
A Comparative Study on Gender Bias in the Purchase of STEM Toys (Fundamental)
- Mrs. Huma Shoaib, Purdue University
- Dr. Monica E. Cardella, Purdue University, West Lafayette
Work in Progress: A Qualitative Exploration of Female Undergraduate Decisions to Specialize within Engineering Disciplines
- Dr. M. Teresa Cardador, University of Illinois at Urbana-Champaign
- Prof. 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
Successful Strategies for Attracting More Female Students to Engineering Majors in Emerging Economies: The Case of Southern Mexico

Prof. Miguel X. Rodriguez-Paz, Tecnologico de Monterrey (ITESM)
Prof. Israel Zamora-Hernandez, Tecnologico de Monterrey
Mr. Jorge A. Gonzalez, Tecnológico de Monterrey
Dr. J. Asuncion Zarate-Garcia, Tecnologico de Monterrey (ITESM)

T352A - Community Engagement Division Technical Session 7
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

T352B - Community Engagement Division Technical Session 5
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Promoting Innovation Skills and Social Commitment in Engineering Students through the University Social Project Course

Dr. Flor Angela Bravo, Pontificia Universidad Javeriana
Dr. Juan M. Cruz, Rowan University
Prof. Jairo Alberto Hurtado JAH, Pontificia Universidad Javeriana

Designing Little Free Libraries for Community Partners in a First-Year Graphics and Design Course

Elizabeth Johnson, Playful Learning Lab
Elise Rodich, University of St. Thomas
Hannah French
Dr. AnnMarie Thomas, University of St. Thomas

Improving the Engineering Pipeline through University and Community-developed Museum-based Educational Kits

Dr. Stacey V. Freeman, Boston University
Dr. Sandra Lina Rodegher, Boston University

Engagement in Practice: Establishing a Culture of Service Learning in Engineering Orientation Classes at KSU

Dr. M. Loraine Lowder, Kennesaw State University
Dr. Christina R. Scherrer, Kennesaw State University
Dr. Kevin Stanley McFall, Kennesaw State University
Dr. David R Veazie P.E., Kennesaw State University

Student-led Initiative Promoting K-5 Hands-on Engineering Education

Ms. Shreya Gupta, Bit Project, College of Engineering, UC Davis
Mr. Dong Gyun Kim, Bit Project, College of Engineering, UC Davis
Ms. Victoria Kang Li Xu, Bit Project, College of Engineering, UC Davis

A Qualitative Study of Empathy in the Experiences of Students in a First-Year Engineering Service Learning Course

Mrs. Adetoun Yeaman, Virginia Polytechnic Institute and State University
Dr. Diana Bairaktarova, Virginia Polytechnic Institute and State University
Dr. Kenneth Reid, Virginia Polytechnic Institute and State University

Development of Empathy in a Rehabilitation Engineering Course

Dr. Lauren Anne Cooper, California Polytechnic State University, San Luis Obispo
Amanda Johnston, Purdue University, West Lafayette
Emily Honor Hubbard, California Polytechnic State University, San Luis Obispo
Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo

Everybody Needs Somebody to Teach: Embodiment, Telecommunication, and Telepresence in STEM Learning

Mr. Glen Hordemann, Texas A & M University
Dr. Malini Natarajarathinam, Texas A&M University
Dr. Sharon Lynn Chu, University of Florida
Dr. Mathew Kuttolamadom, Texas A&M University
Prof. Francis Quek, Virginia Polytechnic Institute and State University
Mr. Osazuwa John Okundaye Jr, Texas A&M University

High Altitude Water Shortage Issues in Peru

Mrs. Mary Andrade, University of Louisville
Mr. Michael Scott Keibler, University of Louisville
Josh Rivard

How the Use of an Internet Radio Program and Podcast Helped Civil Engineering Students Engage with Local Communities in Need

Prof. Romeo Ballinas-Gonzalez, Tecnologico de Monterrey
Prof. Benjamin Sanchez, Tecnologico de Monterrey
Prof. Miguel X. Rodriguez-Paz, Tecnologico de Monterrey (ITESM)
Prof. Juan Arturo Nolazco-Flores, Tecnologico de Monterrey

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
T355 - Engineering Leadership Skills Development Across the Undergraduate-to-Workforce Transition

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Engineering Leadership Development Division
Moderator: Meagan Kendall, University of Texas at El Paso

Wisdom through Adversity: Situated Leadership Learning of Engineering Leaders
- Dr. Andrea Chan, Troost Institute for Leadership Education in Engineering (ILead)
- Dr. Cindy Rottmann, University of Toronto
- Dr. Doug Reeve P.Eng., University of Toronto
- Dr. Emily Moore P.Eng., University of Toronto
- Mr. Milan Maljkovic, Troost Institute for Leadership Education in Engineering
- Ms. Emily Macdonald-Roach

Using Competing Values Framework to Map the Development of Leadership Skills as Capstone Design Students Transition to the Workplace
- Mr. Tahsin Mahmud Chowdhury, Virginia Polytechnic Institute and State University
- Dr. Daniel Knight, University of Colorado, Boulder
- Dr. Daria A. Kotys-Schwartz, University of Colorado, Boulder
- Prof. Julie Dyke Ford, New Mexico Institute of Mining and Technology
- Dr. Homero Murzi, Virginia Polytechnic Institute and State University

An Evaluation of an Engineering Leadership Development Program on Alumni Job Placement and Career Progression
- Dr. Dena Lang, Pennsylvania State University
- Mr. Travis Gehr
- Dr. Meg Handley, Pennsylvania State University
- Dr. John Jongho Park, Pennsylvania State University
- Mr. Andrew Michael Erdman, Pennsylvania State University

A Narrative Inquiry into Pedagogical Approaches that Support the Development of Transversal Skills in Engineering Students
- Dr. Michele Norton, Texas A&M University
- Dr. Behbood Ben Zoghi, Texas A&M University

T357A - Research! Research! Research! in Faculty Development

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Faculty Development Division
Moderators: Michael Sherwin, University of Pittsburgh; Stephanie Cutler, Pennsylvania State University

Come hear new and fun things about research in faculty development!

“It’s Been a While”: Faculty Reflect on Their Experiences Implementing What They Learned During an Intensive Summer Program
- Dr. Ariana C. Vasquez, Colorado School of Mines
- Dr. Amy Hermundstad Nave, Colorado School of Mines
- Dr. Sam Spiegel, Colorado School of Mines

From Q&A to Norm & Adapt: The Roles of Peers in Changing Faculty Beliefs and Practice
- Amber Gallup, University of New Mexico
- Dr. Vanessa Svhila, University of New Mexico
- Ms. Madalyn Wilson-Fetrow, University of New Mexico
- Dr. Yan Chen, University of New Mexico
- Dr. Pil Kang, University of New Mexico
- Kristen Ferris, University of New Mexico

Validation of the Climate Scale in the Persistence of Engineers in the Academy Survey (PEAS)
- Dr. Julie Aldridge, Ohio State University
- Dr. So Yoon Yoon, University of Cincinnati
- Dr. Ebony Omotola McGee, Vanderbilt University
- Dr. Joyce B. Main, Purdue University at West Lafayette
- Dr. Monica Farmer Cox, Ohio State University

Career Development Impacts of a Research Program on Graduate Student and Postdoc Mentors
- Nicole McIntyre, University of California, Berkeley
- Dr. Catherine T. Amelink, Virginia Polytechnic Institute and State University
- Jeffrey Bokor, University of California
T357B - Research in Faculty Development

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Faculty Development Division
Moderator: Erica Hagen, University of Wisconsin - Madison

Come hear and ask questions about the latest research around faculty development!

Analysis of Panel Summaries of Proposals Submitted to the S-STEM Program

Ms. Samara R. Boyle, Rice University
Dr. Yvette Pearson P.E., Rice University
Dr. Margaret E. Beier, Rice University
Ms. Jacqueline Gilberto, Rice University
Prof. Stephen P. Mattingly, University of Texas at Arlington
Dr. Ann Saterbak, Duke University
Anila K. Shethia, Rice University

Bridging the Gap: Preparing Future Engineering Faculty for Post-secondary Teaching Excellence

Dr. Tareq Daher, University of Nebraska, Lincoln
Dr. Markeya S. Peteranetz, University of Nebraska-Lincoln

Organizational Citizenship Behavior and Faculty Mindset Amidst Professional Development Activities

Kristen Ferris, University of New Mexico
Dr. Vanessa Svihla, University of New Mexico
Dr. Pil Kang, University of New Mexico

To Be, or Not to Be, a Professor: Views of Engineering Postdoctoral Scholars

Dr. Sylvia L. Mendez, University of Colorado at Colorado Springs
Dr. Valerie Martin Conley, University of Colorado at Colorado Springs
Dr. Sarah E. Cooksey, University of Colorado at Colorado Springs
Ms. Kathryn Elizabeth Starkey, University of Colorado at Colorado Springs

T357C - WIP-ing Up Faculty Development!

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Faculty Development Division
Moderator: John Morelock, University of Georgia

Come learn about works in progress (WIPs) in the Faculty Development Division! What are people working on? Come find out!

Evaluating the Teaching Evaluations of 100 North American Schools

Dr. Haroon Malik, Marshall University
Dr. Wael A. Zatar, Marshall University

Thinking Entrepreneurially about Your Career

Dr. Andrea L. Welker, Villanova University
Dr. Maria-Isabel Carnasciali, University of New Haven
Dr. Craig G. Downing, Rose-Hulman Institute of Technology
Dr. Douglas E. Melton, Kern Entrepreneurial Engineering Network

WIP: Mentoring Early-career Engineering Faculty - A Faculty Development Coordinator Model

Dr. Julie Walters, Oakland University
Miss Leanne DeVreugd, Oakland University
Dr. Laila Guessous, Oakland University

WIP: Supporting Faculty Developers’ Engagement with Disciplinary Perspectives

Mr. Richard J. Aleong, Purdue University-Main Campus, West Lafayette (College of Engineering)

T360 - FOCUS ON EXHIBITS: Virtual Showcase

12:00 P.M. - 1:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: ASEE Headquarters

Live interaction with sponsors and exhibitors.
T371A - NSF Grantees: Diversity 3
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderators: Amber Genau, University of Alabama at Birmingham; Alison Kerr, The University of Tulsa

Presentations from groups with current NSF-funded projects focused on understanding and supporting diverse populations within engineering.

**Military Veteran Students’ Pathways in Engineering Education (Year 6)**
- Dr. Susan M. Lord, University of San Diego
- Dr. Catherine Mobley, Clemson University
- Dr. Catherine E. Brawner, Research Triangle Educational Consultants
- Dr. Joyce B. Main, Purdue University, West Lafayette

**Investigating the Experiences of Military Professionals who Return to Engineering Graduate School**
- Dr. Diane L. Peters, Kettering University
- Dr. Elizabeth Gross, Sam Houston State University

**Increasing Diversity and Student Success in Engineering and Computer Science through Contextualized Practices**
- Dr. Doris J. Espiritu, Wilbur Wright College
- Dr. Ruzica Todorovic, Wilbur Wright College

**Early Research Scholars Program at UIC**
- Dr. Renata A. Revelev, University of Illinois at Chicago
- Prof. Joseph Hummel
- Mohammad Taha Khan, University of Illinois at Chicago

**Expanding Access to and Participation in Midfield (Year 4)**
- Dr. Matthew W. Ohland, Purdue University, West Lafayette
- Dr. Susan M. Lord, University of San Diego
- Dr. Richard A. Layton P.E., Rose-Hulman Institute of Technology
- Dr. Marisa K. Orr, Clemson University
- Dr. Catherine E. Brawner, Research Triangle Educational Consultants
- Mr. Russell Andrew Long
- Mr. Hossein Ebrahimmiejad, Purdue University at West Lafayette
- Mr. Hassan Ali Al Yagoub, Purdue University at West Lafayette

T371B - NSF Grantees: Identity
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderators: Amber Genau, University of Alabama at Birmingham; Julia Williams, Rose-Hulman Institute of Technology

Presentations from groups with current NSF-funded projects focused on development of student identity within engineering education.

**Development and Refinement of Interview Protocol to Study Engineering Students’ Beliefs and Identities**
- Amy Kramer P.E., Ohio State University
- Dr. Emily Dringenberg, Ohio State University
- Dr. Rachel Louis Kajfez, Ohio State University

**Participation in Cocurricular Activities and the Development of Engineering Identity**
- Dr. Debra A. Major, Old Dominion University
- Seterra D. Burleson, Old Dominion University
- Xiaoxiao Hu, West Virginia University
- Dr. Kristi J. Shryock, Texas A&M University

**Interactions Between Engineering Student Researcher Identity and Epistemic Thinking**
- Dr. Lisa Benson, Clemson University
- Dr. Courtney June Faber, University of Tennessee at Knoxville
- Dr. Rachel Louis Kajfez, Ohio State University
- Dr. Marian S. Kennedy, Clemson University
- Dennis M. Lee, Clemson University
- Karina Sylvia Sobieraj, Ohio State University
- Cazembe Kennedy, Clemson University

**Partnership for Equity: Engaging with Faculty to Cultivate Inclusive Professional Identities for Engineers and Computer Scientists**
- Seoyeon Park, Texas A&M University
- Dr. Rebecca A. Atadero, Colorado State University
- Dr. Anne Marie Aramati Casper, Colorado State University
- Dr. Karen E. Rambo-Hernandez, Texas A&M University
- Dr. Jody Paul, Metropolitan State University of Denver
- Dr. Melissa Lynn Morris, University of Nevada - Las Vegas
- Dr. Christopher Douglas Griffin, West Virginia University
- Dr. Ronald R. DeLyser, University of Denver
- Dr. Christina Paguyo, University of Denver
- Dr. Scott T. Leutenegger, University of Denver

**CAREER: Actualizing Latent Diversity in Undergraduate Engineering Education**
- Dr. Allison Godwin, Purdue University at West Lafayette
- Ms. Brianna Shani Benedict, Purdue University at West Lafayette
## T371C - NSF Grantees: Student Development

### 11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE

### Sponsor: NSF Grantees Session

### Moderator: Michael Johnson, Texas A&M University

Presentations from groups with current NSF-funded projects focused on aspects of student development during undergraduate and graduate education in engineering.

#### Examining the Importance of Noncognitive and Affective (NCA) Factors for Engineering Student Success

- Ms. Lily Krest, Purdue University at West Lafayette
- Mr. Justin Charles Major, Purdue University at West Lafayette
- Mr. Matthew Scheidt, Purdue University at West Lafayette
- Ms. Julianna Ge, Purdue University at West Lafayette
- Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo
- Dr. John Chen P.E., California Polytechnic State University, San Luis Obispo
- Dr. James M. Widmann, California Polytechnic State University, San Luis Obispo
- Dr. Allison Godwin, Purdue University at West Lafayette
- Dr. Edward J. Berger, Purdue University at West Lafayette

#### A Qualitative Analysis of How a Student, Faculty, and Practicing Engineer Approach an Ill-structured Engineering Problem

- Secil Akinci-Ceylan, Iowa State University
- Dr. Kristen Sara Cetin, Michigan State University
- Dr. Benjamin Ahn, Iowa State University of Science and Technology
- Dr. Bora Cetin, Michigan State University
- Dr. Andrea E. Surovek, South Dakota School of Mines and Technology

#### Learning Trajectories through Undergraduate Engineering Curricula and Experiences

- Dr. Micah Lande, South Dakota School of Mines and Technology

#### Enhancing Graduate Education by Fully Integrating Research and Professional Skill Development within a Diverse, Inclusive, and Supportive Academy

- Dr. Eduardo Santillan-Jimenez, University of Kentucky
- Dr. Qing Duan, University of Cincinnati
- Dr. Jacinda K. Dariotis, University of Cincinnati
- Prof. Mark Crocker, University of Kentucky

### T371D - NSF Grantees: Student Thought

### 11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE

### Sponsor: NSF Grantees Session

### Moderators: Amber Genau, University of Alabama at Birmingham; Jennifer Turns, University of Washington

Presentations from groups with current NSF-funded projects focused on systems of student thought, including ethics, problem solving, and decision marking.

#### Student and Practitioner Approaches to Systems Thinking: Integrating Technical and Contextual Considerations

- Ms. Erika A. Mosyjowski, University of Michigan
- Mrs. Javiera Espinoza von Bischhoffshausen, University of Michigan
- Dr. Lisa R. Lattuca, University of Michigan
- Dr. Shanna R. Daly, University of Michigan

#### Development of an Academic Dashboard for Empowering Students to be Adaptive Decision Makers

- Dr. Marisa K. Orr, Clemson University
- Baker A. Martin, Clemson University
- Rebecca B. Spilka, Clemson University
- Haleh Barmaki Brotherton, Clemson University
- Ms. Katherine M. Ehlert, Clemson University

#### Engineering Undergrads Effectively Communicate Their Experience

- Dr. Andrew Olewnik, State University of New York at Buffalo
- Dr. Randy K. Yerrick, State University of New York at Buffalo
- Mr. Manoj Madabhushi
- Mr. Rachith R. Ramaswamy, State University of New York at Buffalo
- Dr. Yonghee Lee, State University of New York at Buffalo
- Ms. Hala Alfadhl, State University of New York at Buffalo
- Amanda A. Simmons, State University of New York at Buffalo

#### Foundations of Social and Ethical Responsibility Among Undergraduate Engineering Students: Overview of Results

- Dr. Carla B. Zoltowski, Purdue University at West Lafayette
- Prof. Brent K. Jesiek, Purdue University at West Lafayette
- Dr. Stephanie Claussen, Colorado School of Mines
- Ms. Shiloh James Howland, Brigham Young University
Ms. Dayoung Kim, Purdue University at West Lafayette
Ms. Swetha Nittala, Purdue University, West Lafayette

**Ways of Experiencing Ethics in Engineering Practice: Variation and Factors of Change**

Dr. Carla B. Zoltowski, Purdue University, West Lafayette
Dr. Nicholas D. Fila, Iowa State University of Science and Technology
Dr. Justin L. Hess, Purdue University at West Lafayette
Alison J. Kerr, University of Tulsa
Ms. Dayoung Kim, Purdue University, West Lafayette
Dr. Michael C. Loui, University of Illinois at Urbana - Champaign
Dr. Andrew O. Brightman, Purdue University at West Lafayette

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**T399A - SPONSOR TECHNICAL SESSION: Presented by the University of Maryland**

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions

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**T399B - SPONSOR TECHNICAL SESSION: Presented by Liaison**

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions

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**T399D - SPONSOR TECHNICAL SESSION: Get Your Simple-to-Use TI-RSLK MAX Robot Fully Built, Tested, and Ready for Learning in Under 20 Minutes - Presented by Texas Instruments**

11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions

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**T399E - SPONSOR TECHNICAL SESSION: Online Learning with MATLAB and Simulink - Presented by Mathworks**

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions

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**T399F - SPONSOR TECHNICAL SESSION: Assessments in the Online Engineering Classroom - Presented by Wiley**

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions

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The newest addition to the TI-RSLK product family, the TI-RSLK MAX is user-friendly, can be assembled quickly, and provides hands-on options for teaching embedded systems design. With a solderless building process and updated curriculum to tackle many fundamental and trending topics in engineering, the kit can easily be implemented in large or small classes and is ideal for classes with time constraints, flipped classrooms, virtual distance learning, or limited lab technology. The low cost makes the kit accessible for students to own or for classroom sets to be reused year-over-year by students and faculty. The TI-RSLK MAX has the flexibility to teach students engineering fundamentals on design and testing, project-based learning, embedded systems, Internet of Things, controls, mechatronics, and more. This session will show you how to construct the robotics kit and how to test the functionality with our TI-RSLK MAX debug application.

Educators are having to adapt their courses to achieve their learning objectives while faced with changing student and university requirements. As part of the transition, educators need to provide hands-on experience through lab-based modules. MathWorks provides several cloud-based tools to enable creation of flexible teaching and learning plans. In this session, we’ll discuss how these tools can contribute to course development and delivery workflow with potential for immediate use in classes and labs.

We will discuss several resources including:

- Accessing MATLAB and Simulink Online for anytime, anywhere use
- Leveraging interactive content with self-paced courses, MATLAB Apps, and Live Scripts
- Virtualizing labs through simulation and/or hardware accessible at home
- Mentoring students at scale with automated assessment and feedback in MATLAB Grader
- Connecting students with the community by participating in the MATLAB user community

Pivoting to online teaching can prove challenging, especially in problem-based engineering courses. Administering engineering homework, projects, and exams in a virtual environment requires a thoughtful approach. Two experienced educators will share their strategies and tips for managing assessment online based on decades of collective experience.
T411A - Joint Panel: Moving Engineering Forward with Micro-Mobility
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Cooperative and Experiential Education Division
Moderators: Lindsay Corneal, Grand Valley State University; Mary Andrade, University of Louisville
Speakers: Dr. John Farris, Grand Valley State University; Dr. Diane L Peters P.E., Kettering University; Mr. Giorgio Mariano

Freedom of movement drives human progress, and the new forms of micro-mobility have a significant impact on engineering education. Currently in its infancy, the micro-mobility movement provides a transformational global shift, emerging as an alternative to traditional transportation modes. From bikes to scooters to self-driving autonomous delivery vehicles to various forms of electric wheels, advances in micro-mobility have taken many cities by storm. The micro-mobility movement has the potential to improve transportation in congested cities, assist the elderly and disabled with freedom of movement, deliver life-saving medical devices and supplies, and provide a powerful tool in the fight to increase access to transportation for traditionally underserved communities. In the past couple of years, these modes of transportation have emerged as a true potential solution for urban mobility, enabled by advances in GPS tracking, connectivity, lower cost and increased longevity of batteries, and the ubiquity of smartphone technologies. This is a 30-minute live (synchronous) interactive session. Speakers will give a brief introduction and presentation on health and transportation-related micro-mobility projects, followed by an opportunity for attendees to discuss topics of interest in a group setting.

T411B - Joint Panel: Developing a Talent Pipeline through Cooperative/Experiential Education in Applied Research
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Cooperative and Experiential Education Division
Moderators: Casey Thelenwood, Grand Valley State University; Katherine McConnell, University of Colorado Boulder
Speakers: Dr. Bogdan Adamczyk, Grand Valley State University; Dr. Brent Nowak, Grand Valley State University; Jonathan Engelsma

Developing a sustainable talent pipeline is critical for applied research organizations. Organizations benefit from hiring internship/co-op students who can adapt to a research environment, develop professionalism, creativity, and a problem-solving skill set, and provide the necessary depth and breadth for research-based projects to provide a value-added benefit. The 30-minute panel discussion will focus on the organizational structure/business model, internship/co-op recruitment process, training and acclimation into a research-based culture, the development of a professional and technical skillset, overcoming a significant learning curve, commitment to an individual and group contribution, and the appropriateness of project work to develop students into full-time research engineers. This is a live interactive panel session. Speakers will give a brief introduction and presentation, followed by an opportunity for attendees to discuss topics of interest in a group setting.

T414 - Research on Engineering Practice: Catalyzing the Next Generation of Scholars
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Samantha Brunhaver, Arizona State University, Polytechnic campus; Alexandra Strong, Florida International University; Brent Jesiek, Purdue University at West Lafayette; Russell Korte, The George Washington University

This ASEE special session is part of a National Science Foundation-sponsored collaborative conference grant to catalyze a scholarly community around research on engineering practice. One of the overarching goals of this grant has been to foster a diverse community of scholar-practitioners engaged and interested in the study of engineering practice, particularly at the early career level (e.g., graduate students, postdoctoral researchers, and early-career research scientists and faculty members). A selected panel of early-career scholars will present brief lightning talks introducing themselves and their work. The scholars will then show a poster about a project and their broader research and career interests related to engineering practice, for feedback, ideas, and support from session attendees. Please join us in celebrating the ideas and accomplishments of this next generation of research on engineering practice scholars!

T416 - ECC and Manufacturing Divisions - NSF Guest Speaker Session
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Energy Conversion and Conservation Division; Manufacturing Division
Moderators: Siamak Farhad, The University of Akron; Seyed Mousavinezhad, Idaho State University
Speaker: Dr. Pushpa Ramakrishna

The Energy Conversion (ECCD) and Manufacturing divisions announce their joint session focused on green energy manufacturing and sustainable energy waste management related to manufacturing. We are looking forward to abstracts addressing development and implementation of pedagogical tools and strategies, hands-on learning, and capstone design projects related to education areas in energy conversion and manufacturing processes.
T421 - Metrics and Measuring Research Impact: What Engineering Librarians Really Need to Know

1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Engineering Libraries Division

Moderators: Daniela Solomon, Case Western Reserve University; William Bowman, Florida Institute of Technology

Speakers: Mrs. Sylvia Jones, Southern Methodist University; Mr. Tom C. Volkening, Michigan State University

This panel will provide engineering librarians with substantive insight into the applicability of research impact metrics, covering both their strengths and their limitations.

T445 - STEAM Education

1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Engineering Physics and Physics Division

Moderators: Bala Maheswaran, Northeastern University; Robert Ross, University of Detroit Mercy

Speakers: Marie Bukowski; Ms. Rachelle Reisberg, Northeastern University; Dr. Stacy S Klein-Gardner, Vanderbilt University

This session provides P-12 Science, Technology, Engineering, Arts, and Math (STEAM) education and covers the following:

- The current state of P-12 STEAM programs
- Issues related to diversity and inclusion in STEAM
- Experiential learning activities for P-12 STEAM
- Increase talent pool by improving P–12 STEAM Experiential education to enter colleges
- Strengthen the skills of teachers through additional training in Experiential Learning approach
- The future progress of STEAM worldwide

T451 - Busting a Career Move? When and Why or Why Not?

1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Women in Engineering Division

Moderator: Adrienne Minerick, Michigan Technological University

Across our careers as academic faculty and/or administrators, we all wonder: When is it time to move on? Should we move on? How do we move on? This panel is focused on addressing these questions. A broad range of experiences and wisdom regarding this challenging decision will be shared. Individuals will provide insights into a) choosing not to move on and remain at an institution, and b) why they chose to move on. Panelists will explore what benefits and costs arose from each decision. While diverse panelists will be selected, the organizers realize that the speakers offer only their own experiences, and so there will be focused time for questions and input from other participants. Please join us for a focused discussion on career self-authorship.

Panel: Busting a Career Move? When and Why or Why Not?

Dr. Adrienne R. Minerick, Michigan Technological University
Dr. Jenna P. Carpenter, Campbell University
Dr. Cindy Waters, Naval Surface Warfare Center
Dr. Beena Sukumaran, Rowan University

T455 - We The North: Engineering Leadership Programs in Canada

1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Engineering Leadership Development Division

Moderators: Cindy Rottmann, University of Toronto; Meg Handley, Pennsylvania State University

Speakers: Dr. Emily Moore P.Eng., University of Toronto; Nate Quitoriano, McGill University; Tamara Etmannski, University of British Columbia; Marnie Jamieson P.Eng., University of Alberta; Darren Meister, University of Western Ontario; Amy Hsiao, University of Prince Edward Island

The ASEE LEAD Division is hosting a panel session highlighting six engineering leadership initiatives in Canada. Panelists will be invited to provide short overviews of their engineering leadership efforts, accomplishments, and struggles, followed by a question and answer period. Panelists are encouraged to share programmatic, curricular, or co-curricular elements that relate to ASEE LEAD’s four strategic initiatives: design, explore, assess, and inform.

DESIGN: How/when did your engineering leadership initiative come to be? Key features?

EXPLORE: Describe your outreach efforts with industry and/or community partners

ASSESS: How have you assessed your efforts along the way?

INFORM: How have you helped university faculty and administrators understand the significant value of the field of engineering leadership in academia and practice?

The panel will conclude with a discussion of the six programs viewed through a conceptual framework generated in Klassen et al.’s 2016 ASEE Annual Conference paper - Charting the Landscape of Engineering Leadership in North American universities—and a Q and A session.
T456 - Military and Veterans Division Panel Session
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Military and Veterans Division
Moderator: Patrick Bass, The Citadel
Discussion of veteran transition process concerning, military, semi-military, and civilian academic institutions.

T458 - TUESDAY Keynote Live Question and Answer
2:00 P.M. - 2:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Board of Directors
Moderator: Sheryl Sorby, University of Cincinnati
Speaker: Remi Duquette
Live question and answer with Remi Duquette, moderated by ASEE President-Elect Sheryl Sorby.

T478 - Demographics and Enrollment Challenges
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Undergraduate Experience Committee
Moderators: Jenna Carpenter, Campbell University; David Tomasko, Ohio State University
Speakers: Dr. Stephanie G. Adams, University of Texas at Dallas; Jane Dong; Prof. Mark O. Federle P.E., Marquette University; Dr. Jumoke ‘Kemi’ Ladeji-Osias, Morgan State University; Dr. Jenna P. Carpenter, Campbell University; Dr. David L. Tomasko, Ohio State University
This session will give an overview of national demographic-related enrollment trends at the undergraduate and graduate levels in engineering, with information on how they are projected to change over the next decade. Panelists will then address the demographic and enrollment challenges at each of their respective institutions, including which of these are unique to their institutional profile, what strategies they have employed to address these issues, the consequences of these trends on their campus and programs/departments, their biggest concerns/challenges moving forward related to enrollment trends, and ideas on how ASEE members might work together to collectively address these issues.

T499 - Round Table Discussion Presented by the University of Maryland
1:00 P.M. - 2:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions
Moderator: Nathan Kahl, American Society for Engineering Education

T504 - Biomedical Engineering Division Business Meeting
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Biomedical Engineering Division
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.

T505 - CHED Executive Board Meeting
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Chemical Engineering Division

T506 - Best in 5 Minutes: Demonstrating Interactive Teaching Activities
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Civil Engineering Division; Environmental Engineering Division
Moderators: Charles Riley, Oregon Institute of Technology; Shannon Parks, University of Pittsburgh at Johnstown; David Sanchez, University of Pittsburgh
This session features short papers describing impactful classroom moments, including demonstrations, student activities, or experiences that include physical models, virtual reality, in-class physical activities, illustrative experiments, experiential learning, and dynamic feedback mechanisms. The audience may be active participants!

Best in 5 Minutes: Improving Students’ Conceptual Understanding of Arch Construction and Behavior Using Physical Models of Masonry Arches in a Classroom Exercise
Dr. Rachel Herring Sangree, Johns Hopkins University
Dr. Benjamin W. Schafer, Johns Hopkins University

Coordinating Field Trips for Design Courses
Prof. Scott A. Civjan P.E., University of Massachusetts, Amherst

Mechanics of Reinforced Concrete Beams – The Whole is Greater than the Sum of its Parts
ASEE'S VIRTUAL CONFERENCE
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Dr. Daniel Hochstein, Manhattan College

**Three Models and Engineering Analysis**
Dr. Timothy Aaron Wood, The Citadel

**Yielding and Fracture in Steel Design: From Trash Bags to Treasure**
Dr. Anthony Battistini, Angelo State University

**Engaging Students Through an Interactive Mass Balance Fundamentals Demonstration**
Dr. Benjamin Michael Wallen P.E., United States Military Academy
Dr. Michael A. Butkus, United States Military Academy
Major Nathaniel P. Sheehan, United States Military Academy
Capt. Andrew Ng, United States Military Academy
Lt. Col. Andrew Ross Pfluger, United States Military Academy

**Making Water Work: An Energy Head Equation Demonstration**
Major Ruth Abigail Mower, United States Military Academy
Major Erick Martinez P.E., United States Military Academy
Lt. Col. Landon M. Raby, United States Military Academy
Major John Boyle, United States Military Academy, West Point
Lt. Col. Andrew Ross Pfluger, United States Military Academy

**The Five-minute Adsorption Demonstration**
Dr. Michael A. Butkus, United States Military Academy
Mr. Anand Deju Shetty, United States Military Academy
Dr. Benjamin Michael Wallen P.E., United States Military Academy
Major Nathaniel Sheehan, United States Military Academy
Lt. Col. Andrew Ross Pfluger, United States Military Academy

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**T513 - DEED Business Meeting**
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Design in Engineering Education Division

Annual business meeting.

**T514 - ERM Business Meeting**
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division

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.

**T518 - EDGD Executive Committee Meeting**
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Design Graphics Division

This is a meeting of the executive committee of the Engineering Design Graphics Division, moderated by the chair, Heidi M. Steinhauer.

**T519 - Engineering Economy Division Business Meeting**
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Economy Division

This meeting will discuss the yearly activities of the division and the professional interest council. Topics include the division financials, activities at the annual conference, election of division officers, and updates on the division awards and on The Engineering Economist journal.

**T521 - ELD Round Table Discussions**
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Libraries Division

This session provides an opportunity for small group discussions on a variety of topics involving engineering librarianship. Session moderated by Amy Van Epps (Harvard University) and Bruce D. Neville (Texas A&M University).
T523B - ECET Dept Heads Meeting
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Technology Division
Annual meeting for ECET department chairs.

T523C - ETD Executive Board
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Technology Division
Summer meeting of ETD officers and interested others.

T527 - FYEE Steering Committee Meeting
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division
A meeting for the FYEE Steering Committee and future conference hosts. By invitation only.

T533 - Pre-College Engineering Education Division Business Meeting
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Business meeting.

T547 - ERM Community Welcome Session
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Student Division; Educational Research and Methods Division
Moderators: Cassandra Woodcock, University of Michigan; Peter Odom, Purdue University at West Lafayette
This is a free ERM-sponsored event that brings together new and established ERMers for an interactive conversation. Come meet members of our division, learn about ERM events, and discuss current topics of interest to our community.

T560A - DIVERSITY ROUND TABLE - The Impact of COVID-19 on Underrepresented Engineering Students
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters
Moderators: Agnieszka Miguel, Seattle University; Stephanie Farrell, Rowan University
In response to the COVID-19 outbreak, universities around the country moved to remote instruction for the remainder of spring term. Faculty and staff were directed to work remotely, and students were asked to move out of their residence halls—presumably to homes where they were expected to have Internet access and a place to study so that they could participate in virtual learning.

“Stay-at-home” orders issued for most states in the nation have prevented students from physically meeting their friends and peers to study together or receive support and encouragement in person. Many who were counting on jobs during spring term to support themselves have not been able to work. Their parents may be going through financial difficulties due to the closure of many non-essential businesses.

History has taught us that in the times of a national crisis, those from marginalized populations suffer the most. The gap between students who belong to disadvantaged groups and those who do not widens. Research has shown that the ability to identify with engineering and the feeling that they belong in their undergraduate peer group is key to students’ persistence, satisfaction, and self-efficacy. This is especially true for students from underrepresented groups. Furthermore, students from marginalized groups benefit from supportive learning communities more than others.

In this round table, we will discuss the impact of COVID-19 on engineering students, especially those who belong to underrepresented groups. How has the abrupt conversion to virtual learning affected students' self-efficacy, motivation, persistence, and engineering identity? What are examples of successfully maintaining supportive learning communities during a pandemic? What are other best practices that lead to offering equitable and inclusive virtual education for all students in our community?
T567A - PNW Section Mixer
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Council of Sections

Please join your colleagues for the 12th Annual Pacific Northwest Section Mixer.

T567B - Zone I Business Meeting
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Council of Sections

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.

Moderator: Pritpal Singh – Council of Sections, Zone I Chair - Villanova University

T567C - Zone II Business Meeting
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Council of Sections

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.

Moderator: Andrew Kline – Council of Sections, Zone II Chair - Western Michigan University

T567D - Zone III Business Meeting
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Council of Sections

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.

Moderator: Kenneth Van Treuren – Council of Sections, Zone III Chair - Baylor University

T567E - Zone IV Business Meeting
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Council of Sections

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.

Moderator: Lily Gossage – Council of Sections, Zone IV Chair - California State Polytechnic University

T567F - Council of Sections Meeting
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Council of Sections

Meeting of the Section and Zone leadership to promote discussion, discover promising opportunities, and chart future direction.

Moderator: Gary Steffen – Vice President of Member Affairs – Purdue University Fort Wayne

T573F - PIC I Business Meeting
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Professional Interest Council

T573G - PIC II Business Meeting
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Professional Interest Council

T573H - PIC III Business Meeting
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Professional Interest Council

T573I - PIC IV Business Meeting
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Professional Interest Council

T573J - PIC V Business Meeting
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Professional Interest Council

T577B - Safe Zone Level 1
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: ASEE Commission on Diversity, Equity & Inclusion; First-Year Programs Division
Moderators: Karin Jensen, University of Illinois at Urbana - Champaign; Brandis Keller, Texas A&M University
Speakers: Dr. Adrienne Minerick, Michigan Technological University; Dr. Kelly J Cross, University of Nevada, Reno

Did you know…
- 1 in 5 LGBTQIA+ students fear for their physical safety on college campuses?
TUESDAY, JUNE 23 SESSIONS

- 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.

T577C - Do You See Me?: Hypervisible Invisibility
#EngineeringWhileBlack
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsors: ASEE Commission on Diversity, Equity & Inclusion; Minorities in Engineering Division
Moderators: Federica Robinson-Bryant, Embry-Riddle Aeronautical University - Daytona Beach; Susan Walden, University of Oklahoma
Speakers: Dr. James Holly, Jr.; Ms. Chanel Beebe, Purdue University at West Lafayette; Mr. Donovan Colquitt, Purdue University at West Lafayette; Ms. DeLean Tolbert, University of Michigan - Dearborn

Black men and women are capable, dignified, and tenacious. Nevertheless, underrepresentation of black individuals within the field remains a stubborn issue at all levels. While many explanations have been offered anecdotally and within literature, this panel discussion will offer engineering stakeholders an insider view on what it’s like to be black in engineering. Beyond conversation, we’d like to suggest ways of affirming black students’ academic and racial/cultural identity.

- Attendees will be encouraged to critique mainstream justifications for the scant presence of black people in engineering.
- Attendees will be aided in identifying new ways of teaching and supporting black students and professionals.
- Attendees will be exposed to innovative ways to identify engineering skills that black students exhibit in non-engineering contexts.

As engineering educators and researchers, it is imperative that we examine the consequences of our broader sociohistorical context on the academic content and culture in which we exist. This is of particular importance as calls for broadening participation in engineering continue to increase. Therefore, the panel discussion participants desire to challenge the public and scholarly discourse that has offered reasons for the dismal status of black Americans in engineering without complex analyses of the contributions of systemic racism to this ongoing problem. Specifically, in the realm of K-12 engineering education, an abundance of initiatives have sprung forth as a result of calls to broaden participation, but very few identify the circumstances that first excluded blacks from participation in the field or explicitly address the myriad barriers that currently hamper their engagement. We see the failure in the engineering field to recruit, retain, and successfully prepare black students as a crisis, and as black scholars we each leverage our experience, intellect, and talents toward innovative solutions to this critical situation.

Storytelling can be a powerful educational tool; in fact, we will borrow from the autoethnographic research tradition to stimulate a scholarly discussion that moves toward more equitable teaching and practice by elucidating contradictions in teaching engineering that others (non-blacks) may not be attuned to. Autoethnographers view research and writing as socially just acts rather than a preoccupation with accuracy; the goal is to produce analytical, accessible texts that change us and the world we live in for the better (Ellis, Adams, and; Bochner, 2011). The process of self-exploration and interrogation aids individuals in locating themselves within their own history and culture, allowing them to broaden their understanding of their own values and experiences in relation to others. Having successfully navigated the educational system as a black Americans studying engineering, we aim to share insights from our experiences that are useful to expand the conversation around low representation of black students beyond deficit narratives.

This panel will begin with participants acknowledging their current roles and engagement within the field of engineering as well as their educational trajectory that led to their current positions. They then will discuss the pivotal experiences that contributed to their epistemological and ontological identity formations as engineers, and how their racial identity influenced these progressions. Participants will be encouraged to share ecological factors that promoted their successful matriculation through multiple engineering programs at various institutions of higher education. In addition to sharing their own stories, panel participants will be asked to explain how their experiences inform their research, teaching, and other work within engineering. Audience members will then be aided in time of reflection to consider the information expressed by the panelists, before concluding with time for questions.

T578 - UEC Associate/Assistant Deans Meeting
3:30 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Undergraduate Experience Committee
Associate Deans Meeting
Organizer: Dr. Jerome Lavelle, Associate Dean, North Carolina State University
**T601 - VIRTUAL WORKSHOP:**
Workshop on Pico/Nano/Micro-satellite Engineering (Life Cycle of a PNMSat Mission and Hands-on Experience Using Classroom Satellite Kit)

**4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor: Aerospace Division**

**Speaker: Dr. Sharan Asundi, Old Dominion University**

The goal of this workshop is to provide an overview of PNMSat Engineering and a three- to five-year road map to successfully start a PNMSat program and potentially launch an academic satellite. The underlying intent of the workshop is to emphasize the integration of education, research, and development to sustain a PNMSat program at an academic institution.

**T614A - VIRTUAL WORKSHOP:**
Using Power, Privilege, and Intersectionality as Lenses to Understand our Experiences and Begin to Disrupt and Dismantle Oppressive Structures Within Academia

**4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor: Educational Research and Methods Division**

**Speakers: Dr. Nadia N. Kellam, Arizona State University; Dr. Vanessa Svihla, University of New Mexico; Dr. Donna M Riley, Purdue University at West Lafayette; Dr. Alice Pawley, Purdue University at West Lafayette; Dr. Kelly J. Cross, University of Nevada, Reno**

The presenters will frame the session and set ground rules for inclusive interaction before guiding attendees through a role-playing activity, development of an intersectionality wheel, and the development of strategies for overcoming these power differentials in academia.

We will begin the special session with introductions, a discussion of the ground rules and the objectives for the session. In these introductions, we will have attendees share their name, preferred pronouns, and interest and expertise in the topics of this workshop.

Then we will move into a series of role playing, fish bowl activities where volunteers will role play using provided, detailed character vignettes, and where an academic leadership team that consists of engineering administrators, engineering faculty, social science faculty, and a student officer of the Student Government Association is holding their first meeting as part of a diversity committee within the engineering college. After each round of the role playing scenario, groups of attendees will discuss identities within the team, the experiences of individuals on the teams, and discussions of broader structural inequalities that were brought to light through this scenario. Each attendee will then bring to mind a meeting that they have been a part of and consider these aspects of that meeting (individuals, identities, structural inequalities).

We will then identify intersectional “isms” that may produce boundaries and power differentials on interdisciplinary teams using role-play and individual experiences as starting points. With these “isms” identified (e.g., racism, tenurism, sexism, engineeringism), we will create individualized intersectionality wheels and consider how those “isms” impact lived experiences on teams. Intersectionality wheels include multiple spokes with each line representing an “ism” with the top half of the circle representing privileged positions and the bottom half representing oppression. An example of one of these lines is racism, with white being on the privileged, upper half and people of color on the oppressed, bottom half of the circle (see https://www.awis.org/intersectionality/ for an example of an intersectionality wheel). After creating these intersectionality wheels and building awareness around privilege on teams, participants will reflect on and discuss strategies for surmounting, managing, and mitigating these boundaries and power differentials.

Finally, we will discuss power, privilege, and intersectionality as it aligns with each of the facilitator's work. For example, we will share an intersectionality wheel that we created based on data collected from Vanessa and Nadia’s pairRED study (Partnering across insider-views of RED teams) that includes leadership team members with different social identities and roles on various RED teams. This final presentation will also provide additional readings and resources for attendees interested in learning more about power, privilege, and intersectionality. Attendees can take both the new strategies discussed in the session and the protocol for developing intersectionality wheels back to their institutions to facilitate a similar session to use with future interdisciplinary teams.

**T614B - VIRTUAL WORKSHOP:**
Advancing Learning through Curricula Design and Enactment Utilizing the Engineering Learning Framework

**4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor: Educational Research and Methods Division**

**Speakers: Dr. Sam Spiegel, Colorado School of Mines; Dr. Amy Hermundstad Nave, Colorado School of Mines**

Many faculty begin their careers with little or no formal education in teaching and learning. Yet teaching and learning is at the core of a university’s mission and business. To help faculty learn about the process of designing and delivering an effective course, we developed the Engineering Learning framework.

This interactive workshop will help new faculty (as well as experienced faculty who are interested in learning about course design) begin to design, or redesign, a course using the Engineering Learning framework. We will begin the session by brainstorming aspects of effective teaching. This first step is important to ensure that all participants can articulate a clear vision of what they mean by effective teaching and effective
T628 - VIRTUAL WORKSHOP: Advising Graduate Students: Lessons Learned from the Dissertation Institute
4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Graduate Studies Division
Speakers: Dr. Holly M. Matusovich, Virginia Polytechnic Institute and State University; Dr. Mayra S Artiles, Virginia Tech Department of Engineering Education; Dr. Stephanie G. Adams, University of Texas at Dallas; Mr. Juan M. Cruz, Virginia Polytechnic Institute and State University

Description:

The strategies that we will share in our workshop stem from a National Science Foundation-funded project titled the Dissertation Institute. The Dissertation Institute is a one-week intervention for minority students in the final phases of obtaining a doctorate. During this intervention, students are given a series of talks and tools for succeeding in the pursuit of a doctorate as well as time to practice these skills, particularly those relevant to writing. We also conduct research on our participants and their experiences in pursuing a doctorate.

From commonalities found in the data collected, we have developed a series of strategies to provide doctoral students with the precise support they need for success. Through the use of discussion and role-playing, participants will be able to learn and practice strategies on the following topics:

- Scaffolding students into independent research
- Building trust and rapport with your graduate students
- Leveraging opportunities to sustain degree progress
- 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.

T638 - VIRTUAL WORKSHOP: Advancing Mechanical Engineering Education Through Mobile Learning Micro-Workshop Training
4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Speakers: Dr. Krishna Pakala, Boise State University; Dr. Diana Bairaktarova, Virginia Polytechnic Institute and State University

This workshop will introduce participants to mobile technologies and learning strategies that can enhance learning for mechanical engineering (ME) students. Participants will see examples of how ME instructors used mobile learning strategies effectively in the classroom and identify ways to apply and transfer concepts through practice. Participants will engage in active learning through micro-workshops focused on relevant topics of digital learning, such as digital distraction, cloud-based collaboration, virtual office hours, and wireless presentation. Facilitators also will share highlights from a successful professional development program aimed at integrating mobile learning in higher education.

By participating in this workshop, attendees will:

1. Identify some mobile learning technologies and learning strategies which may be used for learning in a ME course
2. See examples of how effective mobile learning technologies and strategies were used by ME instructors
3. Identify ways in which effective mobile learning technologies and strategies can be used in their specific ME courses
4. Discuss the pros and cons of using mobile learning technologies and strategies in their course
5. Hear about a PD program designed to help ME instructors and others in using mobile tech and strategies for increasing student learning

Technology and Workshop Plan Technology: Smartphones and Tablets
In this workshop participants will:

1. Pair and discuss how mobile learning technologies and strategies are currently being used at their institutions to advance learning in ME courses
2. Be introduced to a series of concepts related to digital learning; through corresponding micro-workshops, participants will have the opportunity to transfer concepts to practice
3. Hear methods by which the discussed digital concepts were applied by instructors for ME learning
4. Work in small groups to complete a provided template for mapping their individual plan for mobile learning integration in a ME course
5. Hear an overview of a successful professional development program for mobile learning at Boise State University
4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Minorities in Engineering Division
Speakers: Dr. Krystal L. Williams; Dr. Eugene Anderson; Dr. Brian A. Burt, Iowa State University of Science and Technology

The session will begin with a presentation about national trends and the current status of engineering diversity. Afterwards, a collaborative learning breakout session will ensue led by engineering education and policy scholars. The breakout groups will be organized around the following themes related to the scholars’ expertise: The Male Minority: Understanding the Experiences of Black Males in Engineering; Promising Institutional Diversity and Inclusion Practices; and Engineering Pathways: Connecting K-12 and Higher Education to Broaden Participation for Students of Color.

T657 - VIRTUAL WORKSHOP: Transforming Inclusive Teaching, Mentoring, and Academic Advising in Engineering: A Core Competencies and Skills Framework
4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Faculty Development Division
Speaker: Dr. April Dukes, University of Pittsburgh

This session is designed to engage participants in a research-based foundational framework of skills that underlie inclusive teaching, mentoring in a research setting, academic advising, and being an inclusive colleague. Participants will have a chance to explore how the skills in this framework are foundational across all of these activities, and practice several in real time. Participants will leave with concrete ideas for applying new knowledge across areas of their own practice.

This session will include both presentation of information, case-based discussions, and interactive elements. Content will include the following:

- A description of the foundational framework highlighting common skills and inclusion of an accompanying rubric to gauge progression and learning of these skills
- A discussion about social identities and relationship building
- A series of cases/scenarios that practice skills in different educational settings (e.g., teaching, mentoring in a research setting, academic advising, and being an inclusive colleague)

- Content for guided reflection and planning further development of skills
- Additional resources

T699A - VIRTUAL WORKSHOP: Mastery-based Learning: From Exposure to Expertise
4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions
Speakers: Dr. Sara A. Atwood, Elizabethtown College; Dr. Kurt M DeGoede, Elizabethtown College

We have spoken to many engineering faculty interested in implementing a mastery-based approach. These faculty find that students no longer come to their office hours, use shortcuts to simply get the "right answer" on homework problems, focus more on the grade than on learning, and ultimately leave their courses only "kinda" knowing how to do most things. A mastery-based approach places responsibility for learning back on the student and takes students from exposure to expertise on the fundamental topics in the course.

Attendees will leave with an understanding of how outcomes-based assessment differs from traditional approaches and the advantages and disadvantages of each, an overview of published research on best practices, and implementation tips and tricks. Attendees should bring a course syllabus and will spend much of the workshop developing a draft syllabus for a mastery-based rework of their course, including defining and organizing outcomes, structuring the details of grading policies, and thinking through a parallel shift in the logistics of class-session and testing environments.

Additional Information:
The presenters have used mastery-based learning in four courses spanning all levels of the curriculum and have presented this workshop by invitation to other engineering departments. Presenters will provide their own handouts.
Leading change during times of transition requires establishing an environment of trust and transparency. Authentic leaders create an environment shaped by a clear set of ideals and values to establish a foundation based on honesty, competency, trust, and transparency. Leading successfully during times of turmoil and transition requires both competence in technical skills as well as behavioral and human-relations skills, which include self-regulation and motivating and mentoring your colleagues as well as demonstrating empathy for those who may feel left behind. This is an active workshop using case studies and scenarios to increase understanding and establish trusting relationships that ultimately allow successful changes during times of transition.

Peer evaluations are widely used to monitor student teams, but faculty may not always know what to do with the results to improve student team experiences. This workshop will focus on post-processing various kinds of data gathered in peer evaluations – round-robin ratings of teamwork, process measures such as conflict and psychological safety, free-text comments, and more. Participants will consider case studies of de-identified data from the CATME system, interpret those cases in collaboration with others, and discuss approaches for intervening with students and teams – or if intervention is warranted. Those using CATME will derive particular benefit, but participants will benefit from the workshop even if they use other approaches to peer evaluation.
T699E - VIRTUAL WORKSHOP: Partnering with the Engineering for Us All (E4USA) Advanced High School Course: Next Steps for All Stakeholders

4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Sponsored Sessions

Speakers: Mr. Kevin Calabro, University of Maryland College Park; Jackelyn Raquel Lopez Roshwalb, University of Maryland College Park; Dr. Bruk T. Berhane, University of Maryland College Park; Dr. Adam R. Carberry, Arizona State University; Ms. Medha Dalal, Arizona State University; Dr. Stacy S. Klein-Gardner, Vanderbilt University; Dr. Jennifer Kuo, Dr. Jumoke 'Kemi' Ladefi-Osias, Morgan State University; Dr. Kenneth Reid, Virginia Polytechnic Institute and State University; Marnie Wong, Arizona State University

The workshop begins with an overview and an update of the NSF-funded Engineering For US All (E4USA) project (NSF award 1849430). E4USA is a national pilot of an advanced high school course in engineering that is accessible to all students and potentially college credit bearing. We will review the initial 2019-2020 pilot year and then form into breakout groups based on stakeholder roles:

~ PK-12 teachers and schools looking to offer the E4USA course

~ Institutions of higher education looking to offer credit and placement for E4USA students and/or interested in sponsoring a high school

~ Education service providers and curriculum writers looking to develop content to offer for use in E4USA classrooms

~ Professional development providers interested in co-developing and/or hosting professional development of local E4USA teachers

~ Researchers interested in the collection, analysis, and sharing of data from this program

T699F - VIRTUAL WORKSHOP: How to Identify Appropriate NSF Funding Programs and Prepare Competitive NSF Engineering Education Research Proposals

4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Aerospace Division

Speakers: Edward Berger, National Science Foundation; Michelle Camacho, National Science Foundation; Monica Cardella, National Science Foundation; Dr. John Jackman, National Science Foundation; Dr. Paige E Smith, National Science Foundation; Amy Wilson-Lopez, National Science Foundation; Vinod Lohani, National Science Foundation

The engineering education community includes educators, industry practitioners, and professional organizations working collaboratively to attract, recruit, and retain a diverse group of students in engineering who can strengthen the U.S. economy and benefit society. The National Science Foundation (NSF) supports this community through multiple programs that invest in leading-edge engineering education research that advances our understanding of teaching, learning, and institutional change in engineering education at all education levels and in diverse settings. NSF serves as a catalyst for divergent thinking, innovation, and collaboration among engineering faculty and practitioners resulting in bold and innovative solutions to engineering education challenges. Selecting the right NSF program for your new idea and writing a compelling narrative are two critical steps in making your proposal competitive.

In this workshop, NSF 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 Divisions of Undergraduate Education (DUE), Research on Learning in Formal and Informal Settings (DRL), and Engineering Education Centers (EEC). This workshop will facilitate interactions with NSF program directors. Participants will learn about the proposal submission and administration process as well as how to identify areas in which their proposals can be enhanced. 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. The workshop will include a discussion of the merit review process followed by team-based review of a proposal previously submitted to NSF. Participants will leave the workshop with a better understanding of the engineering education research programs available as well as strategies to improve their proposals.

T701 - Aerospace Division Social

7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Aerospace Division

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information.
T704 - BME Division Awards Virtual Social
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Biomedical Engineering Division

The ASEE BME Division virtual social is an opportunity to interact with your BME colleagues in an informal setting. We also will present the winners of the Theo Pilkington Award, Biomedical Engineering Teaching Award, and Best Paper Award. We hope to see you there!

T706 - Civil Engineering Division Annual Awards Banquet
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division

The annual awards banquet of the Civil Engineering Division celebrates the achievements of members of the division.

T717 - Engineering and Public Policy Social
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE, TBD
Sponsor: Engineering and Public Policy Division

Informal gathering for division members. It's BYOB this year...

T736 - Materials Division Social Event
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Materials Division

T738 - ME Division Convivium
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE, TBD
Sponsor: Mechanical Engineering Division

The Mechanical Engineering Convivium is a Division-supported social event for members and guests. Please consider joining us for a chance to reconnect with old friends - and make new ones!

T741 - Multidisciplinary Engineering Division Social
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE, TBA
Sponsor: Multidisciplinary Engineering Division

As a virtual event, there is no ticket needed and no charge. Feel free to join Multidisciplinary Engineering members to share your ideas and experiences with multidisciplinary projects, courses, programs, and ideas/experiences with the new virtual world.

Contact MULTI Program Chair Cindy Barnicki (barnickc@msoe.edu) for additional details.

T745 - Engineering Physics and Physics Division Social Event
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Physics and Physics Division

Engineering Physics and Physics social event.

T747 - Student Division Social
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE, PENDING
Sponsor: Student Division

Come meet with other students, network, and learn about opportunities to get involved in the student division.
W201 - Flight and Control Simulators for Virtual Learning
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Aerospace Division
Moderators: Waterloo Tsutsui, Purdue University at West Lafayette; Michael Hatfield, University of Alaska Fairbanks

A Next-Generation Flight Simulator Using Virtual Reality for Aircraft Design (Work in Progress)
Dr. Dominic M. Halsmer P.E., Oral Roberts University

Acquiring and Implementing an Air Traffic Control Simulator in a Higher Education Aviation Program
Dr. Meron Lindenfeld, Farmingdale State College, State University of New York
Prof. Louis A. Scala, Farmingdale State College, State University of New York

Implementation of an Inductive Learning and Teaching Framework for an Aircraft Flight Dynamics and Control Class
Dr. A. Ram Kim, Iowa State University
Dr. Benjamin Ahn, Iowa State University of Science and Technology
Prof. Matthew Erik Nelson, Iowa State University

Role of Agricultural Simulation Games to Promote Youth-Adult Discussions Related to Agricultural Sustainability
Nathan C. Rice, University of Nebraska, Lincoln
Dr. Jennifer Keshwani, University of Nebraska, Lincoln
Dr. Deepak R. Keshwani, University of Nebraska, Lincoln

Education and Research at the Nexus of Food, Energy, and Water with a 3-Axis Farming Robot
Dr. Abhijit Nagchaudhuri, University of Maryland, Eastern Shore
Mr. Jesu Raj Pandya, University of Maryland, Eastern Shore
Dr. Madhuni Mitra, University of Maryland, Eastern Shore
Travis Ford, University of Maryland, Eastern Shore

W203 - Biological and Agricultural Engineering Division Technical Session 1
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Biological and Agricultural Engineering Division
Moderator: Janie Moore, Texas A&M University

The Role of the Co-curricular Spaces in the Engagement and Success of Minority Students
Dr. Hamidreza Sharifan, Texas A&M University
Dr. Janie M. Moore, Texas A&M University

Garden TOOLS: Technology-rich Agricultural Engineering Opportunities in Outdoor Learning Spaces
Dr. Erin Ingram, University of Nebraska, Lincoln
Dr. Jennifer Keshwani, University of Nebraska, Lincoln
Mrs. Tammera J. Mittelstet, University of Nebraska, Lincoln
Dr. Julie Thomas, University of Nebraska, Lincoln

W204 - Biomedical Engineering Curriculum and Design - June 24th
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Biomedical Engineering Division
Moderators: Katherine Reuther, Columbia University in the City of New York; Rachel Childers, University of Oklahoma

Biomedical Engineering Students Gain Design Knowledge and Report Increased Confidence When Continually Challenged with Integrated Design Projects
Dr. Steven Higbee, Indiana University Purdue University, Indianapolis
Dr. Sharon Miller, Indiana University Purdue University, Indianapolis

A Survey of Biomedical Design Projects to Inform Skill Development in a New Undergraduate Biomedical Engineering Curriculum
Ms. Kelsey Nicole Warren, Kansas State University
Dr. Charles Carlson, Kansas State University
Dr. Steve Warren, Kansas State University

Required Computer Science Education in BME Undergraduate Programs
Prof. Robert A. Linsenmeier, Northwestern University

Designing a MATLAB-based Escape Room
Ms. Lauren Nicole Heckelman, Duke University
Dr. Elizabeth Kathleen Bucholz, Duke University
An Assessment Instrument for User-centered Innovation Potential Among Biomedical Engineers

Carolina Vivas-Valencia, Purdue University, West Lafayette
Dr. Nan Kong, Purdue University, West Lafayette
Mrs. Eunhye Kim, Purdue University, West Lafayette
Dr. Senay Purzer, Purdue University, West Lafayette
Dr. Lindsey B. Payne, Purdue University, West Lafayette

W206A - Star Tech: Bringing Data Science and Technologies into the Classroom
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division
Moderator: David Saftner, University of Minnesota Duluth

This session includes papers on new ways to bring data science and data technologies into the classroom.

Integration of Unmanned Aerial Vehicles and Aerial Photogrammetry into a Civil Engineering Course to Enhance Technology Competency

Mary Kay Camarillo P.E., University of the Pacific
Dr. Elizabeth Basha, University of the Pacific
Mr. Muhammad Saud Khan, University of the Pacific

Integrating Building Information Modeling (BIM) into the Civil Engineering Curriculum

Dr. Edwin R. Schmeckpeper P.E., Norwich University
Dr. Nadia Al-Aubaidy, Norwich University

Preliminary Results from Implementing a Data-driven Team Project in an Introductory Risk and Uncertainty Analysis Class for Sophomore Civil and Environmental Engineering Students

Dr. Sotiria Koloutsou-Vakakis, University of Illinois at Urbana - Champaign

Engaging, Data-based, Visual Approach to Explaining Concrete

Prof. Jinwoo An, University of Mount Union
Mr. Alan M. Hunter, University of Central Florida
Dr. Xi Wang P.E., University of Mount Union
Prof. Boo Hyun Nam, University of Central Florida
Dr. Yong Je Kim, University of Central Florida
Dr. Byoung Hooi Cho, University of Central Florida

W206B - Integrating Sustainability and Resilience Concepts into Courses
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division
Moderator: Timothy Wood, The Citadel

This session examines perceptions and teaching practices of sustainability and resilience concepts in civil engineering education.

Civil Engineering Students’ Beliefs about the Technical and Social Implications of Global Warming and When Global Warming Will Impact Them Personally and Others

Dr. Andrew Katz, Virginia Tech
Dr. Tripp Shealy, Virginia Polytechnic Institute and State University
Dr. Allison Godwin, Purdue University at West Lafayette

Integrating the United Nations Sustainable Development Goals and the Envision Rating System to Assess Sustainability in Civil Engineering Capstone Design

Dr. Leslie R. Brunell P.E., Stevens Institute of Technology (School of Engineering and Science)

Usage of Building Information Modeling for Sustainable Development Education

Prof. Benjamin Sanchez, Tecnologico de Monterrey
Prof. Romeo Ballinas-Gonzalez, Tecnologico de Monterrey (ITESM)
Prof. Miguel X. Rodriguez-Paz, Tecnologico de Monterrey (ITESM)
Prof. Juan Arturo Nolazco-Flores, Tecnologico de Monterrey

Educating Engineers in Coastal Resiliency with a Global Perspective on Climate Change

Dr. Corinna Marie Fleischmann P.E., U.S. Coast Guard Academy
Dr. Hudson V. Jackson, U.S. Coast Guard Academy
Cmdr. Brian Maggi P.E., U.S. Coast Guard Academy
W207 - College Industry Partnerships Division Technical Session 1
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: College Industry Partnerships Division
Moderators: Patricia Sullivan, New Mexico State University; Charles Baukal, John Zink Co. LLC
Reimaging 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
Preparing Advanced Manufacturing Technicians for the Workplace: Perspectives from Rural Employers
  Dr. Faye R. Jones, Florida State University
  Dr. Marcia A. Mardis, Florida A&M University - Florida State University
Faculty Perceptions of Industry Sponsorships in Capstone Design Courses
  Dr. Jen Symons, University of Portland
  Ms. Kate Rohl, University of Portland

W208 - Computers in Education Division Technical Session 4: Digital Learning Part II
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Computers in Education Division
Moderators: Ashkan Negahban, Pennsylvania State University; Raghu Echempati, Kettering University
This session will be one of two sessions dealing with papers related to digital learning.
Development of a MATLAB/ROS Interface to a Low-cost Robot Arm
  Prof. Robert L. Avanzato, Pennsylvania State University, Abington
Work in Progress: Student Perception of Computer Programming within Engineering Education: An Investigation of Attitudes, Beliefs, and Behaviors
  Dr. Kelly S. Steelman, Michigan Technological University
  Dr. Michelle E. Jarvie-Eggart, Michigan Technological University
  Kay L. Tislar, Michigan Technological University
  Dr. Charles Wallace, Michigan Technological University
  Dr. Nathan D. Manser, Michigan Technological University
  Mrs. Briana C. Bettin, Michigan Technological University
  Leo C. Ureel II, Michigan Technological University
Measuring Students’ Engagement in Learning Volumes of Revolution when Using Advanced Visualization Media in an Active Learning Environment
  Dr. Fadi Castronovo, California State University, East Bay
  Jesus Oliver Ph.D., California State University, East Bay
  Mr. Andrew Stancluescu, California State University, East Bay
Implementing Serial Communication for the Instructional Processor
  Dr. Ronald J. Hayne, The Citadel
Undergraduate STEM Students’ Role in Making Technology Decisions for Solving Calculus Questions and the Impact of These Decisions on Learning Calculus
  Dr. Emre Tokgoz, Quinnipiac University
  Hasan Alp Tekalp
  Mrs. Elif Naz Tekalp
  Berrak Seren Tekalp BST

W209 - Construction Engineering Division Technical Session 2
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Construction Engineering Division; Architectural Engineering Division
Moderators: Mohamed ELZomor, Florida International University; Kimberly Talley, Texas State University; Norman Philipp, Pittsburg State University; Rachel Mosier, Oklahoma State University
Evaluating the Evolution of Construction Management Students’ Conflict Management Styles as a Result of Andragogical Methods
  Dr. David Wesley Martin, Central Washington University
Evaluation of the Impact of a Summer Construction Camp on Participants’ Perceptions
  Dr. Saeed Rokooei, Mississippi State University
  Dr. Mohammadorsouh Tafazzoli, Washington State University
Integrative Pedagogical Framework to Support Construction Students’ Professional Skills and Engagement
  Mr. Piyush Pradhananga, Florida International University
  Mr. Mohamed ElZomor, Florida International University
  Ms. Gabriella Santi
  Dr. Arif Mohaimin Sadri, Florida International University
The Perspectives of Three Universities’ Building Information Modeling Course Development
  Andrew Richard Klime, California Polytechnic State University, San Luis Obispo
  Dr. Fernanda L. Leite, University of Texas, Austin
W213A - Design Across Curriculum 1
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Design in Engineering Education Division
Moderators: Victoria Bill, NYU Tandon School of Engineering; Robert Loweth, University of Michigan

A New Framework for Student-Led Cocurricular Design Projects
Miss Nicole Danielle Trenchard, Harvard School of Engineering and Applied Sciences
Dr. Christopher Lombardo, Harvard School of Engineering and Applied Sciences

Work in Progress: Lessons Learned Supporting First-Year Students in an Academic Maker Space
Prof. Victoria Bill, NYU Tandon School of Engineering
Ariane Schoenwiesner, New York University

Student Practices Developing Needs Statements for Design Problems
Mr. Robert P. Loweth, University of Michigan
Dr. Shanna R. Daly, University of Michigan
Jiangqiong Liu
Prof. Kathleen H. Sienko, University of Michigan

Collaboration Patterns and Design Practices in First-Year Project-Based Engineering
Ha Nguyen, University of California, Irvine
Dr. Liang Li Wu, University of California, Irvine
Dr. Gregory N. Washington, University of California, Irvine
Prof. Kyu Yon Lim, Ewha Womans University
Dr. Christian Fischer, University of Tübingen, Germany

A Team Build-Test-Redesign Project in an Engineering Statics Course
Dr. Xiaobin Le P.E., Wentworth Institute of Technology
Prof. Richard L. Roberts, Wentworth Institute of Technology
Dr. Gloria Guohua Ma, Wentworth Institute of Technology
Mr. Herb Connors, Wentworth Institute of Technology

W213B - Empathy and Human-Centered Design 1
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Design in Engineering Education Division
Moderator: Alexander Pagano

Engineering Design and Social Justice: A Systematized Literature Review
Mr. Cristian Eduardo Vargas-Ordóñez, Purdue University at West Lafayette
Dr. Morgan M. Hynes, Purdue University at West Lafayette

Work in Progress: California Challenges in STEM Energy Education through Human-Centered Design Process: A Cooperative Adaptive-Learning Approach to Academic Success for Underserved Students
Prof. Abbas Ghassemi, University of California, Merced
Mr. Christopher A. Butler, University of California, Merced

Structure of a Human-Centered and Societal-Based First-Year Maker Space Design Course
Dr. Pamela L. Dickrell, University of Florida
Dr. Lilianny Virguez, University of Florida
Andrea Goncher, University of Florida

Work in Progress: Introducing Students to Human-Centered Design in a Design for Manufacturability Course
Mr. Alexander Pagano, University of Illinois at Urbana-Champaign
Dr. Saadeddine Shehab, University of Illinois at Urbana-Champaign
Prof. Leon Liebenberg, University of Illinois at Urbana-Champaign

W214A - Team Facilitation and Effectiveness
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Christine King, University of California, Irvine; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Team Effectiveness in Predicting Student Learning: An Analysis of First-year Engineering Students
Dr. P.K. Imbrie, University of Cincinnati
Ms. Jutshi Agarwal, University of Cincinnati
Mr. Gibin Raju, University of Cincinnati

Work in Progress: Challenges with Teaming Instruction and Managing Dysfunction
Dr. Benjamin Emery Mertz, Rose-Hulman Institute of Technology
Dr. Ashley Bernal, Rose-Hulman Institute of Technology
Dr. Patrick Cunningham, Rose-Hulman Institute of Technology
Dr. Shraddha Sangelkar, Rose-Hulman Institute of Technology

**Cross-functional Team Course Design Project in Engineering**
Dr. Nicholas D. Fila, Iowa State University
Dr. Diane T. Rover, Iowa State University
Dr. Mani Mina, Iowa State University
Dr. Phillip H. Jones III, Iowa State University

**Effect of Psychological Safety on the Interaction of Students in Teams**
Mr. Behzad Beigpourian, Purdue University, West Lafayette
Dr. Matthew W. Ohland, Purdue University, West Lafayette
Dr. Daniel M. Ferguson, Purdue University, West Lafayette

**W214B - Data-informed Approaches to Understanding Student Experiences and Outcomes**

*10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** Educational Research and Methods Division

**Moderators:** Arif Mohaimin Sadri, Florida International University; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

**Learning in Clusters: Exploring the Association Between Noncognitive and Affective Profiles of Engineering Students and Academic Performance**

Dr. John Chen, California Polytechnic State University, San Luis Obispo
Jenna Michelle Landy, California Polytechnic State University, San Luis Obispo
Mr. Matthew Scheidt, Purdue University, West Lafayette
Mr. Justin Charles Major, Purdue University, West Lafayette
Ms. Julianna Ge, Purdue University, West Lafayette
Camaryn Elizabeth Chambers, California Polytechnic State University, San Luis Obispo
Christina Grigorian
Michelle Kerfs, California Polytechnic State University, San Luis Obispo
Dr. Edward J. Berger, Purdue University, West Lafayette
Dr. Allison Godwin, Purdue University, West Lafayette
Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo
Dr. James M. Widmann, California Polytechnic State University, San Luis Obispo

**Competence, Engineering Achievement, and Persistence**
Mr. Harrison Douglas Lawson, Michigan State University
Ms. Amalia Krystal Lira, Michigan State University
Alexandra A. Lee, Michigan State University
Prof. Minhye Lee, Daegu National University of Education
Dr. Lisa Linnenbrink-Garcia, Michigan State University
Prof. S. Patrick Walton, Michigan State University
Dr. Daina Briedis, Michigan State University

**A Data-science Approach to Flagging Non-retention in Engineering Enrollment Data**
Mariem Boujelbene, University of Louisville
Mr. Khalil Damak, University of Louisville
Asman Cagla Acun Sener, University of Louisville
Dr. Jeffrey Lloyd Hieb, University of Louisville
Dr. Campbell R. Bego, University of Louisville
Dr. Patricia A. Ralston, University of Louisville
Prof. Ofla Nasraoui, University of Louisville

**Examining STEM Diagnostic Exam Scores and Self-efficacy as Predictors of Three-year STEM Psychological and Career Outcomes**
Ms. Brittany C. Bradford, Rice University
Dr. Margaret E. Beier, Rice University
Ms. Megan McSpedon, Rice University
Prof. Michael Wolf, Rice University

**Unleashing the Power of Data Analytics to Examine Engineering Students’ Experiences and Outcomes**
Dr. Qin Liu, University of Toronto
Dr. Greg Evans, University of Toronto

**W215 - Improvements in ECE Circuit Analysis**

*10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** Electrical and Computer Division

**Moderators:** Jennifer Bonniwell, Milwaukee School of Engineering; Huhiui Wang, Jacksonville University

**Systematic Review of Rigorous Research in Teaching Introductory Circuits**
Mr. Tom Henry J. Reagan, Colorado School of Mines
Dr. Stephanie Claussen, Colorado School of Mines
Mr. Eric Lyne

**Understanding Potential Misconceptions Shared Between Instructors and Students in Fundamental Electric Circuits**
Mr. Alejandro H. Espera Jr., Virginia Polytechnic Institute & State University
Dr. Nicole P. Pitterson, Virginia Polytechnic Institute & State University
Ing. René Alexander Soto-Pérez, Purdue University, West Lafayette

Turning Mesh Analysis Inside Out
Dr. Brian J. Skromme, Arizona State University
Wendy M. Barnard, Arizona State University
Mary White

Work in Progress: Investigating Students’ Meta-cognitive Awareness of Their Misconceptions About Electric Circuits
Dr. Kun Yao, University of Georgia
Dr. Adel W. Al Weshah, University of Georgia
Dr. Nathaniel Hunsu, University of Georgia

Helping Students Write It Right: Instilling Good Report-writing Habits in a Linear Circuit Lab Course
Dr. Eva Cosoroaba, University of Vermont

W216 - ECCD Technical Session 4: Energy and Analysis
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Energy Conversion and Conservation Division
Moderators: Matt Aldeman, Illinois State University; Sandip Das, Kennesaw State University

Papers presented in this session are related to energy and analysis, and their educational aspects.

A Comparison of the Renewable Energy and Energy Storage Sectors in Germany and the United States, with Recommendations for Engineering Teaching Practices
Dr. Lisa Bosman, Purdue University, West Lafayette
Jennifer Brinker, Northeast Wisconsin Technical College
Dr. Kenneth Walz, Madison Area Technical College

Relationship of the Industrial Assessment Center to the Land-grant Mission of Oklahoma State University
Dr. Hitesh D. Vora, Oklahoma State University
Ms. Pragya Nairaula, Oklahoma State University
Amrit Sunil Chugani, Oklahoma State University
Mr. Niles Anil Baraskar, Oklahoma State University
Anusha Sunil Saraf, Oklahoma State University
Dr. Michael L. McCombs, Oklahoma State University

An Evaluation of Focused Outreach and Recruiting Efforts in a Nuclear-related Workforce Development Program
Dr. Hayrettin B. Karayaka, Western Carolina University
Dr. Chip W. Ferguson, Western Carolina University
Dr. Amber C. Thompson, Western Carolina University

Analysis and Field-based Learning of Energy Conservation Measures in an Engineering Thermodynamics Course
Dr. Arash Kialashaki, California State University, Chico

W217 - Engineering and Public Policy Division Technical Session 1
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering and Public Policy Division
Moderator: Deanna Matthews, Carnegie Mellon University

Factors Influencing the Performance of Scientific and Technological Innovation in Chinese Universities: Evidence from fsQCA
Dr. Xiangyu Zhou, Zhejiang University
Dr. Lina Wei, Zhejiang University
Prof. Wei Zhang, Zhejiang University

A Statewide Policy-driven Approach to Gender Equity
Dr. Andrea E. Surovek, South Dakota School of Mines and Technology
Dr. Andrea Lyn Liebl, University of South Dakota
Dr. Alyssa M. Kiesow, Northern State University
Dr. Mary Emery
Dr. Pam F. Rowland
Dr. Cynthia Anderson

W220 - Ethical Reasoning and Decision Making
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Ethics Division
Moderators: Alexa Rihana Abdallah, University of Detroit Mercy; Joshua Gargac, University of Mount Union

Ethical Reasoning and Moral Foundations Among Engineering Students in China
Dr. Rockwell Franklin Clancy III, University of Michigan-Shanghai Jiao Tong University Joint Institute

Work in Progress: How Should We Decide? The Application of Ethical Reasoning to Decision Making in Difficult Cases
Mrs. Natalie C.T. Van Tyne P.E., Virginia Tech

Piloting an Adaptive Ethical Decision-making Tool for Engineering Students
Dr. Vignesh Subbian, University of Arizona
Dr. Linda R. Shaw, University of Arizona

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
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**ASEE'S VIRTUAL CONFERENCE**

**WEDNESDAY, JUNE 24 SESSIONS**

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**W221 - Professional Issues and Opportunities for Engineering Librarians**

*10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE*

Sponsor: Engineering Libraries Division

Moderators: Emily Hart, Syracuse University; Marcus Spann, Louisiana State University and A&M College

**ETAC ABET Accreditation and Information Literacy: A Case Study of Mechanical Engineering Technology**

Mr. Michael Fosmire, Purdue University, West Lafayette

**Assessing an Assessment: A Case Study of the NSSE “Experiences with Information Literacy” Module**

Ms. Debbie Morrow, Grand Valley State University

**Recent Changes to the Fundamentals of Engineering (FE) Exam and Ways Engineering Libraries Can Support Students**

Ms. Jean L. Bossart, University of Florida

**Diversity, Equity, and Inclusion Teaching Practices Among Engineering Librarians**

Sarah E. Lester, California Polytechnic State University, San Luis Obispo

**An Examination of Systematic Reviews in the Engineering Literature**

Ms. Alison Henry, University of Alberta

Ms. Lauren Stieglitz, University of Alberta

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**W222 - Engineering Management Division 1: The Practice of EMD**

*10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE*

Sponsor: Engineering Management Division

Moderator: Christopher Rowe, Vanderbilt University

Papers related to the professional practice of engineering management and how such concepts could be presented in the classroom.

**Career Paths in Structural Engineering: What We Can Learn from the SE3 (Structural Engineering Engagement and Equity) Report**

Prof. Christina McCoy P.E., Oklahoma State University

Prof. Carisa H. Ramming, Oklahoma State University

**The Effect of Different Dimensions of Conflict on Measures of Team-member Effectiveness**

Mr. Lawrence M. Strenger, CATME

Mr. Behzad Beigpourian, Purdue University, West Lafayette

Dr. Matthew W. Ohland, Purdue University, West Lafayette

Dr. Daniel M. Ferguson, Purdue University, West Lafayette

**A Simple Model for Identifying Costs of Quality**

Dr. Mustafa Shraim, Ohio University

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**W225 - Inventive Opportunities for Research and Exposure**

*10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE*

Sponsor: Environmental Engineering Division

Moderators: Patricia Hogan, Suffolk University; Veera Gnaneswar Gude, Mississippi State University; Rachel Brennan, Pennsylvania State University

**Developing a Multicampus Model for REU Sites**

Dr. Pamela McLeod, ReNUWIt at Stanford University

Dr. Junko Munakata Marr, Colorado School of Mines

Prof. Richard G. Luthy, Stanford University

**Environmental and Ecological Engineering in Context: A Foundational Graduate Course**

Dr. Inez Hua, Purdue University, West Lafayette

Dr. Loring Nies, Purdue University, West Lafayette

Dr. Lindsey B. Payne, Purdue University, West Lafayette

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**W226 - Experimentation and Laboratory-oriented Studies Division Technical Session 3**

*10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE*

Sponsor: Experimentation and Laboratory-Oriented Studies Division

Moderator: Nebojsa Jaksic, Colorado State University - Pueblo

**A Survey of the Proportion of Classes in Undergraduate Engineering Curricula that Include Labs**

Eleanor Byrnes, Harvey Mudd College

Yaqub Alam Mahsud, Harvey Mudd College

Spencer Rosen, Harvey Mudd College

Matthew Spencer, Harvey Mudd College

**Oklahoma State University’s ENDEAVOR: Transformation of Undergraduate Engineering Education Through Experience-based Learning.**

Dr. Hitesh D. Vora, Oklahoma State University

Dr. Brad Rowland, Oklahoma State University

Dr. Joe Conner, Oklahoma State University

Prof. Brian K. Norton P.E., Oklahoma State University

Dr. Qinang Hu, Oklahoma State University

Dr. Toni Ivey, Oklahoma State University

**Developing Best Practices for Teaching Scientific Documentation: Toward a Better Understanding of How Lab Notebooks Contribute to Knowledge-building in Engineering Design and Experimentation**

Dr. Rick Evans, Cornell University
Prof. Jeffrey Moses, Cornell University
Dr. Traci M. Nathans-Kelly, Cornell University

Perspectives and Practices of Undergraduate/Graduate Teaching Assistants on Writing Pedagogical Knowledge and Lab Report Evaluation in Engineering Laboratory Courses
Dr. Dave Kim, Washington State University, Vancouver
Dr. John D. Lynch, Washington State University, Vancouver

Dr. Benjamin D. Chambers, Virginia Polytechnic Institute and State University
Matthew B. James, Virginia Polytechnic Institute and State University

Continuing to Promote Metacognitive Awareness in a First-year Learning Strategies Course
Dr. Elizabeth Anne Stephan, Clemson University
Ms. Abigail T. Stephan, Clemson University
Laurel Whisler, Clemson University

Prof. Jeffrey Moses, Cornell University
Dr. Traci M. Nathans-Kelly, Cornell University

Perspectives and Practices of Undergraduate/Graduate Teaching Assistants on Writing Pedagogical Knowledge and Lab Report Evaluation in Engineering Laboratory Courses
Dr. Dave Kim, Washington State University, Vancouver
Dr. John D. Lynch, Washington State University, Vancouver

Dr. Benjamin D. Chambers, Virginia Polytechnic Institute and State University
Matthew B. James, Virginia Polytechnic Institute and State University

Continuing to Promote Metacognitive Awareness in a First-year Learning Strategies Course
Dr. Elizabeth Anne Stephan, Clemson University
Ms. Abigail T. Stephan, Clemson University
Laurel Whisler, Clemson University

W227 - The Best of First-year Programs Division
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division
Moderators: Kaitlin Mallouk, Rowan University; Timothy Hinds, Michigan State University

This will be a "best-of" session, so we expect a higher headcount than normal.

Predictors of First-year Retention Among Undergraduate Engineering Students Who Earn a C in their First-semester Math Course
Dr. Campbell R. Bego, University of Louisville
Dr. Jason Immekus, University of Louisville
Dr. Jeffrey Lloyd Hieb, University of Louisville

Information-seeking Behavior Among First-year Engineering Students and the Impacts of Pedagogical Intervention
Dr. George James Lamont, University of Waterloo
Dr. Kari D. Weaver, University of Waterloo
Mrs. Rachel Figueiredo, University of Waterloo
Dr. Kate Mercer, University of Waterloo
Dr. Andrea Jonas, University of Waterloo
Dr. Heather A. Love, University of Waterloo
Dr. Brad Mehlenbacher, University of Waterloo
Carter Neal, University of Waterloo
Dr. Katherine Zmetana, University of Waterloo
Dr. Rania Al-Hammoud P.Eng., University of Waterloo

Do Open-ended Design Projects Motivate First-year Engineering Students?
Dr. Chao Wang, Arizona State University

An Autoethnography: Outcomes from Faculty Engagement in Course Development in a Large First-year Engineering Program
Dr. Holly M. Matusovich, Virginia Polytechnic Institute and State University
Dr. Homero Murzi, Virginia Polytechnic Institute and State University
Dr. David Gray, Virginia Polytechnic Institute and State University

W231 - Instrumentation Division Technical Session 2
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Instrumentation Division
Moderator: Ali Alavizadeh, Purdue University Northwest

Credential Harvesting Using Raspberry Pi
Dr. Tae-Hoon Kim, Purdue University Northwest
Dr. Ge Jin, Purdue University Northwest
Dr. Michael Tu, Purdue University Northwest
Mr. Tianyang Guan, Purdue University Northwest

The Impact Detector Project: Mechanical and Electrical Worlds Collide
Dr. Dale H. Litwhiler, Pennsylvania State University, Berks Campus

Applied Instrumentation Course for Undergraduate Thermal-fluid Sciences
Dr. Elliott Bryner, Embry-Riddle Aeronautical University
Dr. Daniel Dannelley, Embry-Riddle Aeronautical University, Prescott

Fundamental Instrumentation Course for Undergraduate Aerospace and Mechanical Engineering
Dr. Daniel Dannelley, Embry-Riddle Aeronautical University, Prescott
Dr. Elliott Bryner, Embry-Riddle Aeronautical University

Design and Development of Robust Portable Trainers Used in PLC and Pneumatic Laboratories
Dr. Ali Alavizadeh, Purdue University Northwest
Dr. Maged Mikhail, Purdue University Northwest

Metering and Data Acquisition System for Electrical Gateway
Dr. Herbert L. Hess, University of Idaho, Moscow
W232 - International Accreditation and Credentials: International Division Technical Session 1
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: International Division
Moderators: Siben Dasgupta, Wentworth Institute of Technology; Phillip Sanger, Purdue University at West Lafayette

This session includes issues regarding accreditation and credentials outside of the U.S.

Achievements, Issues, and Recommendations of Quality Assurance in Engineering Education Within Colleges and Universities in Mainland China Under the Background of Program Accreditation
Dr. Ming Li, Beijing Foreign Studies University

Developments in Professional Engineering License Mobility and Recognition of International Credentials
Dr. Carmine C. Balascio P.E., University of Delaware

Outcome-based (Engineering) Education (OBE): International Accreditation Practices
Prof. Junaid Qadir, Information Technology University, Lahore, Pakistan
Dr. Aamir Shafi, National University of Computing and Emerging Sciences, Lahore, Pakistan
Prof. Ala Al-Fuqaha, Hamad Bin Khalifa University
Dr. Abd-Elhamid M. Taha, Alfaisal University
Prof. Kok-Lim Alvin Yau, Sunway University
Dr. Ing. João Ponciano, University of Glasgow
Dr. Sajjad Hussain, University of Glasgow
Prof. Muhammad Ali Imran P.E., University of Glasgow
Prof. Sajid Sheikh Muhammad, National University of Computer and Emerging Sciences, Lahore, Pakistan
Dr. Rao Naveed Bin Rais, Ajman University, UAE
Dr. Muhammad Rashid, Umm Al Qura University
Dr. Boon Leing Tan, Xi’an International University

W234 - Promoting Communication Skills
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Liberal Education/Engineering & Society Division
Moderator: Robin Fowler, University of Michigan

Communication Across Divisions: Trends Emerging from the 2019 Annual Conference of ASEE and Some Possibilities for Strategic Action
Dr. Kathryn A. Neeley, University of Virginia
Dr. Judith Shaul Norback, Georgia Institute of Technology
Mr. Charlie Bennett, Georgia Institute of Technology
Dr. Benjamin J. Laugelli, University of Virginia

Quantitative Assessment of Students’ Revision Processes
Lisa R. Volpatti, Massachusetts Institute of Technology
Mr. Alex Jordan Hanson, University of Texas at Austin
Jennifer M. Schall
Dr. Benjamin J. Laugelli, University of Virginia

Implementing Writing-as-Process in Engineering Education
Bruce Kovanen, University of Illinois at Urbana-Champaign
Ryan Ware, University of Illinois at Urbana-Champaign
Megan Mericle, University of Illinois at Urbana-Champaign
Nicole Turnipseed, University of Illinois at Urbana-Champaign
J. Patrick Coleman, University of Illinois at Urbana-Champaign
Celia Mathews Elliott, University of Illinois at Urbana-Champaign
Prof. John S. Popovics, University of Illinois at Urbana-Champaign
Prof. S. Lance Cooper, University of Illinois at Urbana-Champaign
Dr. John R. Gallagher, University of Illinois at Urbana-Champaign
Prof. Paul Prior, University of Illinois at Urbana-Champaign
Julie L. Zilles, University of Illinois at Urbana-Champaign

The Places They Will Go: What Happens When Engineering Students Critically Reflect
Ms. Gabrielle Orbaek White, Swansea University
Dr. Patricia Xavier, Swansea University
Dr. Catherine Groves, Swansea University
ASEE’S VIRTUAL CONFERENCE
WEDNESDAY, JUNE 24 SESSIONS

W235 - Undergraduate Research and Industry
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Manufacturing Division
Moderator: Richard Chiou, Drexel University

Interdisciplinary Senior Design Project to Develop a Personal Blind Spot Information System
Dr. Yalcin Ertekin, Drexel University
Dr. Irina Nicoleta Ciobanescu Husanu, Drexel University
Mr. Mike Stine Jr.
Mr. Douglas Brian Forbes, Lockheed Martin
Mr. Benjamin Cohen
Ryan Buckley

Investing in the Future: Bringing Research and Industry into Simulation-based Manufacturing Education
Dr. Faisal Aqlan, Pennsylvania State University
Dr. Qi Dunsworth, Pennsylvania State University
Dr. Jessica Resig

Undergraduate Research: Experimental Study on Performance of Marine Propellers
Dr. Jahangir Ansari, Virginia State University

W237 - Mathematics Division Technical Session 2: Presentations
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mathematics Division
Moderator: Amitabha Ghosh, Rochester Institute of Technology (COE)

On the Effectiveness of Designing Didactical Situations Targeting R^n to Teach the Concept of Subspace in Linear Algebra
Dr. Anibal Sosa, Universidad Icesi, Colombia
Dr. Norha M. Villegas, Universidad Icesi, Colombia
Mrs. Stephanie Celis Gallego, Universidad Icesi, Colombia
Mr. Diego Antonio Bohórquez, Universidad Icesi, Colombia

Mathematics Content of an Undergraduate Course on Deep Learning
Prof. Yosi Shibberu, Rose-Hulman Institute of Technology

Using Time-based Experiences for Explaining the Concept of Discontinuity
Dr. Daniel Raviv, Florida Atlantic University

Math of OK Go
MiKyla Jean Harjamaki, Playful Learning Lab
Dr. AnnMarie Thomas, University of St. Thomas
Ms. Krista Schumacher, University of St. Thomas

Abby Bensen, University of St. Thomas
Ms. Emma Michelle Monson, University of St. Thomas

Improving STEM Education by Analyzing the Design of a Bottle
Alexander Henderson, San Jose State University
Alexander Garcia, San Jose State University

10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderators: Amber Genau, University of Alabama at Birmingham; Hua Li, Texas A&M University - Kingsville

Presentations from groups with current NSF-funded projects focused on the development of hands-on models for classroom use.

Development of Team-Based Hands-On Learning Experiences
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. Meltem Alemdar, Georgia Institute of Technology
Benjamin Klein, Georgia Institute of Technology

Engaging STEM Learners with Hands-on Models to Build Representational Competence
Eric Davishahl, Whatcom Community College
Dr. Lee W. Singleton, Whatcom Community College
Todd Haskell, Western Washington University

Development of a Multiscale Experimentation and Visualization Module for Undergraduate Mechanics Education
Mr. Blake Herren, University of Oklahoma
Nyree Mason
Dr. Firas Akasheh, Tuskegee University
Dr. Gül E. Okudan-Kremer, Iowa State University of Science and Technology
Prof. Zahed Siddique, University of Oklahoma
Prof. Yingtao Liu, University of Oklahoma

A First-year Progress Report on ”Collaborative Research Using Low-cost Desktop Learning Modules to Educate Diverse Undergraduate Communities in Engineering"
Katelyn Dahlke, University of Wisconsin - Madison
Kitana Kaiphanliam, Washington State University
Prof. Bernard J. Van Wie, Washington State University
David B. Thiessen, Washington State University
Dr. Prashanta Dutta, Washington State University
W271B - NSF Grantees: Learning Tools (Virtual)
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderator: Renata Revelo, The University of Illinois at Chicago

Presentations from groups with current NSF-funded projects focused on the development of virtual or online learning tools, particularly for visualization.

Development, Deployment, and Evaluation of Instructional Modules for Current and Future Practitioners of Model-based Systems Engineering
- Dr. Audeen W. Fentiman, Purdue University
- Ms. Tian Tian Li, Purdue University at West Lafayette
- Dr. Kerrie A. Douglas, Purdue University at West Lafayette
- Dr. John W. Sutherland, Purdue University at West Lafayette
- Dr. Jorge D. Camba, Purdue University at West Lafayette
- Daniel DeLaurentis, Purdue University at West Lafayette

Collaborative Research: Designing an Immersive Virtual Environment for Chemical Engineering Process Safety Training
- Dr. Daniel D. Anastasio, Rose-Hulman Institute of Technology
- Landon Bassett, University of Connecticut
- Jeffrey Stransky, Rowan University
- Dr. Cheryl A. Bodnar, Rowan University
- Dr. Daniel D. Burkey, University of Connecticut
- Dr. Matthew Cooper, North Carolina State University

Spatial Visualization Skills Training at Texas State University to Enhance STEM Students’ Academic Success
- Dr. Clara Novoa, Texas State University
- Dr. Bobbi J. Spencer, Texas State University
- Ms. Leona Hazzlewood, Texas State University
- Dr. Araceli Martinez Ortiz, Texas State University

A Random Forest Model for Personalized Learning in a Narrative Game
- Dr. Ying Tang, Rowan University
- Mr. Ryan Hare, Rowan University

W299A - SPONSOR TECHNICAL SESSION: Integrating Coordinate Metrology into Engineering Programs - Presented by ZEISS Industrial Quality Solutions
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions
Moderator: Lauren Van Beek, ZEISS Industrial Quality Solutions
Speaker: Lauren Van Beek, Academic Program Manager, ZEISS Industrial Quality Solutions

Join the ZEISS academic program team in a discussion of how using coordinate measuring machines in educational institutions can help engineering students understand the importance of quality control in manufacturing. Presentation includes an overview of the need for metrology education for an advanced manufacturing workforce, a demonstration of ZEISS CMM equipment and software, and an overview of the special packages ZEISS offers to educational institutions.

W299B - SPONSOR TECHNICAL SESSION: Presented by MSC Software
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions

W304A - Design in Biomedical Engineering (Works in Progress)
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Biomedical Engineering Division
Moderators: Brian Helmke, University of Virginia; Dianne Hendricks, University of Washington

WIP: Experiential, Interdisciplinary Course in Global Health Innovation and Entrepreneurship
- Dr. Katherine E. Reuther, Columbia University
- Ms. Rachel Diane Field, Columbia University
- Dr. Aaron Kyle, Columbia University

Design-thinking Concepts in Undergraduate Engineering Capstone Projects
- Mr. Michael A. Phelan, Temple University
- Mr. Aratrik Guha
- Mr. Brandon K. Harrison, Temple University
- George Moukarzel, Temple University
- Ms. Abigail A. Tetteh
- Dr. Yah-el Har-el, Temple University
ASEE’S VIRTUAL CONFERENCE
WEDNESDAY, JUNE 24 SESSIONS

Dr. Ruth Ochia P.E., Temple University

Inclusion of Industry Professional Experts in Biomedical Engineering Design Courses At-scale

Collin W. Shale, Johns Hopkins University
Miss Shababa Binte Matin, Johns Hopkins University
Mr. Nicholas J. Durr, Johns Hopkins University
Elizabeth A. Logsdon, Johns Hopkins University

WIP: Engineering and Industrial Design Sub-teams for a Multi-disciplinary Biomedical Engineering Design Course

Ms. Erica M. Comber, Carnegie Mellon University
Mr. Elisha Anthony Raeker-Jordan, Carnegie Mellon University
Mrs. Kalliope Georgette Roberts, Carnegie Mellon University
Ms. Melanie Alexis Loppnow, Carnegie Mellon University
Mr. Andrew Hudson, Carnegie Mellon University
Prof. Wayne Chung, Carnegie Mellon University
Dr. Conrad M. Zapanta, Carnegie Mellon University

WIP: Transdisciplinary Design Education in Biomedical Engineering and Industrial Design Towards Identifying Unmet Needs of U.S. Veterans and their Healthcare Teams

Dr. Christopher Arena, Virginia Polytechnic Institute and State University
Dr. Elham Morshedzadeh, Virginia Polytechnic Institute and State University
Dr. John L. Robertson, Virginia Polytechnic Institute and State University
Dr. Andre Albert Muelenaer, Virginia Polytechnic Institute and State University
Brad D. Hendershot, DoD-VA Extremity Trauma and Amputation Center of Excellence, Walter Reed National Military Medical Center
Dr. Jessica L. O’Leary, Salem VA Medical Center
Dr. Aliza M. Lee, U.S. Department of Veterans Affairs
Dr. Devasmita Choudhury
Mr. Brandon C. Briggs
Dr. Pamela Jean VandeVord, Virginia Polytechnic Institute and State University

Redesigning a Biomedical Engineering Capstone Design Sequence to Enhance Student Engagement

Dr. Olga Imas, Milwaukee School of Engineering
Dr. Jeffrey A. LaMack, Milwaukee School of Engineering
Dr. Icaro Dos Santos, Milwaukee School of Engineering
Dr. Larry Fennigkoh P.E., Milwaukee School of Engineering
Dr. Charles S. Tritt, Milwaukee School of Engineering

W304B - Laboratory Learning in Biomedical Engineering (Works in Progress)

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Biomedical Engineering Division

Moderators: Jennifer Choi, University of California, Davis; Rachael Schmedlen, University of Michigan

WIP: Comparison of a Standards-based Assessment to a Traditional, Summative Rubric in a Biomedical Engineering Laboratory

Dr. Casey Jane Ankeny, Northwestern University
Prof. David P. O’Neill, Northwestern University
Lisa Beckmann, Northwestern University

WIP: Lab Benchmarking: How Are We Using Lab Courses in BME Curricula?

Michael P. Rathslag, University of Illinois, Urbana-Champaign
Miss Brittany R. Van Vleet, University of Illinois, Urbana-Champaign
Dr. Jennifer R. Amos, University of Illinois, Urbana-Champaign
Prof. Karin Jensen, University of Illinois, Urbana-Champaign

WIP: Interfacing with Microcontrollers: An Online Laboratory Learning Experience

Dr. Scott Howard Seidman, University of Rochester

WIP: Utilizing Guided Worksheets to Address Gender Gap in Troubleshooting Laboratory Course

Sabia Zehra Abidi, Rice University
Dr. Renata Fortuna Ramos, Rice University

Gamification and the use of "FPS," or First-person Shooting/“Seeding” Perspective in a Laboratory Course

Dr. Sarah Corinne Rowlinson, University of Florida

WIP: Pilot Study for the Effect of Simulated Laboratories on the Motivation of Biological Engineering Students

Mr. Ryan P. Devine, University of Georgia
Dr. Dominik May, University of Georgia
Dr. Cheryl T. Gomillion, University of Georgia

Schedule subject to change. Please go to www.see20.pathable.co for up-to-date information
W305A - Chemical Engineering in the Sophomore Year
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Chemical Engineering Division
Moderators: Katie Cadwell, Syracuse University; Justin Shaffer, Colorado School of Mines
Student Attitudes When Solving Homework Problems that Reverse Engineer YouTube Videos
Uchenna Asogwa, University of Toledo
Prof. Matthew W. Liberatore, University of Toledo
Mr. Timothy Ryan Duckett, University of Toledo
Dr. Gale A. Mentzer, Acumen Research and Evaluation, LLC
Creating and Facilitating Engaging, Rigorous Fully-Online Technical Courses (or just Online Content for Face-to-Face Courses) - an MEB Example
Dr. Tracy Q. Gardner, Colorado School of Mines
Evaluating a New Second-year Introduction to Chemical Engineering Design Course Using Concept Mapping
Matheus Oliveira Cassol, University of British Columbia, Vancouver
Dr. Jonathan Verrett, University of British Columbia, Vancouver
Quantifying Success and Attempts on Auto-graded Homework when Using an Interactive Textbook
Prof. Matthew W. Liberatore, University of Toledo
Megan Davidson, University of Toledo
Kayla Chapman
Student Performance in an Online Chemical Engineering Thermodynamics Course on a Summer Schedule
Dr. David L. Silverstein P.E., University of Kentucky
Dr. Sarah A. Wilson, University of Kentucky

W305B - Chemical Engineering in the Junior and Senior Year
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Chemical Engineering Division
Moderators: Cheryl Bodnar, Rowan University; Jason White, University of California, Davis
Process Control Design and Practice – A New Approach to Teaching Control to Chemical Engineers
Dr. Thomas Andrew Meadowcroft, Rowan University
Using Incident Reporting to Integrate Hazard Analysis and Risk Assessment into the Unit Operations Lab
Dr. Sarah A Wilson, University of Kentucky
Prof. Samira M. Azarin Azarin, University of Minnesota
Dr. Christopher Barr, University of Michigan
Dr. Janie Brennan, Washington University in St. Louis
Prof. Tracy L. Carter, Northeastern University
Amy J. Karlsson, University of Maryland
Jeffrey Stransky, Rowan University
Landon Bassett, University of Connecticut
Dr. Daniel D. Anastasio, Rose-Hulman Institute of Technology
Dr. Matthew Cooper, North Carolina State University
Dr. Daniel D. Burkey, University of Connecticut
Dr. Cheryl A. Bodnar, Rowan University
Chemical Engineering Senior Design at Colorado School of Mines: Recent Innovations & Achievements
Prof. Michael David Mau Barankin, Colorado School of Mines
Prof. Kevin J. Cash, Colorado School of Mines
Development of Learning Modules for Process Plant Operation
Dr. Richard Turton P.E., West Virginia University
Dr. Fernando V. Lima, West Virginia University
Mr. Brent A. Bishop, West Virginia University

W306A - Making it Sticky: Ways to Reinforce Prerequisite Knowledge
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division
Moderator: Leslie Brunell, Stevens Institute of Technology (School of Engineering and Science)
This session includes papers describing approaches to help students recall or reinforce pre-requisite knowledge.
Making Connections: Ensuring Strength of the Civil Engineering Curriculum
Personalized Learning Plans for Prerequisite Materials in a Senior-level Traffic Engineering Course
Dr. Vikash Gayah, Pennsylvania State University
Dr. Sarah E. Zappe, Pennsylvania State University
Dr. Stephanie Cutler, Pennsylvania State University
A Comparative Analysis of the Students’ Performance in Two Statics Courses Due to the Inclusion of an Adaptive Learning Module (ALM) to Review the Mathematics Prerequisite Knowledge
Dr. Ricardo Zaurin PE, University of Central Florida
Sudipta Dey Tirtha, University of Central Florida
Prof. Naveen Eluru, University of Central Florida
Using Case Studies and Educational Technology to Teach Structural Analysis and Design to Construction Engineering and Management Undergraduates
Dr. Monique H. Head, University of Delaware
Dr. Allen A. Jayne P.E., University of Delaware
Dr. Kevin R. Guidry, University of Delaware

W306B - Flipped, Blended, Online, Oh My
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division
Moderator: Matthew Lovell, Rose-Hulman Institute of Technology

This session includes papers on approaches to deliver courses using online learning approaches and tools.

A Comparison between Mixed-Mode and Face-to-Face Instructional Delivery Approaches for Engineering Analysis: Statics
Dr. Ricardo Zaurin PE, University of Central Florida
Sudipta Dey Tirtha, University of Central Florida
Prof. Naveen Eluru, University of Central Florida

Design, Implementation, and Evaluation of an Online Computer Course for Engineering Problem Solving
Dr. Cora Martinez, Florida International University, Department of Civil and Environmental Engineering
Dr. Lili Steiner, Florida International University

Highlights and Lessons Learned from a Partially Flipped Civil Engineering Classroom Study
Dr. Kimberly Warren, University of North Carolina at Charlotte
Meagan Padro, University of North Carolina at Charlotte
Dr. Chuang Wang, University of Macau

The Evaluation of Different Learning Tools in Flipped Mechanics of Materials
Dr. Sarira Motaref P.E., University of Connecticut

W307 - College Industry Partnerships Division Technical Session 2
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: College Industry Partnerships Division
Moderators: Magdalini Lagoudas, Texas A&M University; Charles Baukal, John Zink Co. LLC

The Industry 4.0 Talent Pipeline: A Generational Overview of the Professional Competencies, Motivational Factors, and Behavioral Styles of the Workforce
Dr. David Pistrui, University of Detroit Mercy

Dr. Darrell K. Kleinke P.E., University of Detroit Mercy
Dr. Shuvra Das, University of Detroit Mercy
Dr. Ronald Bonnstetter, Target Training International
Dr. Eric T. Gehrig, Target Training International

The Status of University-Industry Collaboration in China, the E.U., and the U.S.—A Comparative Research on Co-authored Publications
Dr. Tuoyu Li, Zhejiang University
Miss Zicong Zhao, Zhejiang University
Dr. Yujie Wang, Zhejiang University
Dr. Chen Li, Zhejiang University

W308A - Computers in Education Division Technical Session 5: Online Teaching and Learning
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Computers in Education Division
Moderators: Mahmoud Quweider, The University of Texas Rio Grande Valley; Stephen Edwards, Virginia Polytechnic Institute and State University

This session will include papers on digital learning.

A Multi-year Case Study in Blended Design: Student Experiences in a Blended, Synchronous, Distance Controls Course
Prof. Alisa Gilmore P.E., University of Nebraska, Lincoln
Dr. Tareq Daher, University of Nebraska, Lincoln
Dr. Markeya S. Peteranetz, University of Nebraska, Lincoln

"Keep Your Eyes on Your Own Paper" - Academic Dishonesty in the Era of Online Homework Assistance
Dr. Kenneth Reid, Virginia Tech
Max Mikel-Stites, Virginia Tech

Student and Faculty Perceptions of Integrated E-learning Modules Aimed at Developing an Entrepreneurial Mindset
Dr. Maria-Isabel Carnasciali, University of New Haven
Dr. Nadiye O. Erdil, University of New Haven
Dr. Ronald S. Harichandran, University of New Haven
Dr. Jean Nocito-Gobel, University of New Haven
Dr. Cheryl Q. Li, University of New Haven

Experiences in Developing a Robust Popular Online CS1 Course for the Past Seven Years
Joe Michael Allen, University of California, Riverside
Prof. Frank Vahid, University of California, Riverside
**W308B - Computers in Education Division Technical Session 6: Computer Science Freshman Courses**

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor: Computers in Education Division**

**Moderators:** Fitratullah Khan, University of Texas Rio Grande Valley; Emre Tokgoz, Quinnipiac University

This session will highlight COED papers related to teaching Computer Science I and II courses.

**Teaching Coral before C++ in a CS1 Course**
Joe Michael Allen, University of California, Riverside
Prof. Frank Vahid, University of California, Riverside

**Analyzing Pivoting Among Weekly Many Small Programs in a CS1 Course**
Joe Michael Allen, University of California, Riverside
Prof. Frank Vahid, University of California, Riverside

**Improving Pass Rates by Switching from a Passive to an Active Learning Textbook in CS0**
Ms. Dawn McKinney, University of South Alabama
Dr. Alex Daniel Edgcomb, Zybooks
Prof. Roman Lysecky, University of Arizona
Prof. Frank Vahid, University of California, Riverside

**Effectiveness of Using Guided Peer Code Review to Support Learning of Programming Concepts in a CS2 Course: A Pilot Study**
Dr. Tamaike Brown, State University of New York at Oswego
Dr. Gursimran Singh Walia, Georgia Southern University
Mr. Alex David Radermacher, North Dakota State University
Dr. Maninder Singh, St. Cloud State University
Dr. Mourya Reddy Narasareddygari, Rider University

**W311 - Cooperative and Experiential Education Division Technical Session 1 - Skill and Competency Development through the Co-op Experience**

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor: Cooperative and Experiential Education Division**

**Moderators:** Katherine McConnell, University of Colorado Boulder; Mary Andrade, University of Louisville

This session will provide a best-practices overview for skill and competency development through the co-op experience. This live (synchronous delivery) session will include a brief overview from each presenter, followed by an interactive question-and-answer session that allows for focused audience engagement. Before participating in this session, it is advised that the online technical session content (pre-recorded, asynchronous delivery) be reviewed.

**Understanding How Co-op Students View their Learning**
Ms. Katherine M. Ehler, Clemson University
Dr. Marisa K. Orr, Clemson University

**Co-op Education and the Impact on the Behaviors and Competencies of Undergraduate Engineering Students**
Dr. Nassif E. Rayess, University of Detroit Mercy
Dr. David Pistrui, University of Detroit Mercy
Dr. Ron Bonnstetter, Target Training International
Dr. Eric T. Gehrig, Target Training International

**Linking Co-op and Senior Project: Technical Proposal Requirement Embedded in Second Co-op Rotation**
Dr. Lindsay Corneal, Grand Valley State University
Dr. Wendy S. Refeoor, Grand Valley State University
Dr. Christopher P. Pung P.E., Grand Valley State University

**Development of Employability Skills in Engineering Disciplines through Co-op**
Ms. Haaniyah Ali, York University
Dr. Jeffrey Harris, York University

**W313A - Design Across the Curriculum 2**

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor: Design in Engineering Education Division**

**Moderators:** Charlotte de Vries, Pennsylvania State University, Behrend College; Lilianny Virguez, University of Florida

**The Implementation of Dynamic Learning in a Project-based Introductory Engineering Course**
Mr. Johnathon Garcia, New Mexico Institute of Mining and Technology
Ryan E. Harlow, New Mexico Institute of Mining and Technology
Estevan Andres Nunez, New Mexico Institute of Mining and Technology
Miss lorena Isabel Velasquez, New Mexico Institute of Mining and Technology
Dr. Curtis John O’Malley, New Mexico Institute of Mining and Technology

**Development of a Mentorship Program between Upper-class and First-year Engineering Students through 3-D Printing**
Dr. Charlotte Marr de Vries, Pennsylvania State University, Behrend College
ASEE’S VIRTUAL CONFERENCE
WEDNESDAY, JUNE 24 SESSIONS
#ASEEVC

Prof. Jill Johnson P.E., Pennsylvania State University, Behrend College
Mr. Brian Lani

Utility Value of an Introductory Engineering Design Course: An evaluation among Course Participants
Dr. Lilianny Virguez, University of Florida
Dr. Pamela L. Dickrell, University of Florida
Andrea Goncher, University of Florida

Challenges in a Freshman General Education Class
Dr. Michelle Maher, University of Missouri-Kansas City
Miss Kathleen O'Shea, University of Missouri-Kansas City
Dr. Jacob M. Marszalek, University of Missouri-Kansas City
Dr. Darran Cairns, University of Missouri-Kansas City

The Power of ProTAsTM: Work in Progress Paper Assessing the Impact of Industry Professionals as Teaching Assistants and Mentors to Advance Engineering Design Education Innovations
Dr. Lindy Hamilton Mayled, Arizona State University
Dr. Ryan J. Meuth, Arizona State University
Dr. Brent James Sebold, Arizona State University
Mr. Eric Prosser, Arizona State University

A Survey about the Internet of Things (IoT): What does IoT Mean to Senior-level Industrial Design Students?
Prof. Bekir Kelceoglu, Syracuse University
Mr. Efe Kutuk, Kean University

W313B - Design Teams 1
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Design in Engineering Education Division
Moderator: Shanna Daly, University of Michigan

Understanding Students’ Experiences with Teamwork in the Australian Context
Mr. Tahsin Mahmud Chowdhury, Virginia Tech
Dr. Homero Murzi, Virginia Tech
Sophia Vicente, Virginia Tech

The Emergence of the Project Manager Role in Student Design Teams: A Mixed-Methods Exploratory Study
Meagan Flus, University of Waterloo
Dr. Ada Hurst, University of Waterloo

Automating Detection of Framing Agency in Design Team Talk
Dr. Ardeshir Raihanian Mashhadi, University at Buffalo, SUNY
Dr. Vanessa Svihla, University of New Mexico

Introducing junto: a Web Tool to Build Project Teams based on a Bidding Strategy
Akhil Krishna Mohan, University of Illinois at Urbana-Champaign
Priyanka Dey, University of Illinois at Urbana-Champaign
Sizhi Tan, University of Illinois at Urbana-Champaign
Dr. Blake Everett Johnson, University of Illinois at Urbana-Champaign
Prof. Wade Fagen-Ulmschneider, University of Illinois at Urbana-Champaign

W313C - Empathy and Human-Centered Design 2
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Design in Engineering Education Division
Moderator: Vanessa Svihla, University of New Mexico

Empathy in a Service-Learning Design Course
Nusaybah Abu-Mulaweh, Purdue University at West Lafayette
Dr. William "Bill" C. Oakes, Purdue University at West Lafayette
Paul Leidig P.E., Purdue University

The Wrong Theory Protocol: A Pre-Ideation Technique to Enhance Creativity and Empathy
Dr. Vanessa Svihla, University of New Mexico
Luke Kachelmeier, University of New Mexico

Can Empathy Be Taught? The Results of an Assignment Targeted at Improving Empathy in Engineering Design
Devanshi Shah, University of Georgia
Miss Xiaou Yang, University of Georgia
Dr. Beshoy Morkos, University of Georgia

Unconscious Bias in Peer Ratings of International Students’ Contributions to First-Year Design Projects
Dr. Angela R. Bielefeldt, University of Colorado, Boulder
W313D - Design Teams 2
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Design in Engineering Education Division
Moderator: Robin Fowler, University of Michigan

Assessing the Culture of Engineering Student Project Teams
Dr. Laura J. Hirshfield, University of Michigan
Mr. James A. Coller, University of Michigan
Ms. Emily A. Madden, University of Michigan
Dr. Robin Fowler, University of Michigan

A Hybrid Approach to Team-forming for Capstone Design Projects
Dr. Peter Schuster, California Polytechnic State University, San Luis Obispo
Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo
Mr. Eltahry Elghandour, California Polytechnic State University, San Luis Obispo
Dr. Lauren Anne Cooper, California Polytechnic State University, San Luis Obispo

Interdisciplinary Design Project Teams: Structuring an Impactful Experience
Prof. Jeanne M. Homer, Oklahoma State University
Mr. James Beckstrom, Oklahoma State University
Dr. Tom Elliott Spector, Oklahoma State University
Prof. John J. Phillips, Oklahoma State University
Prof. Khaled Mansy, Oklahoma State University
Mr. Jerry L. Stivers

Senior Capstone Team Formation Based on Project Interest: Team Selection by Students Compared with Team Selection by Instructors
Dr. Peter Schuster, California Polytechnic State University, San Luis Obispo
Dr. Lauren Anne Cooper, California Polytechnic State University, San Luis Obispo
Dr. Eltahry Elghandour, California Polytechnic State University, San Luis Obispo
Ms. Eileen W. Rossman P.E., California Polytechnic State University, San Luis Obispo
Sarah Harding, California Polytechnic State University, San Luis Obispo
Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo

W314A - Experiences of Underrepresented Students in Engineering
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Joana Marques Melo, Purdue University at West Lafayette; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Work in Progress: STEM Energy Education in California's San Joaquin Valley
Prof. Abbas Ghassemi, University of California, Merced
Mr. Christopher A. Butler, University of California, Merced

Work in Progress: Identifying Structural and Cultural Characteristics of Hispanic-serving Institutions in Engineering Education – A Morphogenetic Approach
Indhira Maria Hasbún, Florida International University
Dr. Alexandra Coso Strong, Florida International University

Understanding the Demands and Resources for Academic Success of Second-career Undergraduate Engineering Students as Compared to Traditional Undergraduate and Graduate Engineering Students
Dr. Oleksandr Kravchenko, Old Dominion University
Dr. Konstantin Cigularov, Old Dominion University
Mr. Phillip Dillulio, Old Dominion University

Departures from the “Norm”: How Nontraditional Undergraduates Defined Their Success in an Alternative Engineering Transfer Program
Dr. Angela Minichiello P.E., Utah State University
Dr. Oenardi Lawanto, Utah State University
Dr. Sherry Marx, Utah State University

Combining Strategies for Leadership Development of Engineering Students
Dr. Nayda G. Santiago, University of Puerto Rico, Mayaguez Campus
Dr. Manuel A. Jimenez, University of Puerto Rico, Mayaguez Campus
Dr. Luisa Guillemand, University of Puerto Rico, Mayaguez Campus

Impacting Students from Economically Disadvantaged Groups in an Engineering Career Pathway
Dr. Manuel Jimenez, University of Puerto Rico, Mayaguez Campus
Dr. Luisa Guillemand, University of Puerto Rico, Mayaguez Campus
Dr. Sonia M. Bartolomei-Suarez, University of Puerto Rico, Mayaguez Campus
Prof. Oscar Marcelo Suarez, University of Puerto Rico,
ASEE’S VIRTUAL CONFERENCE
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Mayaguez Campus
Dr. Aidsa I. Santiago-Román, University of Puerto Rico, Mayaguez Campus
Dr. Nayda G. Santiago, University of Puerto Rico, Mayaguez Campus
Dr. Carla López del Puerto, University of Puerto Rico, Mayaguez Campus
Dr. Pedro O. Quintero, University of Puerto Rico, Mayaguez Campus
Prof. Nelson Cardona-Martínez, University of Puerto Rico, Mayaguez Campus

Ms. Brianna Shani Benedict, Purdue University, West Lafayette
Mrs. Kayla R. Maxey, Purdue University, West Lafayette
Ms. Dina Verdin, Purdue University, West Lafayette
Dr. Allison Godwin, Purdue University, West Lafayette

W314C - Approaches to Assessment and Student Reflection
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Michelle Soledad, Virginia Polytechnic Institute and State University; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Reconciling the Student’s Deliverables with the Instructor’s Expectations in Engineering Exams
Dr. Ephraim Zegeye, Liberty University
Dr. Tom Eldredge, Liberty University

The Conceptual Fluency Approach for Introductory Thermodynamics
Catherine Marie Hamel, University of Maryland
Prof. W. Ethan Eagle, University of Maryland

Measurement of the Effect of Interactive Questions in Lab Manuals on Student Learning
Sabrine Griffith, Harvey Mudd College
Spencer Rosen, Harvey Mudd College
Eleanor Byrnes, Harvey Mudd College
Dr. Laura Palucki Blake, Harvey Mudd College
Matthew Spencer, Harvey Mudd College

Four Complications in Designing a Validated Survey to Gather Information on Student Reactions to Reflection Activities
Kenya Mejia, University of Washington
Dr. Jennifer A. Turns, University of Washington
Wendy Roldan, University of Washington

The Napkin Sketch Pilot Study: A Minute-paper Reflection in Pictorial Form
Capt. Jes Barron, U.S. Military Academy
Lt. Col. Brad C. McCoy, U.S. Military Academy
Major John J. Case, U.S. Military Academy
Major John Andrew Kearby, U.S. Military Academy

Work in Progress: An Ecosystems Metaphor for Propagation
Dr. Susan Bobbitt Nolen, University of Washington
Dr. Milo Koretsky, Oregon State University
W314D - Understanding Student Behavior and Experiences
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Patrick Cunningham, Rose-Hulman Institute of Technology; James Pembright, Embry-Riddle Aeronautical University - Daytona Beach
Enhancing Peer Influence in STEM Learning and Engagement through Social Media Interactions Using Network Science Principles
Dr. Arif Mohaimin Sadri, Florida International University
Student Learning Strategies: Helping or Hindering Their Success?
Nancy Nelson, University of Calgary
Dr. Robert William Brennan, University of Calgary
Examining Relationships Between Student Interactions with Peers and Resources and Performance in a Large Engineering Course Using Social Network Analysis
Mr. Jack Elliott, Utah State University
Dr. Angela Minichiello P.E., Utah State University
Joel Ellsworth, Utah State University
Feedback-seeking Behaviors
Dr. Jeannine E. Turner, Florida State University
Min Tang
Mr. Shayne Kelly McConomy, Florida A&M University/Florida State University
Mostafa Papi
Dr. Jerris Hooker, Florida A&M University/Florida State University
An Analysis of Students’ Brain Activity when Participating in Different Learning Activities
Miss Xinyue (Crystal) Liu, University of Toronto
Dr. Yasaman Delaviz, York University
Dr. Scott D. Ramsay, University of Toronto

W315 - Course Transformation in ECE
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Electrical and Computer Division
Moderators: Jennifer Bonniwell, Milwaukee School of Engineering; Huihui Wang, Jacksonville University
Simple Steps to Lower Student Stress in a Digital Systems Course While Maintaining High Standards and Expectations
Dr. Rabih Younes, Duke University
Cécilé Sadler, Duke University
First-year STEM Course in Engineering
Prof. Christopher D. Schmitz, University of Illinois at Urbana-Champaign
Dr. Geoffrey L. Herman, University of Illinois at Urbana-Champaign
Prof. Timothy Bretl, University of Illinois at Urbana-Champaign
A Project-based Printed Circuit Board (PCB) Electronics Course
Dr. Karl Brakora, Grand Valley State University
Dr. Lihong (Heidi) Jiao, Grand Valley State University
Work in Progress: Exploring Pedagogical Alternatives for Incorporating Simulations in an Introductory Power Electronics Course
Mr. Mohamed Khaled Elshazly, University of Toronto
Dr. Hamid S. Timorabadi, University of Toronto

W316 - ECCD Technical Session 5: Energy and Wind and Design
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Energy Conversion and Conservation Division
Moderators: Sandip Das, Kennesaw State University; Ted Song, John Brown University
Papers presented in this session are related to energy, wind, and design, and their educational aspects.
Power Generation Through Small-scale Wind Turbine
Prof. Bala Maheswaran, Northeastern University
Ms. Alya Abd Aziz, Northeastern University
Mr. Evan Alexander,
Ms. Laura Brigandi, Northeastern University
Cole Branagan, Northeastern University
Air-conditioning Unit Performance Analysis Equipped with a Shaded Condenser
Dr. Maher Shehadi, Purdue Polytechnic Institute
Mobile Renewable Response Trailer (MRRT) for Disaster Relief Efforts
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
Hybrid Green Vessel Design
Joseph C. Rodriguez, United States Coast Guard Academy
Scott C. Pierce, United States Coast Guard Academy
Brennen McCulloch
Mr. George McBurney, United States Coast Guard Academy
## W318 - Engineering Design Graphics Division Technical Session 2

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE  
**Sponsor:** Engineering Design Graphics Division  
**Moderator:** Ranjeet Agarwala, East Carolina University  
Focuses on visualization and the technological needs of engineering faculty and other engineering educators.

### Cloud-based Computer-aided Engineering Education: Finding the Silver Lining
- Dr. Derek M. Yip-Hoi, Western Washington University

### Contextualized Design Projects in Graphics and Visualization Course: Student Perceptions and Sustainability Systems-thinking Knowledge
- Dr. Raghu Pucha, Georgia Institute of Technology  
- Dr. Sunni Haag Newton, Georgia Institute of Technology  
- Dr. Meltem Alemdar, Georgia Institute of Technology  
- Dr. Rebecca Watts Hull, Georgia Institute of Technology  
- Adhiraj Bhatag, Georgia Institute of Technology  

### Evaluation of a Puzzle-based Virtual Platform for Improving Spatial Visualization Skills in Engineering Freshmen
- Dr. Vimal Kumar Viswanathan, San Jose State University  
- Sadaqat Ali Hussainali Mirza, San Jose State University  
- Dr. Chitra R. Nayak, Tuskegee University  
- Dr. Maria Calhoun, Tuskegee University

## W320A - Innovating Ethics Curriculum and Instruction

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE  
**Sponsor:** Engineering Ethics Division  
**Moderators:** Alison Kerr, The University of Tulsa; Joel Schneider, Stanford University  

### Ethical Development through the Use of Fiction in a Project-based Engineering Program
- Dr. Rob Sleezer, Minnesota State University, Mankato  
- Dr. Rebecca A. Bates, Minnesota State University, Mankato

## W320B - Ethical Design

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE  
**Sponsor:** Engineering Ethics Division  
**Moderators:** Jonathan Aurand, Dunwoody Institute; Basel Alsayed Ahmad, University of Alberta  

### Integrating Ethics into the Curriculum Through Design Courses
- Prof. Scott A. Civjan, University of Massachusetts, Amherst  
- Prof. Nicholas Tooker, University of Massachusetts, Amherst  

### Building Better Worlds: An Interdisciplinary Approach to Engineering Ethics Pedagogy
- Dr. Amy Schroeder, University of Southern California  

### Developing and Applying Knowledge and Skills in Ethics and Professional Morality: An Evidence-based Practice Paper
- Dr. Donald Winiecki, Boise State University  
- Mr. Lynn Catlin P.E., Boise State University  
- Dr. Harold Ackler, Boise State University

## W321 - Assessing, Expanding, and Innovating Information Literacy

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE  
**Sponsor:** Engineering Libraries Division  
**Moderators:** Angela Henshilwood, University of Toronto; Lisa Ngo, University of California, Berkeley  

### Extending the Role of the Library and Librarian: Integrating Alternative Information Literacy into the Engineering Curriculum
- Ms. Erin Rowley, University at Buffalo  
- Dr. Lauren Kuryloski, University at Buffalo  
- Dr. Kristen Moore, University at Buffalo
Using a Faceted Taxonomy to Investigate Student Selection of Information Sources in an Engineering Lab Course
Ms. Amber Janssen, California State University Maritime Academy
Dr. William W. Tsai, California State University Maritime Academy

Assessment of Consultations for an Industrial Distribution Writing-Intensive Course
Prof. Pauline Melgoza, Texas A&M University
Ashlynn Kogut, Texas A&M University
Mr. Michael Ryan Golla, Texas A&M University

Lifelong Learning in an Engineering Communication Course
Prof. S. Norma Godavari, University of Manitoba
Dr. Anne E. Parker, University of Manitoba

Credited Information Literacy Training Sessions for Graduate Students - Still Relevant after 18 years: A Case Study
Elise Anne Basque, École Polytechnique de Montréal
Christine Brodeur, École Polytechnique de Montréal
Manon Du Ruisseau, École Polytechnique de Montréal
Mr. Jimmy Roberge, École Polytechnique de Montréal
Mrs. Arina Soare, École Polytechnique de Montréal
Mrs. Marie Tremblay, École Polytechnique de Montréal

W322 - EMD 2: Issues in Engineering Management Education
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Management Division
Moderator: John Richards, United States Military Academy

Papers related to retention/completion, education improvements, and mentoring.

Interleaving Lenses to Scale Our Units of Analysis for Engineering Education Improvement
Mr. Nicholas Jon Monacelli
Dr. Jennifer Karlin, Minnesota State University, Mankato

Piloting an Undergraduate Engineering Mentoring Program to Enhance Gender Diversity
Ms. Elizabeth Hart, University of Dayton
Miss Andrea Mott, University of Dayton
Dr. Sandra L. Furterer, University of Dayton

Predicting Student Degree Completion Using Random Forest
Tatiana A. Cardona, Missouri University of Science and Technology
Dr. Elizabeth A. Cudney, Missouri University of Science and Technology

W323 - STEM Issues in ET
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Technology Division
Moderator: Kathryn Kelley, The Ohio State University

Development of an Interdisciplinary, Project-based Scientific Research Course for STEM Departments
Dr. Faruk Yildiz, Sam Houston State University
David E. Thompson, Sam Houston State University

Enhancing STEM Retention and Graduation Rate by Incorporating Innovative Teaching Strategies in Selected STEM Introductory Courses
Dr. Nikunja Swain P.E., South Carolina State University
Prof. Cynthia T. Davis, South Carolina State University
Dr. Biswajit Biswal, South Carolina State University
Dr. Eugene Kennedy, Louisiana State University

Evaluating Student Conceptions of Technology Majors: Development of Assessment Keyword Tables
Dr. Matthew Turner, Purdue University, New Albany
Dr. Rustin Webster, Purdue University, New Albany

Impact of Mentor-Mentee Fit in Preparing Undergraduate STEM Students to Teach Engineering Technology for Elementary Students
Dr. Lei Xie, Texas State University
Dr. Malini Natarajarathinam, Texas A&M University
Dr. Bugrahan Yalvac, Texas A&M University

W324 - ENT Division Technical Session: Entrepreneurship and IP
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Entrepreneurship & Engineering Innovation Division
Moderators: Prateek Shekhar, New Jersey Institute of Technology; Jason Forsyth, James Madison University

A Systematic Review of Student Entrepreneurial Failure in Engineering Education
Dr. Thomas M. Katona, California Polytechnic State University, San Luis Obispo
Dr. Sarah E. Zappe, Pennsylvania State University, University Park
Dr. Joe Tranquillo, Bucknell University

An Online Course on Intellectual Property for Undergraduate and Graduate Engineers and Scientists
Prof. Howard B. Rockman, University of Illinois at Chicago
Exposure of Undergraduate Research Students to Entrepreneurial Activities to Motivate Future Research Careers
Prof. Ranji K. Vaidyanathan, Oklahoma State University
Dr. Mwarumba Mwavita, Oklahoma State University
Kathryn Ann Bartosik, Clarkson University
Pankaj Sarin, Oklahoma State University

Faculty Views of Undergraduate Intellectual Property Policies and Practices
Dr. Soohyun Yi, Texas Tech University
Dr. Nathalie Duval-Couetil, Purdue University, West Lafayette

Fostering Entrepreneurship in Project-based Software Engineering Courses
Dr. Kevin Buffardi, California State University, Chico
David Rahn, California State University, Chico

W326 - Experimentation and Laboratory-oriented Studies Division Technical Session 4
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Experimentation and Laboratory-Oriented Studies Division
Moderator: Hitesh Vora, Oklahoma State University

“Just in Time” Mechatronics in Senior Design Capstones
Dr. Robert J. Rabb P.E., The Citadel
Dr. James Righter, The Citadel

Scaffolded Laboratory Sequence: Mechanics Lab
Dr. Natasha Smith P.E., University of Virginia

Composite Materials Courses in Colombia
Ing. Esteban Maya Muñoz, Universidad del Valle
Prof. Ronald Sterkenburg, Purdue University, West Lafayette
Dr. Jairo Antonio Valdes Ortiz, Universidad del Valle
Prof. Guillermo Andrés Jaramillo Pizarro P.E., Universidad del Valle

Pilot Study Results from Using TrussVR© to Learn About Basic Trusses
Dr. Sean Maw P.Eng., University of Saskatchewan
Ryan Banow, University of Saskatchewan

W327 - First-year Programs: Professional Development and Skills
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-year Programs Division
Moderators: Marina Miletic; Noah Salzman, Boise State University

How are we preparing our students for the workforce and giving them professional skills in their first year?

A First-year Career Development Course: Securing and Succeeding in an Engineering Job
Dr. Jennifer Sinclair Curtis, University of California, Davis

Work in Progress: Student Perceptions of Professional Integrity Modules Incorporated in a First-year Engineering Program
Dr. Irene B. Mena, University of Pittsburgh

Work in Progress: Integrating Information Literacy into a Multidisciplinary First-year Engineering Program
Mr. Alexander James Carroll, Vanderbilt University
Dr. Joshua Daniel Borycz, Vanderbilt University
Dr. Julianne Vernon, Vanderbilt University

Work in Progress: Professional Development Module in First-year Engineering Courses
Dr. Olukemi Akintewe, University of South Florida
Dr. Jonathan Elliot Gaines, University of South Florida
Ann Maria Bateman, University of South Florida
Ms. Lynn Chisholm, University of South Florida

Asking Questions About Data: First-year Engineering Students’ Introduction to Data Analytics
Mr. Ruben D. Lopez-Parra P.E., Purdue University, West Lafayette
Mr. Arístides Carrillo Fernández, Purdue University, West Lafayette
Amanda Johnston, Purdue University, West Lafayette
Prof. Tamara J. Moore, Purdue University, West Lafayette
Dr. Sean P. Brophy, Purdue University, West Lafayette

W328 - Professional Development for Graduate Students
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Graduate Studies Division
Moderators: Eric Holloway, Purdue University at West Lafayette; Jeffrey Fergus, Auburn University

Technical Leadership Skills Development Through Interactive Workshops
Prof. Dennis W. Hess, Georgia Institute of Technology

**Novel Courses for the Professional Development of Graduate Students: Results and Reflection**

Dr. Michael A. Matthews P.E., University of South Carolina
Dr. Gina M. Kunz, University of South Carolina
Dr. Kevin Brock, University of South Carolina
Dr. Darin Freeburg, University of South Carolina

**Soft Skills Curriculum on a Budget: Tackling the STEM Skills Gap with Limited Resources Using Online Videos**

Melissa Gavin, University of Wisconsin, Platteville
Randy Mentz, University of Wisconsin, Platteville
Lori M. Wedig, University of Wisconsin, Platteville
Dr. Christine H. Storlie, University of Wisconsin, Platteville
Eric Herbst, University of Wisconsin, Platteville

**STEMAmbassadors: Developing Communications, Teamwork, and Leadership Skills for Graduate Students**

Mrs. Astri Briliyanti, Michigan State University
Julie W. Rojewski, Michigan State University
Dr. Dirk Joel Luchini-Colbry, Michigan State University
Dr. Katy Luchini-Colbry, Michigan State University

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**W330 - Computing and Information Technology Division Technical Session 4**

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Computing and Information Technology Division

**Moderators:** Mia Minnes, University of California, San Diego; Yosi Shibberu, Rose-Hulman Institute of Technology

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

**Writing Effective Autograded Exercises Using Bloom’s Taxonomy**

Dr. Lina Battestilli, North Carolina State University
Ms. Sarah Korkes, North Carolina State University

**Predicting Retention Rates from Students’ Behavior**

Dr. Awatif Amin, Johnson C. Smith University

**Work in Progress: Student-generated Material for Artificial Intelligence Course**

Dr. Stephany Coffman-Wolph, Ohio Northern University
Dr. Kimberlyn Gray, West Virginia University Institute of Technology

**Autonomous Vehicles in Computer Engineering Program**

Dr. Afsaneh Minaie, Utah Valley University
Dr. Reza Sanati-Mehrizy, Utah Valley University
Benjamin Chambers

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**W332 - Cultural Issues in Engineering: International Division Technical Session 2**

11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** International Division

**Moderators:** Sigrid Berka, The University of Rhode Island; Joseph Menicucci, Montana State University - Bozeman; Phillip Sanger, Purdue University at West Lafayette

This session covers issues encountered in cross-cultural diversity and competencies.

**Cross-cultural Engineering Skill Development at an International Engineering Summer Boot Camp**

Dr. Nicholas Andres Brake, Lamar University
Dr. Oleksandra Sehin, Texas State University
Mr. John Wade Partain, Universidad Politecnica de Guanajuato
Dr. Damian Valles, Texas State University
Dr. Alberto Marquez P.E., Lamar University
Dr. Jesus Alejandro Jimenez, Texas State University
Dr. George Saltsman, Lamar University
Ms. Rosario Davis, Texas State University

**Cultural Relativism and Technology Transfer in Engineering Education**

Dr. Jayanta K. Banerjee, University of Puerto Rico, Mayaguez Campus

**Work in Progress: Global Engineering Perspectives Scholars Program**

Prof. Donna M. Ebenstein, Bucknell University
Prof. L. Felipe Perrone, Bucknell University
Dr. Margot L. Vigeant, Bucknell University
Dr. Deborah L. Sills, Bucknell University
Dr. Craig Beal, Bucknell University
Dr. Amal Kabalan, Bucknell University
Dr. Susan R. Baish, Bucknell University

**Teamwork in Action: Collaborating Across Borders**

Dr. Arshia Khan, University of Minnesota, Duluth
Dr. Rania Al-Hammoud P.Eng., University of Waterloo
Dr. Ona Egbue, University of South Carolina, Upstate

**Understanding Students’ Perceptions of Dimensions of Engineering Culture in Ecuador**

Dr. Miguel Andres Guerra, Universidad San Francisco de Quito
Dr. Homero Murzi, Virginia Tech
Mr. Johnny Crayd Woods Jr., Virginia Tech
Mr. Abram Diaz-Strandberg, Virginia Tech
 ASEEE’s VIRTUAL CONFERENCE
WEDNESDAY, JUNE 24 SESSIONS

**W333A - Pre-college Engineering Education Division Technical Session 5**

11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Pre-College Engineering Education Division
Moderator: AnnMarie Thomas, University of St. Thomas

Advancing High School STEM Education: Implications for Engineering Technology
- Dr. Anne M. Lucietto, Purdue University, West Lafayette
- Dr. Mesut Akdere, Purdue University, West Lafayette
- Dr. Scott R. Bartholomew, Purdue University, West Lafayette
- Dr. Greg J. Strimel, Purdue University, West Lafayette

Developing Transmedia Engineering Curricula Using Cognitive Tools to Impact Learning and the Development of STEM Identity
- Dr. Glenn W. Ellis, Smith College
- Dr. Jeremiah Pina, Smith College
- Dr. Rebecca Mazur,
- Mr. Al Rudnitsky, Smith College
- Prof. Beth McGinnis-Cavanaugh, Springfield Technical Community College
- Isabel Huff, Springfield Technical Community College
- Sonia Ellis, Smith College, Springfield Technical Community College
- Crystal M. Ford, Smith College
- Kate Lytton, Collaborative for Educational Services
- Ms. Kaia Claire Cormier, Smith College

Development and Assessment of a Summer Program to Introduce High School Students to STEM Through Aviation and Transportation Engineering
- Dr. Jalil Kianfar P.E., Saint Louis University
- Stephen M. Belt, Saint Louis University

Examining the Role of LEGO Robots as Artifacts in STEM Classrooms
- Dr. Shramana Ghosh, New York University
- Dr. Pooneh Sabouri, New York University
- Dr. Vikram Kapila, New York University

Impact of a Summer Research Program for High School Students on Their Intent to Pursue a STEM Career: Overview, Goals, and Outcomes
- Mrs. Marialice Mastronardi, University of Texas at Austin
- Dr. Audrey Boklage, University of Texas at Austin
- Mrs. Risa D. Hartman, University of Texas at Austin, NASCENT Center
- Dr. Darlene Yañez, University of Texas at Austin, NASCENT Center
- Dr. Maura Borrego, University of Texas at Austin

**W333B - Pre-college Engineering Education Division Technical Session 6**

11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Pre-College Engineering Education Division
Moderator: Sarah Lilly, University of Virginia

WIP: An Effective Model for Leveraging Field Trips to Broaden Participation in STEM
- Mrs. Claire Duggan, Northeastern University
- Dr. Ibrahim F. Zeid, Northeastern University
- Mrs. Jennifer Ociif Love, Northeastern University
- Mr. Nicolas Leo Fuchs, Northeastern University
- Ms. Emily Chernich
- Ms. Brittany Fung, Northeastern University

WIP: Effective Identity-Safety Cues for Assuaging Social Identity Threat of Young Black Girls in STEM
- Dr. Janille A. Smith-Colin, Southern Methodist University
- Dr. Jeanna Wieselmann, Southern Methodist University

WIP: Pilot Evaluation of a Summer Camp to Attract Middle School Students to STEM
- Murad Musa Mahmoud, Wartburg College
- Ms. Trinity Borland, Wartburg College
- Mr. Ripken Gehrig Holst, Wartburg College
- Prof. Kurt Henry Becker, Utah State University

WIP: Building Capacity to Promote STEAM in Communities - The Impact of Professional Development for Teachers, Instructors, and Staff Members
- Mr. Marcelo Caplan, Columbia College

WIP: Engaging Pre-college Students in Hypothesis Generation Using a Citizen Scientist Network of Air Quality Sensors
- James A. Moore
- Matthew Dailey
- Mr. Zachary Wilhelm, University of Utah
- Dr. Kerry Kelly, University of Utah
- Pascal Goffin, University of Utah
- Prof. Anthony Butterfield, University of Utah
- Prof. Jason Wiese
- Dr. Wei Xing, University of Utah
- Katrina Myquyen Le, University of Utah
- Mr. Thomas Becnel, University of Utah
- Prof. Pierre-Emmanuel Gaillardon
W334 - Relationships Between Skills and Knowledge Domains
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Liberal Education/Engineering & Society Division
Moderator: Sean Ferguson, University of Virginia

A Teacher’s Journey Through Engineering and Liberal Arts
Prof. Keith E. Hedges, Drury University

Correlating the Student Engineer’s Design Process with Emotional Intelligence
Dr. Ryan H. Koontz, South Dakota School of Mines and Technology
Dr. Daniel F. Dolan, South Dakota School of Mines and Technology
Kimberly Karen Osberg, South Dakota School of Mines and Technology

Does Playing the Violin Help Science Students Become Better Scientists?
Prof. Wei Yao, Zhejiang University
Mr. Bifeng Zhang, Zhejiang University
Dr. Hu Shunshun, Zhejiang University

Investigating the Relationship Between Self-efficacy and Perceived Importance of Communication Skills Among Engineering Students
Mr. Zhen Zhao, Arizona State University
Dr. Samantha Ruth Brunhaver, Arizona State University

W335 - Student Learning Assessment Methods
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Manufacturing Division
Moderator: Ismail Fidan, Tennessee Tech University

Assessment of Metacognitive Skills in Design and Manufacturing
Dr. Lisa Jo Elliott, Pennsylvania State University, Erie
Dr. Faisal Aqlan, Pennsylvania State University, Erie
Dr. Richard Zhao, Pennsylvania State University, Erie
Morgan Scott Janney, Pennsylvania State University, Erie

Text Mining-based Qualitative Student Assessment of Interactive Simulation Learning Using SIMIO Tool – A Work in Progress
Dr. Aditya Akundi, University of Texas Rio Grande Valley
Dr. Immanuel Edinbarough P.E., University of Texas Rio Grande Valley

Integrating Manufacturing-related Materials and Quality Control Standards into Master-level Engineering Education
Dr. Hua Li, Texas A&M University, Kingsville

Prof. Kai Jin, Texas A&M University, Kingsville
W338A - Mechanical Engineering Technical Session: Pedagogy I - Best Teaching Practices
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Moderator: Anna Howard, North Carolina State University at Raleigh

This session contains papers on best teaching practices within Mechanical Engineering. Papers on effective learning strategies, the application of automatic problem generators, self-evaluation and revision method and cumulative/practice tests will be presented.

- **Assessing the Effectiveness of an Automated Problem Generator to Develop Course Content Rapidly and Minimize Student Cheating**
  Dr. Philip Jackson, University of Florida
  Ricker Lamprecht, University of Florida

- **Does the Use of Cumulative and Practice Tests Further Improve a Blended STEM Classroom?**
  Prof. Autar Kaw, University of South Florida
  Dr. Renee M. Clark, University of Pittsburgh

- **Effective Learning Strategies: Grading Rubric to Enhance Student Learning**
  Dr. Muzammil Arshad, Texas A&M University
  Dr. R. R. Romatoski, Saint Ambrose University

- **The Self-evaluation and Revision Method for Homework: A Homework Method for Metacognition Improves Post-secondary Engineering Students’ Attitudes Toward Homework**
  Major Patrick Alan Linford, U.S. Military Academy
  Lt. Col. James E. Bluman, U.S. Military Academy
  Dr. Gregory Martin Freisinger, U.S. Military Academy
  Prof. John R. Rogers, U.S. Military Academy
  Lt. Col. Brian J. Novoselich, U.S. Military Academy

W338B - Mechanical Engineering Technical Session: Dynamics II - Feel the Vibe
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Moderator: Ronald Adrezin, United States Coast Guard Academy

This technical session will contain papers focused on pedagogy and assessment using vibrations projects and case studies as a backdrop.

- **Design of Instructional Tools to Facilitate Understanding of Fluid Viscous Dampers in A Vibration and Controls Class and Course Assessment**

W338C - Mechanical Engineering Technical Session: Capstone and Design
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Moderator: Brian Novoselich, United States Military Academy

This session will focus on all things relating to capstone design and mechanical engineering projects. Sample courses and projects will be presented, as well as understanding the role of the team in engineering projects.

- **Design Course in a Mechanical Engineering Curriculum**
  Dr. Jamie Szwalek, University of Illinois at Chicago
  Dr. Yeow Siow, University of Illinois at Chicago
  Miss Jaqueline Ozmara Rojas Robles, University of Illinois at Chicago

- **Engineering Capstone Design of a Radio Telescope**
  Dr. Stephen Andrew Wilkerson P.E., York College of Pennsylvania
  Dr. Stephen Andrew Gadsden, University of Guelph
  Dr. Kala Meah, York College of Pennsylvania
  Prof. Donald Jerome Hake II, York College of Pennsylvania

- **Performance Balanced Team Formation for Group Study and Design Projects**
  Dr. Amir Karimi P.E., University of Texas at San Antonio
  Dr. Randall D. Manteufel, University of Texas at San Antonio

- **Educational Opportunities of a Designed-based Project that Challenges Freshman Students to Build a Miniature Racing Car**
  Prof. Farid Breidi
  Mr. Jotam E. Chen, University of Southern Indiana
  Ms. Madelyn D. Sturgeon
  Mr. Justin Michael Amos, University of Southern Indiana
W339A - Alternative Methods of Teaching and Learning Mechanics
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Mechanics Division
Moderators: Ron Averill, Michigan State University; Carisa Ramming, Oklahoma State University

The Mechanics Project: A Pedagogy of Engagement for Undergraduate Mechanics Courses
Prof. Keith D. Hjelmstad, Arizona State University
Amie Baisley, University of Florida

Structuring Student Success: Incorporating a Genre-based Pedagogical Method to Improve a Strength of Materials Laboratory Manual
Dr. Eleazar Marquez, Rice University
Dr. Samuel Garcia Jr., Texas State University

Implementation and Evaluation of Active-learning Techniques: Adaptable Activities for a Variety of Engineering Courses
Dr. Jillian Schmidt, Missouri University of Science and Technology
Dr. Nicolas Ali Libre, Missouri University of Science and Technology

The ‘Typical Particle’ Approach to Learning Rigid Body Dynamics
Prof. Keith D. Hjelmstad, Arizona State University
Amie Baisley, University of Florida

W339B - Hybrid and Online Teaching of Mechanics
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Mechanics Division
Moderators: Nicolas Libre, Missouri University of Science and Technology; Sarah Wodin-Schwartz, Worcester Polytechnic Institute

Dynamics Online Course: A Challenge Content Delivered with Best Teaching Practices Keeps Students Engaged
Dr. Carmen M. Muller-Karger, Florida International University
Dr. Lili Steiner, Florida International University

Blended Statics: Finding an Effective Mix of Traditional and Flipped Classrooms in an Engineering Mechanics Course
Mr. Serge Raymond Maalouf, University of Maine
Dr. Olivier Putzeys P.E., University of Maine

WIP: Study to Lower DFQ Rates in Statics and Dynamics for Multiple Engineering Majors
Dr. Carlos R. Corleto, Texas A&M University
Dr. Matilda (Tillie) Wilson McVay, Texas A&M University

W340 - Minorities in Engineering Division Technical Session 3
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Minorities in Engineering Division
Moderator: Peter Golding, University of Texas at El Paso

A Decade-long Programmatic Study of SHPE’s Chapter Reporting Program: Best Practices, Lessons Learned, and Outcomes for National Engineering Diversity Chapter-based Organizations (Experience)
Dr. Mauro Rodriguez Jr., California Institute of Technology
Ms. Karen Mariela Siles, IBM Corporation
Dr. Dora Louise Renaud, Society of Hispanic Professional Engineers

Broadening the Participation of Latinx in Engineering: Highlights from a National, Longitudinal Study
Dr. Lisa Y. Flores, University of Missouri
Dr. Rachel L. Navarro, University of North Dakota
Dr. Heather Hunt, University of Missouri
Dr. Hang-Shim Lee, Konkuk University
Dr. Patton O. Garriott, University of Denver

¿Por qué no los dos? The Importance of Translanguaging in Bridging Language, Literacy, and Engineering
Dr. Joel Alejandro Mejia, University of San Diego
Melissa M. Arana
Mireya Becker Roberto, University of San Diego
Miss Nicole G. Reyes
W341 - Multidisciplinary Engineering Experiences
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Multidisciplinary Engineering Division
Moderators: Homero Murzi, Virginia Polytechnic Institute and State University; Simin Hall, Virginia Polytechnic Institute and State University

Enabling Transdisciplinary Education for Energy Systems Transitions
Mr. Miles Skinner
Dr. Sven Anders, University of Alberta
Dr. Pierre Mertiny, University of Alberta

Implementing Interactive 3-D Models in an Entry-level Engineering Course to Enhance Students’ Visualization
Dr. Alexandra Hain, University of Connecticut
Dr. Sarira Motaref P.E., University of Connecticut

STEM-Oriented Alliance for Research (SOAR): An Educational Model for Interdisciplinary Project-based Learning
Dr. Jacob Murray, Washington State University, Everett
Prof. Lucrezia Cuen Paxson, Washington State University, Everett
Dr. Soobin Seo, Washington State University, Everett
Dr. Mark Beattie, Washington State University, Everett

What is Energy? Examining Engineering Students’ Conceptions of Energy
Madeline Nelson, University of San Diego
Prof. Gordon D. Hoople, University of San Diego
Dr. Joel Alejandro Mejia, University of San Diego
Dr. Diana Chen, University of San Diego
Dr. Susan M. Lord, University of San Diego

A Multidisciplinary Project: Deploying Edge Computing to Augment Endpoint Functionality
Dr. Ciprian Popoviciu, East Carolina University
Dr. Philip J. Lunsford II, East Carolina University
Dr. John Pickard, East Carolina University
Mr. Colby Lee Sawyer, East Carolina University
Mr. Dale Drummond, East Carolina University
Mr. Zachary Ryan Zynda, East Carolina University
Mr. Spencer Lee
Mr. Sean Wear

W342 - New Engineering Educators 1: Learning Aids
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: New Engineering Educators Division
Moderators: Ashish Borgaonkar, New Jersey Institute of Technology; Kerry Widder, Milwaukee School of Engineering

A Case Study of Early Performance Prediction and Intervention in a Computer Science Course
Prof. Mariana Silva, University of Illinois at Urbana-Champaign
Dr. Eric G. Shaffer, University of Illinois at Urbana-Champaign
Nicolas Nytko, University of Illinois at Urbana-Champaign
Dr. Jennifer R. Amos, University of Illinois at Urbana-Champaign

Making Large Classes Work for You and Your Students
Dr. Edward F. Gehringer, North Carolina State University

Improving Student Accessibility, Equity, Course Performance, and Lab Skills: How Introduction of ClassTranscribe is Changing Engineering Education at the University of Illinois
Prof. Lawrence Angrave, University of Illinois at Urbana-Champaign
Prof. Karin Jensen, University of Illinois at Urbana-Champaign
Mr. Zhilin Zhang, University of Illinois at Urbana-Champaign
Mr. Chirantan Mahipal, University of Illinois at Urbana-Champaign

Visual Note-taking: Opportunities to Support Student Agency in Active Learning
Wendy Roldan, University of Washington
Mr. Schawnery Lin
Ms. Yuxin Xu, University of Washington
Andrea Jacqueline Sequeira
Dr. Jennifer A. Turns, University of Washington
W345 - Engineering Physics and Physics Division Technical Session 4
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Physics and Physics Division
Moderators: Yumin Zhang, Southeast Missouri State University; Robert Ross, University of Detroit Mercy
Navigating and Energy-Generating Insole: Vibrating Walking Directions
  Prof. Bala Maheswaran, Northeastern University
  Liza Brooke Russell, Northeastern University
  Cailey Moy Denoncourt, Northeastern University
Introductory Physics: Introducing Ethics
  Dr. Jessica Patricia Conry, Arkansas Tech University
  Dr. Amber Harrington, Arkansas Tech University
The D and F Ionosphere Layers: Why are AM Broadcast Signals Mostly Local?
  Dr. Paul Benjamin Crilly, U.S. Coast Guard Academy

W349 - Curriculum Development in Technological Literacy
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Technological and Engineering Literacy/Philosophy of Engineering Division
Moderator: Soheil Fatehiboroujeni, Purdue University at West Lafayette
This session contains a variety of papers that explore curriculum development issues with respect to technological and engineering literacy.
Complexity, Right Action, and the Engineering Curriculum
  Dr. R. Alan Cheville, Bucknell University
  Prof. John Heywood, Trinity College Dublin
Small Teaching via Bloom’s
  Dr. Marjan Eggermont, University of Calgary
The transition from STEM to STEAM
  Dr. Jayanta K. Banerjee, University of Puerto Rico, Mayaguez Campus
Assessment of Gregorc Style Delineators
  Dr. Mysore Narayanan, Miami University

W350A - Two-year College Division: Transferring and Smoothing Transitions
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Two-year College Division
Moderators: Djedjiga Belfadel, Fairfield University; Dominic Dal Bello, Allan Hancock College
Papers related (but not limited) to transfer issues for students and institutions.
Curricular Complexity as a Metric to Forecast Issues with Transferring into a Redesigned Engineering Curriculum
  Dr. David Reeping, Virginia Tech
  Dustin Grote
  Dr. Lisa D. McNair, Virginia Tech
  Prof. Thomas Martin, Virginia Polytechnic Institute and State University
Phase One Research Results from a Project on Vertical Transfer Students in Engineering and Engineering Technology
  Dr. Surenendra "Vinnie" K. Gupta, Rochester Institute of Technology (COE)
  Dr. Franz Allen Foltz, Rochester Institute of Technology
  Dr. James E. Moon, Rochester Institute of Technology (COE)
  Dr. Roy W. Melton, Rochester Institute of Technology (COE)
  Dr. Michael E. Kuhl, Rochester Institute of Technology (CET)
  Prof. Daniel P. Johnson, Rochester Institute of Technology (CET)
  Prof. Maureen S. Valentine, Rochester Institute of Technology (CET)
  Dr. James H. Lee, Rochester Institute of Technology (CET)
  Dr. Rob Garrick, Rochester Institute of Technology (CET)
  Mr. Ren Liu
Achieving Broader Impacts in STEM at Two-year Hispanic Serving Institutions
  Cynthia Kay Pickering, Science Foundation Arizona
  Caroline Van Ingen-Dunn, SFAz Center for STEM, Arizona State University
  Ms. Anita Grierson, SFAz Center for STEM at Arizona State University
  Anna Tanguma-Gallegos
The Missing Third: The Vital Role of Two-year Colleges in Shrinking Engineering Education Deserts
  Dr. Jennifer Karlin, Minnesota State University, Mankato
  Dr. L. Eric James, Iron Range Engineering
  Prof. Rebecca A Bates, Minnesota State University, Mankato

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**ASEE’S VIRTUAL CONFERENCE**
**WEDNESDAY, JUNE 24 SESSIONS**

#ASEEVC

Dr. Emilie A Siverling, Minnesota State University, Mankato
Ms. Jodi Nelson

**Engineering Service Learning at Children’s Museum: A Decade of Empowering the STEM Education Pipeline**

Dr. Dan G. Dimitriu, San Antonio College
Mr. Klaus B. Bartels, San Antonio College
Mr. Charles Chris Navarro, The DoSeum

**W350B - Two-year College Division: Workforce Pathways and ATE**

11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Two-year College Division

**Moderators:** Philip Regalbuto, Trident Technical College; Dominic Dal Bello, Allan Hancock College

Papers related (but not limited) to workforce pathways and advanced technological education.

**Impacts of the National Science Foundation-funded Mentor-Connect Project on Two-year Colleges**

Ms. Elaine L. Craft, Florence-Darlington Technical College
Mr. David M. Hata, Portland Community College
Emery DeWitt, Mentor-Connect/ FDTC
Dr. Liesel Ritchie, Oklahoma State University
Dr. Nnenia Campbell, Collaborative for the Social Dimensions of Disasters
Dr. Jamie Vickery, Center for the Study of Disasters and Extreme Events, Oklahoma State University

**Comparing Florida’s Advanced Manufacturing Curriculum Framework to the Department of Labor Competency Model**

Pallavi Ramakanth Kowligi, Florida State University
Ms. Priyanka Prajapati, Florida State University
Dr. Faye R. Jones, Florida State University
Dr. Marcia A. Mardis, Florida A&M University/Florida State University

**Filling the Technical Gap: The Integration of Technical Modules in a REU Program for 2+2 Engineering Students**

Mrs. Megan Morin, University of North Carolina - Chapel Hill
Alireza Dayerizadeh, North Carolina State University

**Emerging Role of Two-year Hispanic-serving Institutions (HSIs) in Advanced Technological Education (ATE): Challenges, Opportunities, and Impacts for Growing the United States Technical Workforce**

Cynthia Kay Pickering, Science Foundation Arizona Center for STEM at Arizona State University
Ms. Elaine L. Craft, Florence-Darlington Technical College
Caroline VanIngen-Dunn, Arizona State University

Anna Tanguma-Gallegos, Arizona State University
Emery DeWitt, Florence-Darlington Technical College

**Building a Comprehensive Collaborative Infrastructure to Create Instrumentation Workforce Pathways**

Ms. Alicia Boudreaux Kiremire PE, PMP, FlowStream Management LLC
Dr. Michael K. Swanbom PE, Louisiana Tech University
Mr. Gerry Caskey, Louisiana Delta Community College
Barton Crum, Applied Research for Organizational Solutions (AROS)

Miss Juliette Pate, Louisiana Delta Community College

**W351A - Women in Engineering Division Technical Session 2**

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Women in Engineering Division

**Moderators:** Anne Lucietto, Purdue Polytechnic Institute; Yuting Chen, University of Illinois at Urbana - Champaign

**Gender Stereotypes: Historical Comparison of Female Students’ Beliefs on Career, Marriage, and Children (1935 versus 2019 Populations)**

Dr. Suzanne Zurn-Birkhimer, Purdue University-Main Campus, West Lafayette (College of Engineering)
Ing. Mayari Illarij Serrano Anazco, Purdue Polytechnic Institute

**Professional Women Identify Their Professional and Personal Needs**

Dr. Anne M. Lucietto, Purdue Polytechnic Institute
Dr. Diane L. Peters P.E., Kettering University
Liza Ann Russell, Purdue University
Miss Meher Rusi Taleyrkhan, Purdue University
Ms. Shelly Tan

**Our Guiding Star: Engineering Design. But Where Is It Guiding Us?**

Robyn Paul, University of Calgary
Prof. Laleh Behjat P.Eng., University of Calgary
Dr. Bob Brennan P.Eng., University of Calgary

**Women’s Unique Challenges in the Transitions to Engineering Work**

Chris Gewirtz, Virginia Tech
Francesca Giardine, Smith College
Prof. Robin Ott, Virginia Polytechnic Institute and State University
Anne Kary

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
W351B - Women in Engineering Division Technical Session 3
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Women in Engineering Division

Moderators: Linda Ott, Michigan Technological University; Bethany Brinkman, Sweet Briar College

Addressing Gender Disparities in Computing Majors and Careers: Development and Effects of a Community Support Structure
- Prof. Shaundra Bryant Daily, Duke University
- Dr. Jessica Sperling, Duke University
- Megan Gray, Duke University
- Ms. Medha Gupta, Thomas Jefferson High School for Science and Technology
- Ms. Amy Arnold, Duke University
- Monica Jenkins
- Kelly Perri, Duke University

Computing Pathways: A Quantitative Inquiry into the Dynamic Pathways of Students in Computing with Gender Comparisons
- Mrs. Maral Kargarmoakhar, Florida International University
- Mrs. 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

Self-Efficacy Study in Computing Among College Freshmen
- Mrs. Amrita Dhakal Ghimire, Mississippi State University
- Ms. Litany H. Lineberry, Mississippi State University
- Dr. Sarah B. Lee, Mississippi State University

How a STEM Faculty Member’s Gender Affects Career Guidance from Others: Comparing Engineering to Biology and Physics
- Dr. Eugene Judson, Arizona State University
- Lydia Ross, Arizona State University
- Prof. Stephen J. Krause, Arizona State University
- Prof. Keith D. Hjelmstad, Arizona State University
- Prof. Robert J. Culbertson
- Dr. Lindy Hamilton Mayled, Arizona State University
- Prof. James A Middleton, Arizona State University

Gendered Professional Role Confidence and Persistence of Artificial Intelligence and Machine Learning Students
- Miss Kimberly Ren, University of Toronto

W352 - Community Engagement Division Technical Session 2
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Community Engagement Division

Moderators: Nebojsa Sebastijanovic, Milwaukee School of Engineering; Margaret Pinnell, University of Dayton

Engagement in Practice (EIP): Differences in Perceptions between Engineering and Art Students in an Interdisciplinary Service-Learning Project
- Dr. Yanjun Yan, Western Carolina University
- Prof. Mary Anna LaFratta, School of Art and Design, Western Carolina University
- Dr. Lane Graves Perry III, Western Carolina University
- Dr. Hugh Jack P.E., Western Carolina University

Engagement in Practice: Exploring Boundary Spanning in a School-University Partnership
- Dr. Julee Farley, Montgomery County Public Schools and Virginia Tech
- Dr. Lisa D. McNair, Virginia Tech

Engagement in Practice: Adopting Service Learning and Community Engagement as a High Impact Teaching Strategy in Geotechnical Engineering
- Dr. Simon Thomas Ghanat P.E., The Citadel
- Dr. William J. Davis P.E., The Citadel
- Dr. Dan D. Nale PE, The Citadel - Civil & Environmental Engineering
- Dr. Rebekah D. Burke, The Citadel

Engagement in Practice: The SMU Maker Education Project
- Dr. Rob Rouse, Southern Methodist University
- Mr. Juan Torralba, University of Miami
- Ms. Kathryn Krummeck
- DiMitri Higginbotham, Good Shepherd Episcopal School

Work in Progress: Involving Teachers in International Community Engaged Learning Projects to Enhance their Understanding of Engineering and Intercultural Awareness
- Dr. Margaret Pinnell, University of Dayton
- Dr. Kellie Schneider, University of Dayton
- Dr. Leanne Petry, Central State University
- Dr. M. Suzanne Franco, Wright State University
W356A - Military and Veterans Division Technical Session 1
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Military and Veterans Division

The Engineering Education Experiences of Students Serving in the Reserves or National Guard
Dr. Catherine Mobley, Clemson University
Mr. Joseph Murphy, University of California, Los Angeles
Dr. Joyce B. Main, Purdue University, West Lafayette
Dr. Catherine E. Brawner, Research Triangle Educational Consultants
Dr. Susan M. Lord, University of San Diego

Development of Veteran-friendly Military Technology and Instrumentation Mechanical Engineering Course
Dr. Jerry Lynn Dahlberg Jr, University of North Carolina at Charlotte
Dr. Jae Hoon Lim, University of North Carolina at Charlotte
Dr. Peter Thomas Tkacik, University of North Carolina at Charlotte

Assessing Department of Defense Demand for Veterans During and After Degree Completion
Dr. Alyson Grace Eggleston, The Citadel
Dr. Robert J. Rabb P.E., The Citadel

Virginia Digital Shipbuilding Program (VDSP): Building an Agile Modern Workforce to Improve Performance in the Shipbuilding and Ship Repair Industry
Mr. Joseph Peter Kosteczko, Old Dominion University
Ms. Katherine Smith, Old Dominion University
Mrs. Jessica Johnson
Dr. Rafael Diaz

W356B - Military and Veterans Division Technical Session 2
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Military and Veterans Division

The Impact of Veteran Students on the Academic Performance of Nonveteran Students
Dr. Patrick Bass, The Citadel
Dr. Nathan John Washuta P.E., The Citadel
Mr. Donald L. Price, The Citadel

A Systems Engineering Approach to a Mentorship Program for Online Military and Veteran Engineering Students
Dr. Reza Rahdar, Embry-Riddle Aeronautical University
Dr. Ghazal Barari, Embry-Riddle Aeronautical University
Dr. Yuetong Lin, Embry-Riddle Aeronautical University
Mr. Ryan Goyings, Embry-Riddle Aeronautical University

Affirming Identity Through Authentic Mentoring in a Safe Space: Supporting Military Veterans in an Engineering Graduate Program
Dr. Jae Hoon Lim, University of North Carolina at Charlotte
Ms. Rachel Saunders, 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
Miss Madison Elizabeth Levan, University of North Carolina at Charlotte

W357A - WIP It! Faculty Development Style!
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Faculty Development Division
Moderator: Margret Hjalmarson, George Mason University

This session highlights works in progress (WIPs) from the faculty development division! Come offer insights into future progress and see the newest projects we’re working on!

Certification and Training for Automation and Mechatronics
Dr. Iftekhar Ibne Basith, Sam Houston State University
Dr. Junkun Ma, Sam Houston State University
Dr. Faruk Yildiz, Sam Houston State University

Design Thinking Approach to Identify Barriers to Engineering Education Reform in India
Dr. Rucha Joshi, University of California, Davis
ASEE’S VIRTUAL CONFERENCE
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Dr. Jason R. White, University of California, Davis
Intercollegiate Coaching in a Faculty Professional Development Program that Integrates Pedagogical Best Practices and the Entrepreneurial Mindset

Dr. Heather Dillon, University of Portland
Dr. Lindy Hamilton Mayled, Arizona State University
Dr. Mark L. Nagurka, Marquette University
Dr. Maria-Isabel Carnasciali, University of New Haven
Dr. Douglas E. Melton, Kern Entrepreneurial Engineering Network

WIP: Virtual Writing Group Participation: Surprises & Unintended Outcomes

Dr. Lisa Bosman, Purdue University-Main Campus, West Lafayette (College of Engineering)
Dr. Erin J. McCave, University of Houston
Dr. Molly H. Goldstein, University of Illinois at Urbana Champaign
Dr. Kelli L. Chelberg, College of Menominee Nation

W357B - Lessons Learned about Faculty Development!
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Faculty Development Division
Moderator: Abhishek Kumar, Northeastern University

Come hear about innovative efforts and lessons learned around faculty development!

Changing an Electrical and Computer Engineering Department Culture from the Bottom Up: Action Plans Generated from Faculty Interviews
Elise A. Frickey, Iowa State University
Dr. Diane T. Rover, Iowa State University
Prof. Joseph Zambreno, Iowa State University
Prof. Ashfaq Khokhar, Iowa State University
Dr. Douglas W. Jacobson, Iowa State University
Dr. Lisa M. Larson Ph.D., Iowa State University
Prof. Mack Shelley, Iowa State University of Science and Technology

Lessons Learned in Implementing Increased Support and Building Academic Community for Teaching Faculty
Dr. Heidi Marie Sherick, University of Michigan
Dr. Pauline Khan, University of Michigan
Dr. Elizabeth J. Bailey, University of Michigan

Lessons Learned in Professional and Identity Development as Part of a Teaching Assistant Training Program
Ms. Erica Jean Hagen, University of Wisconsin, Madison
Ms. Elizabeth C. Harris, University of Wisconsin-Madison

Lessons Learned: Integrating Active Learning into Undergraduate Engineering Courses

Dr. Emily Peterek Bonner
Dr. Vittorio Marone, The University of Texas at San Antonio
Dr. Timothy Yuen, The University of Texas at San Antonio
Mrs. Robin Nelson, University of Texas at San Antonio
Dr. JoAnn Browning P.E., The University of Texas at San Antonio

W360A - FOCUS ON EXHIBITS: Virtual Showcase
12:00 P.M. - 1:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters

Live interaction with sponsors and exhibitors.

W360B - Engineering and Engineering Technology Chairs Open Exchange
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters

This interactive session serves as an exclusive forum for engineering and engineering technology chairs and department heads to exchange ideas, talk through challenges, and build new working relationships.

The bulk of the session will be dedicated to small-group roundtable discussions on topics of interest suggested by 2019 Chairs Conclave participants, including faculty evaluations, conflict mediation and resolution, and working with deans and administrators.

Come prepared to have open discussions, share knowledge, resources, and best practices, and build relationships with new and seasoned department chairs and heads.

Note: This session is only open to engineering and engineering technology chairs and department heads.

Learn more at https://chairsconclave.asee.org.
## W371A - NSF Grantees: Design

**10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor:** NSF Grantees Session  
**Moderator: Sarah Ryan, Iowa State University of Science and Technology**

Presentations from groups with current NSF-funded projects focused on the role of design in engineering education.

**Using Design to Understand Diversity and Inclusion within the Context of the Professional Formation of Engineers**
- Dr. Carla B. Zoltowski, Purdue University at West Lafayette  
- Dr. Andrew O. Brightman, Purdue University at West Lafayette  
- Prof. Patrice Marie Buzzanell, University of South Florida  
- Dr. Sean Eddington, Kansas State University  
- Dr. Danielle Corple, Wheaton College  
- Memoria Matters, Purdue University at West Lafayette  
- Ms. Virginia Lynn Booth-Womack, Purdue University at West Lafayette

**Understanding Student Conceptualizations of the Market Context in Engineering Design**
- Dr. Steven Hoffenson, Stevens Institute of Technology  
- Dr. Nicole P. Pitterson, Virginia Polytechnic Institute & State University  
- Jessica Rose Driscoll, Stevens Institute of Technology

**Research Initiation: Enhancing the Learning Outcomes of Empathic Innovation in Biomedical Engineering Senior Design Projects**
- Dr. Nan Kong, Purdue University at West Lafayette  
- Dr. Senay Purzer, Purdue University at West Lafayette  
- Dr. Lindsey B. Payne, Purdue University at West Lafayette  
- Mrs. Eunhye Kim, Purdue University at West Lafayette  
- Carolina Vivas-Valencia, Purdue University

**Scaling Informal Technology Education through Maker Spaces**
- Dr. Foad Hamidi, University of Maryland, Baltimore County  
- Shawn Grimes  
- Stephanie Grimes  
- Ms. Adena Moulton, Digital Harbor Foundation  
- Andrew Coy, Digital Harbor Foundation

## W371B - NSF Grantees: Student Learning 1

**11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor:** NSF Grantees Session  
**Moderators: Amber Genau, University of Alabama at Birmingham; Gregory Mason, Seattle University**

Presentations from groups with current NSF-funded projects focused on the development of tools and courses to improve student learning.

**Course Redesign – Embedding High-impact Practices (HIPS) in STEM Courses**
- Dr. Huanying "Helen" Gu, New York Institute of Technology  
- Dr. N. Sertac Artan, New York Institute of Technology  
- Dr. Ziqian Dong, New York Institute of Technology  
- Prof. Reza Amineh, New York Institute of Technology  
- Dr. Houwei Cao, New York Institute of Technology  
- Dr. Sarah McPherson, New York Institute of Technology

**Understanding Context: Propagation and Effectiveness of the Concept Warehouse in Mechanical Engineering at Five Diverse Institutions and Beyond – Results from Year 1**
- Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo  
- Prof. Dominic J. Dal Bello, Allan Hancock College  
- Dr. Milo Koretsky, Oregon State University  
- Dr. Susan Bobbitt Nolen, University of Washington  
- Dr. Christopher Papadopoulos, University of Puerto Rico, Mayaguez Campus  
- Dr. Michael J. Prince, Bucknell University  
- Dr. James M. Widmann, California Polytechnic State University, San Luis Obispo

**Crowdsourcing Classroom Observations to Identify Misconceptions in Data Science**
- Prof. Ruth E. H. Wertz, Valparaiso University  
- Prof. Karl R.B. Schmitt, Valparaiso University  
- Dr. Linda Clark, Brown University  
- Prof. Bjorn Sandstede, Brown University  
- Dr. Katherine M. Kinnaird, Smith College

**Multidisciplinary Research and Teaching by Means of Employing FTIR Spectroscopic Imaging System and Characterization Techniques**
- Dr. Zahrasadat Alavi, California State University, Chico

**The Broader Impacts of an Additive Manufacturing Course at Three Large Universities**
- Dr. Patricia Ann Maloney, Texas Tech University  
- Dr. Weilong Cong, Texas Tech University  
- Dr. Meng Zhang, Kansas State University  
- Dr. Bingbing Li, California State University, Northridge

Schedule subject to change. Please go to [www.asee20.pathable.co](http://www.asee20.pathable.co) for up-to-date information.
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**W371C - NSF Grantees: Student Learning 2**
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderators: Amber Genau, University of Alabama at Birmingham; Brian Self, California Polytechnic State University, San Luis Obispo

Presentations from groups with current NSF-funded projects focused on the development of tools and courses to improve student learning.

**Accelerated Learning and Assessment in Engineering Mechanics: Designing an Interactive Tool to Support Students' Learning**

Dr. Nicole P. Pitterson, Virginia Polytechnic Institute and State University  
Dr. Jacob R. Grohs, Virginia Polytechnic Institute and State University  
Prof. David A. Dillard, Virginia Polytechnic Institute and State University  
Dr. Sneha Patel Davison, Virginia Polytechnic Institute and State University  
Mr. Todd P. Shuba, Virginia Polytechnic Institute and State University  
Prof. Cliff Shaffer, Virginia Polytechnic Institute and State University  
Mr. Arinjoy Basak, Virginia Polytechnic Institute and State University  
Mr. Jianqiang Zhang, Virginia Polytechnic Institute and State University

**Interactive Editing of Circuits in a Step-based Tutoring System**

Dr. Brian J. Skromme, Arizona State University  
Caleb Redshaw, Arizona State University  
Mr. Abhishek Gupta  
Mr. Shatrughn Gupta, Arizona State University  
Prof. Petru Andrei, Florida A&M University/Florida State University  
Dr. Hector Erives, University of Texas at El Paso  
Mary White  
Dr. DeAnna Bailey, Morgan State University  
Dr. Willie L. Thompson II, Morgan State University  
Dr. Srividya Kona Bansal, Arizona State University  
Wendy M. Barnard, Arizona State University

**Comparing Students’ Solutions to an Open-ended Problem in an Introductory Programming Course with and without Explicit Modeling Interventions**

Dr. Kelsey Joy Rodgers, Embry-Riddle Aeronautical University - Daytona Beach

Dr. Matthew A. Verleger, Embry-Riddle Aeronautical University - Daytona Beach  
Dr. Farshid Marbouti, San Jose State University

**The Sequential Nature of Engineering Problem Solving**

Dr. Carolyn Plumb, Montana State University  
Rose M. Marra, University of Missouri - Columbia  
Dr. Douglas J. Hacker

**W371D - NSF Grantees: Student Learning 3**
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderators: Amber Genau, University of Alabama at Birmingham; Clara Novoa, Texas State University

Presentations from groups with current NSF-funded projects focused on improving student learning through reflection and teamwork.

**Assessment of Reflective and Metacognitive Practices for Electrical and Computer Engineering Undergraduates**

Dr. Samuel J. Dickerson, University of Pittsburgh  
Dr. Renee M. Clark, University of Pittsburgh  
Mr. Nan Jiang

**Reflection in Engineering Education: Advancing Conversations**

Dr. Jennifer A. Turns, University of Washington  
Kenya Z. Mejia, University of Washington  
Dr. Cynthia J. Atman, University of Washington

**The Role of Teaching Assistants and Faculty in Student Engagement**

Dr. Denise Wilson, University of Washington

**Optimizing Student Team Skill Development Using Evidence-based Strategies: Year 5**

Dr. Matthew W. Ohland, Purdue University at West Lafayette  
Dr. Misty L. Loughry, Rollins College  
Dr. David J. Woehr, University of North Carolina, Charlotte  
Dr. Daniel M. Ferguson, Purdue University at West Lafayette  
Dr. Catherine E. Brawner, Research Triangle Educational Consultants  
Mr. Behzad Beigpourian, Purdue University at West Lafayette  
Mr. Siqing Wei, Purdue University at West Lafayette

**Interpersonal Interactions in Engineering Teams: Findings from a Multi-year Mixed Methods Study at Three Institutions**

Mr. Héctor Enrique Rodriguez-Simmonds, Purdue University at West Lafayette  
Tara C. Langus, University of Nevada, Reno  
Mr. Nelson S. Pearson, University of Nevada, Reno

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
In the field of engineering, theoretical analysis is of paramount importance in understanding the basics. This is the focus of most of the engineering education providing students with a deeper theoretical knowledge of necessary concepts. Students are also expected to learn physical phenomenon through experimentation while instructors explain the theory behind the experiment. While this process enhances the analytical capability of the students, it has been difficult to duplicate complex real-life problems during classroom instruction. With the advent of advanced engineering simulation technology and the availability of powerful, inexpensive computers, it is now possible to enhance engineering education. It can now include complex real-life problems in addition to providing added analytical capability to students.

In this session, we will present Altair’s advanced electromagnetic simulation tools for antenna design wireless communication courses. While the basic concept of antennas for transmitting and receiving radio frequency (RF) signals is well known, closed-form exact analytical solutions to many antenna problems are not possible. Following the theoretical analysis methods, several approximations are typically made to simplify and solve the problem, but this consequently limits the accuracy of the solution. Almost exact solutions to antenna problems can be obtained using simulation tools such as Altair Feko, incorporating advanced numerical methods. The effective utilization of electromagnetic simulations for real-life antenna configurations provides students with not only the guidelines for antenna design simulations, but also an illustrative visualization of antenna radiation patterns, radiating currents, and other characteristics that will be very beneficial for both educational purposes and practical applications. During this session, we will also present case studies of how electromagnetic simulations are successfully fused with theory and experiments by educators at different universities.
controls, mechanical dynamics, or higher-level mechatronics courses, seamlessly integrating engineering concepts with actual hardware is key for students to get premium mechatronics jobs in the industry.

In this technical session, we will demonstrate a comprehensive Mechatronics educational kit to teach and learn model-based development with the highest fidelity digital twin simulations. With this kit, you’ll be able to study system dynamics and automated control concepts, integration of high-fidelity controllers modeled in Altair Activate - an open integration platform for system simulations with high-fidelity mechanical systems (/plants) modeled in Altair MotionSolve - a high-fidelity 3D Multi-body Dynamics simulation environment. Furthermore, you’ll learn virtual commissioning of real platform via digital twin combined with optimization of the controller gains with different operating conditions and controller types.

Balancing a ball on a table in a desired position is one of the most important and classical problems of control theory. In this tech session, we’ll use this example and go through the workflow of digital twin simulations combined with hands-on experiments. If you wish to receive a free copy of the digital twin simulation models and reports, please reach out to Keshav at https://www.linkedin.com/in/keshavsundaresh/.

**W401 - K-12 Experience in Aerospace Engineering**

1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsors:** Aerospace Division; Pre-College Engineering Education Division

**Moderators:** Michael Hatfield, University of Alaska Fairbanks; Nadir Yilmaz, Howard University

**Speakers:** Dr. Garrett Ramon Love, North Carolina School of Science and Math; Dr. Kuldeep S. Rawat, Elizabeth City State University; Dr. Venitra M. White, NASA EPDC; Mrs. Paula Mae McElroy, Marlette High School

**W411A - Joint Panel: Leveraging Experiential Education to Become an International Engineering Education Leader**

1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Cooperative and Experiential Education Division

**Moderators:** Robin Hammond, Arizona State University; Katherine McConnell, University of Colorado Boulder

**Speakers:** Prof. Anette Kolmos, Aalborg University; Aldert Kamp, TU Delft

Given industry feedback and recent engineering accreditation changes, STEM educators have been driving curricular changes to better meet the needs of student populations and surrounding business communities. As a result, higher learning institutions, particularly in the STEM fields, have been implementing proactive and innovative steps to design and deliver a curriculum that is outcomes-based, provides discipline-specific knowledge, and is informed by real-world business needs and applications.

In this 30-minute live (synchronous) panel session, speakers will give a brief presentation followed by an opportunity for the panelists to respond to prompts. The session will conclude with the opportunity for attendees to discuss topics of interest with the individual speakers in a large group setting. The presentation will include topical coverage from various international perspectives related to the following:

Curriculum-based Experiential Education Opportunities: Discussion targeted toward faculty or practitioners who are interested in learning about a wide range of hands-on, experiential learning opportunities throughout the curriculum that focuses on “problem identification” as well as "problem solution.” These opportunities are typically supported by innovative maker spaces and team working areas, with assistance from longstanding industry partnerships.

Integration of Design Application throughout the Curriculum: Discussion targeted toward faculty and practitioners who are interested in integrating design applications throughout the curriculum, with mindfulness toward entrepreneurial ventures, social responsibilities, and a global skill set (skills to be effective in a global environment and to work across nationalities and cultures).

The following discussion points will be considered and addressed:

- What prompted your institution to implement this innovation in education?
- What are the specifics of the innovation - the name of the major/programmatic/class-based/institutional educational innovation as well as an articulation of the innovation itself?
- What was learned from this educational innovation (including what would you do differently)?
- What is the planned path ahead?
W411B - DISTINGUISHED LECTURE: Continued Conversation - Social Disruption of Emerging Technologies and Implications for Engineering Education

2:00 P.M. - 2:30 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsors: Cooperative and Experiential Education Division; Manufacturing Division; Software Engineering Division; Multidisciplinary Engineering Division; Engineering and Public Policy Division; Civil Engineering Division; Community Engagement Division

Moderators: Brent Nowak, Grand Valley State University; Mary Andrade, University of Louisville

Speaker: Kiran Bharwani, RIVIAN

Given the recent focus on emerging technologies, the anticipated shift in engineering education is toward more socially relevant, outward-facing engineering curricula. Such curricula emphasize multidisciplinary learning, societal impact, experiential learning (within and outside of the traditional classroom), and a global mindset. The discussion will introduce the global, legal, economic, environmental, and societal impacts of vehicle autonomy and electrification, and include an overview of some of the following impact areas: workforce disruption, driver safety, industry shifts, and educational training. The session will focus on the values of a liberal arts education in developing solutions for 21st-century emerging technologies, particularly the implications associated with vehicle autonomy and electrification in future mobility modes. Relevant topics, including but not limited to the following, will be addressed:

- Global, legal, economic, and environmental impact of vehicle autonomy and electrification
- Growth in vehicle autonomy/electrification in various mobility forms
- Explosion of data-driven software development
- Innovation in vehicle design (electric, composite bodies that are 3-D printed)
- Societal disruption involving vehicle operation/parking, auto industry employment, privacy, and business models.

W414 - DISTINGUISHED LECTURE: Talking the Talk and Walking the Walk: How Our Publications Reflect the Engineering Education Community

2:00 P.M. - 2:30 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Educational Research and Methods Division

Moderators: James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach; Sarah Zappe, Pennsylvania State University

Speaker: Dr. Lisa Benson, Clemson University

As members of a community of scholars, what we write about and who we write about are artifacts of our culture; they reflect who we are collectively. The ways we collaborate on, review, and publish our work also reflect who we are. The engineering education community is unique: As students, educators, and researchers, we hail from other disciplinary backgrounds. We bring with us aspects of our “home” disciplinary cultures, including our expectations about sharing ideas, data, and authorship, our practices around building on and citing each other’s work, and the standards we set for our scholarship. The community around our relatively new discipline is establishing its own research agenda and its own culture with respect to communicating and acting on our scholarly work. As our community develops and grows, many of us are wary of bringing along excess baggage from our home disciplines — those sometimes hostile and oppressive aspects of engineering cultures — that make it difficult for students, early career faculty, and those from marginalized populations in engineering to survive and thrive. In fact, for many of us, negative experiences in our home disciplines (being overlooked for recognition or promotion, being harassed or patronized, being undervalued) served as the impetus for finding our way into engineering education. We are here not because we are looking to escape from the trappings of tradition, but to turn that tradition on its head to create a more open, just, and responsive culture.

Members of the engineering education community have the opportunity to question and explore important issues such as diversity, equity, professional formation, recruitment, complex systems, classroom innovations, and emerging instructional technologies. Through our scholarship, we are poised to examine and change aspects of our culture that generate disparities based on gender, sex, race, ethnicity, and other bases for marginalization. Our publications serve as the voice of our scholarship; they are our call-and-response system as we read and respond to scholarship in our field and build on each other’s work. Does our work — and our responses to others’ work — take the form of action as well? Are we talking the talk and walking the walk?

As we explore important issues in engineering education, our work often makes the case for students to be reflective and intentional, open and willing to critically examine new ideas, empathetic and willing to take multiple perspectives into account. We write about how students grapple with so-called “wicked problems” in engineering. As a community of scholars, how are we grappling with wicked problems in engineering education? In what ways are we modeling reflective, intentional, and perspective-taking approaches as we educate students, conduct our studies, and effect change in engineering education?

In this talk, I will draw on my experiences as editor of the Journal of
Engineering Education and as an education researcher to identify parallels between scholarship in engineering education and our approaches to transformational change in engineering education. In scoping out a few current topics in engineering education research, I will highlight – perhaps most importantly – the issue of access to engineering education scholarship and the ways our community reflects its values and beliefs through its scholarly work as well as its actions related to sharing and building on that work.

**W416 - DISTINGUISHED LECTURE: Smart Energy: Opportunities and Challenges**

2:00 P.M. - 2:30 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsors: Energy Conversion and Conservation Division; Mechanical Engineering Division; Instrumentation Division; Ocean and Marine Division

Moderators: Lynn Albers, Hofstra University; Maryam Younessi Sinaki

Speaker: Dr. Yunus A. Cengel P.E., University of Nevada, Reno

The world is entering into the "smart everything" age, and energy is no exception. Artificial intelligence (AI) is forming the new platform for tomorrow’s products, services, work environments, and the workforce. Data literacy is becoming an essential cross-cutting skill. Power grids are to be replaced by smart grids where electric generation plants, consumer devices, and storage systems are connected and supply-and-demand analyses are made. To survive in this high-tech environment, the society at large will have to embrace change and acquire new skills associated with society 5.0. The future engineers will have to develop a creative mindset and focus on producing original ideas and inventing new goods and services.

**W421 - ELD Lightning Talks 2**

1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Engineering Libraries Division

Moderators: Christa Spence, University of Toronto; Sylvia Jones, Southern Methodist University

Attendees will present lightning talks to share research projects and topics in a fun way.

**W428 - Challenges and Opportunities in Graduate Education**

1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Graduate Studies Division

Moderator: Jeffrey Fergus, Auburn University

Speakers: Dr. La'Tonia Stiner-Jones, Ohio State University; Mr. Eric Holloway, Purdue University at West Lafayette; Dr. Tremayne O'Brian Waller, Virginia Polytechnic Institute and State University; Dr. Jim A. Nicell, Ing., McGill University

Overall, the number of graduate and doctorate degrees awarded in the U.S. has grown over the course of the early 21st century. Fields like engineering and education have been producing Ph.D.’s for several decades. However, recent shifts in technology have changed the Ph.D. process drastically. The specific new field of a Ph.D. in engineering education came formally into existence in 2004 with the creation of Purdue’s School of Engineering Education, with other programs debuting since then. Other, less formalized Ph.D. pathways in engineering education also have appeared, expanding the possibilities of Ph.D. study. Thus, the process of graduate school, while familiar to many academics, is also always becoming new, and it is important to update and reiterate advice to reflect those new realities.

This panel session aims to bring together new faculty in EER and related roles to share their experiences and advice for getting through graduate school.
W448 - The Many Facets of Cyber- and Systems-security Engineering Education
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Systems Engineering Division; Multidisciplinary Engineering Division; Computing and Information Technology Division; Software Engineering Division; Electrical and Computer Division
Moderator: Alice Squires, International Council on Systems Engineering
Speakers: Dr. Radu F. Babiceanu, Embry-Riddle Aeronautical University - Daytona Beach; Dr. Richard E. Fairley, Systems and Software Engineering Associates (S2EA); Dr. Douglas W. Jacobson, Iowa State University of Science and Technology; Dr. Peggy Brouse, George Mason University

Cybersecurity is a systems challenge to ensure integrity, confidentiality, and accessibility of data under adverse circumstances. We find cybersecurity engineers across many domains, from power systems to aerospace to information technology and more, whose primary responsibility is to identify and mitigate vulnerabilities in the operational systems. This panel will explore cybersecurity from multiple perspectives, including how current educational programs are meeting the new ABET cybersecurity criteria, where cybersecurity programs can be found in the university (e.g. systems engineering, information technology, computer science, electrical and computer engineering, or other), how systems engineering educators are integrating cybersecurity into the curriculum, what other approaches have been used to deliver cybersecurity education, the role of professional societies such as the International Council on Systems Engineering (INCOSE) in cybersecurity education and training, and how cybersecurity programs are meeting cyber workforce demands. All the panelists are active leaders and faculty members in cybersecurity programs at their universities.

W458A - DISTINGUISHED LECTURE: 2019 Best PIC and Zone Papers Live Q&A
2:00 P.M. - 2:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Board of Directors
Moderator: Peter Schmidt, University of Evansville

Featuring the 2019 Best PIC and Zone Paper Winners

Best Overall 2019 PIC Paper and PIC II Winner - Assessment of Project-based Learning Courses Using Crowd Signals
Mr. Georgios Georgalis, Purdue University at West Lafayette
Dr. Karen Marais, Purdue University at West Lafayette

Best Overall 2019 Zone Paper and Zone 1 Winner - Implementation and First-year Results of an Engineering Spatial-skills Enhancement Program
Dr. Alexander John De Rosa, Stevens Institute of Technology
Dr. Maxine Fontaine, Stevens Institute of Technology

Dr. Lindy Hamilton Mayled, Arizona State University
Lydia Ross, Arizona State University
Dr. Casey Jane Ankeny, Northwestern University
Prof. Jay Oswald, Arizona State University

Best 2019 PIC III Paper: Do They Understand Your Language? Access Their Fluency with Vector Representation
Eric Davishahl, Whatcom Community College
Todd Haskell, Western Washington University
Ms. Jill Davishahl, Western Washington University
Dr. Lee Singleton, Whatcom Community College
Dr. Wade H. Goodridge, Utah State University

Best 2019 PIC IV Paper: Students' Views on Their Role in Society as an Engineer and Relevant Ethical Issues
Dr. Angela R. Bielefeldt, University of Colorado Boulder
Mr. David Zhao
Alexandra Kulich

Dr. Madeline Polmear, University of Florida
Dr. Nathan E. Canney
Dr. Chris Swan, Tufts University
Dr. Daniel Knight, University of Colorado Boulder

Best 2019 PIC V Paper: Mapping and Strengthening Curriculum-based Industry/Academia Intersections
Dr. Katherine McConnell, University of Colorado Boulder

Best 2019 Zone II Paper: Research to Practice: Leveraging Concept Inventories in Statics Instruction
Prof. Ruth Wertz P.E., Valparaiso University
Theresa Green, Utah State University

Best 2019 Zone III Paper: Blended Learning: Electrical Circuits for Non-EE Students
Dr. Amardeep Kaur, Missouri University of Science and Technology
Dr. Theresa Mae Swift, Missouri University of Science and Technology

Best 2019 Zone IV Paper: Assessing Student Assessment in a Flipped Classroom
Dr. Bryan Mealy, California Polytechnic State University, San Luis Obispo
W458B - 2020/2021 Nominating Committee - by invitation only
1:30 P.M. - 3:00 P.M.
Sponsor: ASEE Board of Directors
Be advised, this meeting will be held separately from the Virtual Annual Conference. Details will be sent directly to committee members.

W460 - DISTINGUISHED LECTURE: Learning Spaces and Teaching Choices
2:00 P.M. - 2:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters
Moderator: Nathan Kahl, American Society for Engineering Education;
Speaker: Dr. Susan McCahan, University of Toronto
Active learning classrooms are now a common feature at many higher education institutions. They are also rapidly blending the physical and virtual worlds to create new types of hybrid learning experiences. While these continue to be created, it is not always the case that faculty are engaged in the design process. However, faculty participation can make a significant difference in the design of learning spaces, and participation by faculty and students in the process is a means of engendering uptake of active pedagogy. Classroom space, which was largely static and relatively unstudied, is undergoing a renaissance both in terms of creative design and scholarly investigation. In her presentation, Prof. Susan McCahan will discuss the history of formal university classrooms and how we arrived at active-learning space design. She will describe an example of participatory design and the outcomes from that process.

W477A - ASEE CDEI Best Diversity, Equity, & Inclusion Paper Award Finalist Presentations
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Commission on Diversity, Equity, & Inclusion
Moderators: Elizabeth Litzler, University of Washington; Jenna Carpenter, Campbell University
Speaker: Dr. Susan E. Walden, University of Oklahoma
Now in its sixth year, the ASEE Best Diversity, Equity, & 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 & Inclusion Paper rubric is used by an ASEE CDEI Paper Selection Committee to assess these scholarly attributes of the nominated manuscripts and to identify approximately 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.

This year’s finalists are:

• Faculty Development Mini-Modules on Evidence-Based Inclusive Teaching and Mentoring Practices in Engineering, by S. Ilkhanipour Rooney, Joshua A. Enzer, Julia A. Maresca, S. Ismat Shah, Sheldon Allister Hewlett, and Jenni M. Buckley (Faculty Development Division)

• How Does Enrollment Management Affect Student Population Diversity in Biomedical Engineering? by Rachel C. Childers and Handan Acar (Biomedical Engineering Division)

• A Review of the State of LGBTQIA+ Student Research in STEM and Engineering Education, by Madeleine Jennings, Rod D. Roscoe Nadia Kellam, and Suren Jayasuriya (Liberal Education/Engineering and Society Division)

• An Exploratory Study of Intentionality toward Diversity in STEM Faculty Hiring, by Samara Rose Boyle, Canek Phillips, Yvette E. Pearson, Reginald DesRoches, Stephen Mattingly, Anne Nordberg, Wei Wayne Li, and Hanadi S. Rifai (Minorities in Engineering Division)

Finalists’ names will be published on the CDEI website (https://diversity. asee.org/deicommittee/win-an-award/)

W477B - DISTINGUISHED LECTURE: Indigeneering Engineering Education: Welcoming Indigenous Knowledge and Wisdom with Integrity
2:00 P.M. - 2:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: ASEE Commission on Diversity, Equity & Inclusion; Engineering Ethics Division; International Division; Liberal Education/Engineering & Society Division; Minorities in Engineering Division; Engineering Technology Council
Moderator: Susan Walden, University of Oklahoma
Speakers: Deanna Burgart, Schulich School of Engineering, University of Calgary; Dr. Susan E. Walden, University of Oklahoma
A transforming world invites us to change our mindset and consider more innovation, more collaboration, and greater co-creation. Ecosystems of innovators, technical specialists, and humanitarians are growing to help find solutions to global challenges. Deanna Burgart, indigeneer, believes that greater incorporation of diverse perspectives, including indigenous...
perspectives and worldviews, can be a catalyst to finding solutions in a more meaningful, long-term way.

As indigenous perspectives are sought, and indigenous knowledge is captured, the importance of creating an ethical understanding on how to do this in a good way is imperative. Deanna will introduce participants to:

- Indigenous Ways of Knowing, Being, and Doing

This section will describe the results of a two-day retreat held for indigenous and non-indigenous STEM professionals, educators, and community members exploring the best ways to support and inspire indigenous youth to pursue STEM careers.

- Cultural Appropriation and Commodification of Indigenous Ways of Knowing

This section will define sacred indigenous knowledge and illustrate the difference between sacred indigenous knowledge and personal knowledge. We will summarize a literature review and examine incidents of cultural appropriation as a means to inform.

- Introduction to Indigenous Self-determination with Respect to Knowledge and Data Protection

A look at how to protect indigenous knowledge going forward. Participants will be called on in a discussion activity on how to best do this in any work seeking to include indigenous perspectives as a response to the United Nations Declaration on the Rights of Indigenous Peoples.

Deanna will use her own stories and examples of initiatives of indigenous inclusion in innovation to invite and inspire participants to join her in seeing a future that invites more indigenous voices to engineering education and solutions for all. She will invite all to explore how we can bring indigenous perspectives to the engineering education landscape in an ethical space of cultural safety that protects the integrity of Indigenous beliefs and worldviews.

Participants will leave feeling empowered to listen, learn, and grow with the wisdom of indigenous peoples they are fortunate to meet on their journey.
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<thead>
<tr>
<th>Session Code</th>
<th>Title</th>
<th>Time</th>
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<td>W503</td>
<td>BAE Division Business Meeting</td>
<td>3:30 P.M. - 4:30 P.M.</td>
<td>ONLINE, A VIRTUAL CONFERENCE</td>
<td>Biological and Agricultural Engineering Division</td>
<td>BAE Division Business Meeting</td>
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<td>W510</td>
<td>CPDD Executive Board Meeting</td>
<td>3:30 P.M. - 4:30 P.M.</td>
<td>ONLINE, A VIRTUAL CONFERENCE</td>
<td>Continuing Professional Development Division</td>
<td>Business meeting of the Continuing Professional Development Division Executive Board</td>
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<td>W520</td>
<td>Engineering Ethics Division Business Meeting</td>
<td>2:30 P.M. - 3:30 P.M.</td>
<td>ONLINE, A VIRTUAL CONFERENCE</td>
<td>Engineering Ethics Division</td>
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<td>W521</td>
<td>Engineering Libraries Division Annual Business Meeting</td>
<td>3:30 P.M. - 4:30 P.M.</td>
<td>ONLINE, A VIRTUAL CONFERENCE</td>
<td>Engineering Libraries Division</td>
<td>Welcome to all ELD members. Come hear about the state of the division and Professional Interest Council IV. Moderated by Julie Cook, ELD Division Chair.</td>
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<td>W523B</td>
<td>Tau Alpha Pi Meeting</td>
<td>3:30 P.M. - 4:30 P.M.</td>
<td>ONLINE, A VIRTUAL CONFERENCE</td>
<td>Engineering Technology Division</td>
<td>Annual meeting of the ET honor society.</td>
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<td>W523C</td>
<td>Engineering Technology National Forum</td>
<td>2:30 P.M. - 3:30 P.M.</td>
<td>ONLINE, A VIRTUAL CONFERENCE</td>
<td>Engineering Technology Division; Engineering Technology Council</td>
<td>ETNF Business meeting</td>
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<td>W527</td>
<td>First-Year Programs Officers Meeting</td>
<td>2:30 P.M. - 3:30 P.M.</td>
<td>ONLINE, A VIRTUAL CONFERENCE</td>
<td>First-Year Programs Division</td>
<td>A convening of the Officers of the First-Year Programs Division to conduct business. By invitation.</td>
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<td>W529</td>
<td>Industrial Engineering Division Town Hall Business Meeting</td>
<td>2:30 P.M. - 3:30 P.M.</td>
<td>ONLINE, A VIRTUAL CONFERENCE</td>
<td>Industrial Engineering Division</td>
<td></td>
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<tr>
<td>W536</td>
<td>Materials Division Meeting</td>
<td>2:30 P.M. - 3:30 P.M.</td>
<td>ONLINE, A VIRTUAL CONFERENCE</td>
<td>Materials Division</td>
<td>Business Meeting</td>
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<td>W539</td>
<td>Hands-on Mechanics</td>
<td>3:30 P.M. - 4:30 P.M.</td>
<td>ONLINE, A VIRTUAL CONFERENCE</td>
<td>Mechanics Division</td>
<td>Mechanics educators will give a demonstration of the hands-on activities they have developed and/or used in engaging students and enhancing the learning outcomes in mechanics courses.</td>
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ASEE’S VIRTUAL CONFERENCE
WEDNESDAY, JUNE 24 SESSIONS

W542 - How Should I Teach? Perspectives and Discussions on What Works for Your Peers in an Engineering Classroom
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: New Engineering Educators Division
Moderators: Jaskirat Sodhi, New Jersey Institute of Technology; Kerry Widder, Milwaukee School of Engineering
Speaker: Dr. Vimal Kumar Viswanathan, San Jose State University

New engineering educators typically enter academia with very limited or no training in classroom instruction. Many educators 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, new educators might feel overwhelmed. This panel is designed as a platform to share the experiences of 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 to provide a starting point for those who are beginning their career in academia. Participants will be able to ask open-ended questions and hear the perspectives of the panelists and 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.

W544 - Ocean and Marine Engineering Division Business Meeting
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Ocean and Marine Division

W547 - Student Division Business Meeting
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Student Division

The ASEE Student Division executive committee will report out on their work in the past year and elections will be held for the new executive committee. Members will have an opportunity to share ideas, raise concerns, and get involved with the Student Division.

W548 - SED Business Meeting
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Systems Engineering Division

This is the business meeting of the Systems Engineering Division.

W549 - TELPhE Division Business Meeting
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Technological and Engineering Literacy/Philosophy of Engineering Division

This is the annual business meeting of the Technological and Engineering Literacy/Philosophy of Engineering (TELPhE) Division. Election of officers will be held, and discussion of future action items will take place.

W555 - LEAD Division Business Meeting
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Leadership Development Division

W557A - Ways that Teaching and Learning Centers Work: Sharing Lessons Learned
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Faculty Development Division
Moderators: Sarah Zappe, Pennsylvania State University; Stephanie Cutler, Pennsylvania State University; Sam Spiegel, Colorado School of Mines
Speakers: Dr. Sam Spiegel, Colorado School of Mines; Dr. Sarah E. Zappe, Pennsylvania State University

Faculty development and teaching and learning centers are gaining more attention in the STEM fields as more focus is placed on innovations in teaching. For some faculty, that means moving towards more modern approaches. Others may be on the fringe of trying new approaches. [1, 2]. This session will bring together ASEE members who are involved in faculty development, either through a formal teaching and learning center or through less formal structures. We will utilize a Center for Teaching and Learning Matrix (T and L Matrix) [3] published by the American Council on Education and the POD network as a reference to consider the ways that different centers work, to identify varying strengths and growth areas, and to provide an opportunity to share strategies or challenges as a whole group. We will share common ways and variations that Teaching and Learning Centers work, using the Trefny Innovative Instruction Center at the Colorado School of Mines and the Leonhard Center for Enhancement of Engineering Education at Penn State as structured examples. There will also be opportunities for participants to network, learn from each other, and define challenges or areas that warrant further study.
Learning Goals:

By the end of this session, learners will be able to:

1. Utilize a Center for Teaching and Learning Matrix (T and L Matrix) published by the American Council on Education and the POD network to conduct a self-analysis of your center/FD efforts
2. Identify at least one strategy you can use to enhance one or more domains from the T and L Matrix in your faculty development work
3. Articulate common ways and variations in the way Teaching and Learning Centers work, using the Trefny Innovative Instruction Center at the Colorado School of Mines and the Leonhard Center for Enhancement of Engineering Education at Penn State as structured examples
4. Articulate what is going well in your Teaching and Learning Center or faculty development efforts
5. Articulate challenges and key barriers you face (other than money and time) in your faculty development efforts
6. Articulate what you would like to learn from other centers and possible research areas
7. Establish new network relationships and possible partners for collaboration

Content and Activities:

We will begin with a short activity that gives participants a chance to get to know each other. We will then utilize the T and L Matrix so participants can conduct a self-analysis of their center and/or faculty development efforts. For time considerations, we will focus the self-analysis on six domains from the Matrix. We will share the Trefny and Leonhard Centers' self-assessments and lessons learned. The participants will also share the ways that their centers, or centers they know about, work. We will follow the content and flow outlined in the table below. For each activity we note the Learning Goal (LG) being addressed.

Facilitators:

Sam Spiegel, Ph.D. (sspiegel@mines.edu) is the director of the Trefny Innovative Instruction Center at the Colorado School of Mines. He served as chair of disciplinary literacy in science and as associate director of the Engineering Education Research Center at the University of Pittsburgh; director of research and development for a multimedia company; and founding director of the Center for Integrating Research and Learning (CIRL) at the National High Magnetic Field Laboratory. His current efforts focus on innovation of teaching practices in STEM fields and systemic change within higher education.

Sarah Zappe, Ph.D. (szer163@psu.edu) is a research professor and director of assessment and instructional support for the Leonhard Center for the Enhancement of Engineering Education at Penn State. She is currently serving as the founding director of the Center for Integrating Research and Learning (CIRL) at the National High Magnetic Field Laboratory. Her current efforts focus on innovation of teaching practices in STEM fields and systemic change within higher education.

Speakers: Dr. Jennifer Sinclair Curtis, University of California, Davis; Mr. Joel J. Ducoste, North Carolina State University at Raleigh; Dr. Sarah A. Rajala, Iowa State University of Science and Technology

Post-tenure review (PTR) is a mechanism that universities are increasingly using to evaluate faculty over a regular time period after they have attained tenure. While there has been mention of PTR in papers at previous ASEE conferences, we want to initiate a new public dialogue about the impact of PTR on departments and engineering colleges. It is unknown how many colleges of engineering have PTR and the potential impact on the perceptions of academic freedom, risk-taking, workload, culture, climate and collegiality. The purpose of this interactive session is to engage faculty and administrative leadership in a discussion of the aforementioned issues.

Improved clarity on the relationship between faculty and administrators with PTR could result in strategic faculty development roadmaps. In an era of evolving rules and practices, gauging the current state of this review mechanism will assist engineering faculty in engaging with policy development at their home institutions. Several aspects of PTR vary among institutions, including: (i) frequency of the review (e.g., 3-5 years); (ii) constitution of departmental-, college-, and university-level committees; (iii) rating systems; and (iv) required professional development plans.

This session will explore: (i) the potential role of ASEE in a survey of COEs on the topic of PTR; (ii) the longer-term needs of understanding the positive and negative impacts of PTR on climate; and (iii) the importance of career planning/roadmapping on PTR. The ultimate long-term goal is to empower post-tenure faculty to incorporate these reviews into their overall career roadmaps. The new faculty development group in ASEE
is in a unique position to coalesce and disseminate best practices for PTRs—often mandated by a university system—into the fabric of COEs and ultimately into the academic career of our faculty.

Session learning goals:

1. Equip participants/post-tenure faculty with new perspectives on navigating the PTR process to their career-development advantage
2. Assist engineering faculty in developing a long-term roadmap that incorporates the PTR process into their short-term and long-term strategic plan
3. Broaden administrators’ national perspective by exploring PTR practices of other institutions. This will provide them with a new understanding and ability to engage in a more informed dialogue at their home institutions during policy revisions.

The conveners have several years of PTR experience, which include coordinating the development of departmental and college policies with the provost’s office, providing guidance to faculty undergoing PTR, managing the submission process for the North Carolina State University College of Engineering, and leading the college-level review of dossiers and associated communications with faculty and upper administration.

The following is an overview of the session:

1. Introduction to Post-tenure Review: We will start with a review of the literature on PTR and pose the question of the potential of PTR to impact the climate, culture, collegiality and changing processes in colleges of engineering.

2. State of Post-tenure Review at Colleges of Engineering: Participants will explore the current state of PTR at their home institutions. Questions include: Do you have PTR now, and how long has it been in place? Is PTR “coming to a campus near you?” Have there been significant changes in the processes and what has the role of the faculty been in the discussion and implementation of changes? What are the elements/processes of a review and the associated timescale?

3. Administrative Perspectives: Current and former engineering deans will provide perspectives on the PTR process and the future impacts on engineering academia.

4. Diagramming a PTR Regulation – A University Comparison: a brief overview of PTR regulations and the execution in the College of Engineering at NC State and highlights of PTR at three other schools. Because a number of the processes are new and still changing, this exercise will help participants initiate a diagram of their unit processes and take a more active, informed role in policy development at their home institutions.

5. Developmental Next Steps: The session convening group will prepare a summary of the findings, share them with participants, and recommend promising practices to the ASEE Faculty Development Division.

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**W558 - ASEE New Board Members Orientation - by Invite Only**

3:15 P.M. - 4:45 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** ASEE Board of Directors

**Moderator:**

New Board Members Orientation

Be advised, this meeting will be held separately from the Virtual Annual Conference. Details will be sent directly to committee members.

**W560A - DIVERSITY ROUND TABLE - COVID-19 Impact on Faculty Academic Careers**

2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** ASEE Headquarters

**Moderator:** Agnieszka Miguel, Seattle University

COVID-19 has upended all aspects of traditional university life. Faculty are experiencing additional demands necessitated by the move to online platforms for all teaching and administrative work, as well as strains placed on research agendas due to laboratories closing, limited fieldwork, and curtailed in-person contact. Off-campus life has also been upended. Faculty who are parents of school-age children are struggling to balance virtual teaching while also caring for their families. Those with elderly parents face extremely difficult decisions about social distancing and best care practices. Single faculty are isolated at home, separated from their friends and families.

Given extensive evidence indicating that women disproportionately shoulder more care-giving at home, what are the implications now that female faculty find themselves balancing workloads that have grown heavier with the challenges associated with the abrupt move to remote instruction and working from home?

Scholars of women in the workplace note that many of the activities that are integral to the reputation and everyday functioning of an organization are often performed by women and, accordingly, are taken for granted as a “natural” expression of women’s preferences for this sort of work. Female faculty disproportionately perform “hidden work” within universities, and this essential work is not compensated within current faculty reward structures around promotion. How can we think strategically and systematically about the implications of the profound shifts in faculty work caused by COVID-19 for the long term, and how will it differentially impact diverse faculty in terms of workload, tenure and promotion, salaries, and teaching evaluations?
ASEE'S VIRTUAL CONFERENCE
WEDNESDAY, JUNE 24 SESSIONS
#ASEEVC

W560B - Live Interactive ASEE Fellows Session - for Fellows Only
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters
Moderator: Sarah Rajala, Iowa State University
For new and existing ASEE Fellows!

W567 - Best Zone Papers
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Council of Sections
Moderator: Gary Steffen, Purdue University Fort Wayne
Presentation of the outstanding 2019 section Annual Conference papers as selected by each of the four ASEE Zones. One paper will be selected as the 2019 best overall section conference paper winner.

Zone I: The Engineers' Orchestra: A Conductorless Orchestra for Developing 21st-Century Professional Skills
Diana Dabby (Olin College)
Zone II: A New Assessment Model in Mechanics of Materials
Ron Averill, Sara Roccabianca, and Geoffrey Recktenwald (Michigan State University)
Zone III: Supplemental Instruction and Just-in-Time Tutoring: The Who, When, and Why Students Attend in a First-year Engineering Course
David J. Ewing, Catherine Unite, Christina Miller, and Cedric Shelby (University of Texas at Arlington)
Zone IV: BOOSTing Preparedness Through Engineering Project-based Service Learning
Deborah Won, Gustavo Menezes, Adel Sharif, Masood Shahverdi, Ni Li, and Arturo Pacheco-Vega (California State University, Los Angeles)
Gisele Ragusa (University of Southern California)

W568A - EDC Public Policy Committee Meeting
2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Deans Council
Meeting of the Engineering Deans Council (EDC) Public Policy Committee members

W568B - EDC Executive Board Meeting
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Deans Council
This is the meeting and luncheon of the Engineering Deans Council Executive Board.

W577B - Safe Zone Level 2
3:30 P.M. - 4:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: ASEE Commission on Diversity, Equity & Inclusion; First-Year Programs Division
Moderators: Rabyn Paul, University of Calgary; Alisha Sarang-Sieminski, Franklin W. Olin College of Engineering
Speakers: Prof. Alon V. McCormick, University of Minnesota - Twin Cities; Mr. Tiago R. Forin, Rowan University

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 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.

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/.
**W577C - Equity and Inclusion Advocacy: Diversity, Equity, and Inclusion 100**

*2:30 P.M. - 3:30 P.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsors:** ASEE Commission on Diversity, Equity & Inclusion; First-Year Programs Division

**Moderators:** Fantasi Curry, Purdue University at West Lafayette; Meagan Pollock, Engineer Inclusion; Jean Sanders, North Carolina State University at Raleigh; Jenna Carpenter, Campbell University

**Speakers:** Miss Fantasi Nicole Curry, Purdue University at West Lafayette; Dr. Meagan C. Pollock, Engineer Inclusion

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 influence, and beliefs related to diversity, equity, and inclusion.

**W640 - Hispanic Women in Engineering: Initiating Dialogue for Change**

*4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** Minorities in Engineering Division

The inspiration for this workshop comes from the challenges and experiences shared by Hispanic women studying engineering, professional engineers in training, engineers in the workplace and in professions, and members of professional societies. This workshop offers a safe space for initiating the much-needed dialogue toward a more inclusive paradigm for minorities in engineering.

The workshop organizers are from a broad and diverse group of Hispanic women in engineering who can discuss undergraduate and graduate student experiences, professional organization perspectives, employee/employer experiences, and engineering education.

**W699A - VIRTUAL WORKSHOP: Mixed Reality in Engineering Education: How Does it Affect User Experience, Motivation, and Student Performance?**

*4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** Sponsored Sessions

**Speakers:** Dr. Kyle Johnsen, University of Georgia; Dr. Dominik May, University of Georgia; Valerie Varney, IMA/ZLW of RWTH Aachen University

Mixed reality, used as the overarching expression for both augmented and virtual-reality technologies, has become a common term within the past few years. Not only does the gaming world use it to make users feel more immersed in computer games, but also many industrial enterprises have discovered that they can use Mixed Reality for training and further education of their staff. According to the Gartner Hype Cycle for Emerging Technologies of 2019, Mixed Reality is no longer seen as an emerging technology but has risen to the stage of productivity.

Universities also have discovered Mixed Reality as an interesting new technology to foster teaching and learning processes. However, university lecturers often struggle to include such new technologies into their lectures, even if it might be easier than expected. Often it is too little knowledge about the advantages and suitable fields of application, or the technological implementation, that deter them. This workshop is meant to show examples of Mixed Reality applications in the engineering education field. It will allow for both individual practical experiences with such technologies and broader discussions about future trajectories for further development, chances, and barriers for Mixed Reality as an integral part of modern engineering education.

The workshop consists of three consecutive phases:

1. In the introductory phase, the presenters start off with a general overview of Mixed Reality technology for educational purposes and give insights into several learning environments making use of Mixed Reality

2. In the second phase, participants have the opportunity to try out several settings and afterwards evaluate their personal experience

3. Lastly, participants will be given an insight into existing assessment, evaluation, and educational research efforts for virtual learning environments. Furthermore, they will discuss their own experience in order to identify use cases for their own teaching and learning purposes
The workshop will include: 1) an introduction to the three dimensional (3-D) learning model of NGSS and 5E instructional model; 2) an illustration of successful LEGO robotics enhanced NGSS-plus-5E lessons created and implemented by the teachers; 3) discussion of classroom implementation experiences and challenges of integrating robotics; 4) an active breakout session where workshop facilitators will work with the participants to support them in developing their own lesson ideas; and 5) constructive feedback and reflection session for participants.

During the workshop, participants will improve their lesson-planning skills by developing a practical understanding of the 3-D learning model of NGSS and by practicing the use of the 5E instructional model. The example lessons created and implemented by the teachers integrate LEGO robots in an authentic manner for teaching key middle school STEM concepts. Workshop attendees will observe demonstrations of the lesson activities using LEGO robots (provided by the organizing team) in groups to simulate learner experience. This will be followed by a discussion of goals of the lessons, pedagogical methods, instructional strategies, challenges of classroom implementation, and suggested modifications for different classroom conditions among the organizing team, teachers, and attendees. Attendees will then have an opportunity to participate in a group activity where they will be supported by the organizers in brainstorming ways in which they can integrate different robotic-based lessons in their own classrooms. The workshop will conclude with a constructive feedback and reflection session soliciting participant opinions regarding the merits and challenges of the presented approach.

The workshop will emphasize the creation of NGSS-aligned classroom implementable lessons that use robotics to engage students with STEM content. It will demystify the process of creating NGSS-aligned lessons for K-12 educators; address the challenges and benefits of their classroom implementation; and encourage participants to engage students with key science and engineering practices through use of technologies such as robotics. Participants will further receive access to rich content developed by the organizers to support the creation and implementation of NGSS-plus-5E lessons as a part of a multiyear research effort, along with planning and implementation support from the project staff in the following academic year as needed.

The educator-leaders of the workshop gained extensive experience in creating and implementing LEGO robotics-enhanced STEM lessons in their middle school classrooms; creating and implementing NGSS-plus-5E lessons; conducting workshops to share their experiences with peers; and sharing their work through scholarly publications, all through their participation with the research-oriented teacher professional development program at NYU Tandon. While the program at NYU used LEGO robots, workshop participants will not be limited to the use of any specific robotic platform for teaching and learning STEM concepts. Nonetheless, it will be beneficial for participants to have working knowledge of at least one robotic platform used in K-12 STEM education. A quick introduction to commonly used educational robotic platforms will also be provided during the session.
W699D - VIRTUAL WORKSHOP: A Phasor Toolbox for AC Circuit Analysis using MATLAB
4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions
Speakers: Dr. Jai P. Agrawal, Purdue University Northwest; Prof. Omer Farook, Purdue University Northwest

DC and AC circuit analysis is the beginning fundamental course in engineering/technology programs. Many textbooks use calculators as the engine for long and complex calculations. Focused on not committing mathematical mistakes, students often do not pay enough attention to the concepts and tools. Furthermore, the conventional method of AC circuit analysis uses phasors and phasor-based methods.

This workshop presents a Phasor Tool Box which contains most functions that would be needed to do phasor calculations and enable students to visualize the phasor diagrams. The tool box is designed in MATLAB and requires students to have minimal scripting background, keeping in mind that these tools will be used by the beginner students in electrical engineering/technology programs. Using this tool is as easy as using algebra for adding, subtraction, multiplication, division of phasors, and additionally to visualize these operations in the complex plane.

Workshop participants will get the soft copy of the Phasor Tool Box and a book, "Phasor Methods of AC Circuit Analysis."

4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions
Speakers: Dr. Sheila Anne Gobes-Ryan, University of South Florida; Dr. Joanna G Bartell, University of South Florida; Jamie Chilton, University of South Florida; Dr. Kingsley A. Reeves Jr., University of South Florida

As engineering programs across the country work to address ABET’s communication competency requirement, these programs increasingly are looking for ways to incorporate writing into their curricula. In addition to developing communication competency, writing in engineering courses also offers a significant opportunity for enhancing core student learning outcomes with the effective application of writing-to-learn strategies. Writing-to-learn strategies have been successfully applied and studied across a range of STEM curricula as a way to increase students’ abilities to grasp, discuss, and apply the materials and methods they are learning.

This workshop, led by members of the integrated communication program at the University of South Florida’s College of Engineering, will be an active, discussion-based session focused on writing-to-learn pedagogy, strategies, and application. The facilitators will first offer an overview of writing-to-learn literature and best practices as well as a short discussion about their own efforts to implement writing-to-learn assignments in several engineering courses in the College of Engineering at the University of South Florida. In the second half of the workshop, participants will have the opportunity to develop writing-to-learn strategies and assignments for their own courses as they brainstorm with and work alongside faculty from diverse engineering backgrounds.

W699F - VIRTUAL WORKSHOP: Integrated E-Learning Modules for Developing an Entrepreneurial Mindset in Students
4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions
Speakers: Dr. Ronald S. Harichandran P.E., University of New Haven; Dr. Nadiye O. Erdil, University of New Haven; Dr. Maria-Isabel Carnasciali, University of New Haven; Dr. Jean Nocito-Gobel, University of New Haven; Dr. Cheryl Q Li, University of New Haven

The University of New Haven has developed 18 e-learning modules designed to be integrated into engineering and computer science courses in a hybrid format so as to develop an entrepreneurial mindset in students. These modules are publicly available and may be downloaded for implementation within a university’s Learning Management System. This workshop will inform attendees about the 18 modules and their learning objectives, train them on how to deploy the modules within engineering and computer science courses, and get them prepared to deploy one module of their choosing.
Empathy as part of emotional intelligence has recently gained a lot of traction in the engineering education research literature and education through human-centered design and diversity/inclusion initiatives. Empathy in engineering is unique and brings its own tools and techniques. This interactive workshop introduces participants to an engineering-specific empathy model and techniques to employ empathy as a tool of self-reflection and in the work environment.

Children begin to postulate their future careers at about four to five years old. However, there is a dearth of children’s literature that features engineers and other STEM professionals, and significantly less STEM-minded literature with women/girls and people of color in non-stereotype-conforming roles. With increasing industry demand for engineers, it is critical that we create new ways of reaching children, sparking interest, and challenging stereotypes.

Advancement in computer and Internet technologies allowed tremendous growth of networks and hence the Internet of Things. Engineering educators and researchers utilized this protocol to connect their experimental systems with the web. That, in turn, led to Internet-accessible remote laboratories. Given their specialized development, there is no formal or informal training either in the design and development of remote laboratories or their use in laboratory course offerings and associated management. This workshop will provide an opportunity for academics, researchers, and developers to gain hands-on experience in using remote laboratories. Participants will become familiar with a few developed remote laboratory technologies in STEM disciplines, be shown how to use them, and learn about the associated pedagogy. At the end there will be a discussion session where attendees can learn from experienced experts about incorporating remote laboratories in their own laboratory courses.
W699K - VIRTUAL WORKSHOP: Introducing STEM Concepts at Freshman Level via a New Design-driven Robotics Class
4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions
Speaker: Dr. Anurag Purwar, Stony Brook University

In this workshop, we will 1) introduce attendees to the motivation and structure of the class; 2) lead them through a series of hands-on robot and mechanical design exercises using the robot kit and app to design and prototype simple mechanical contraptions, as well as more complex machines and robots; and 3) demonstrate how to incorporate significant design activities in the classroom while teaching concepts from mechanical engineering, electronics, and computer programming.

The robot kit works with off-the-shelf electronics and open-source software such as Arduino, and employs an open architecture to allow users to design and make their own parts. The software served through a web browser is the first app of its kind, which helps students design planar linkages for robot motions. The app implements algorithms developed through an NSF-funded award to the presenter.

The first 20 registered attendees will be provided with a free robot kit.

W699L - VIRTUAL WORKSHOP: P-12 Engineering Outreach - Amplifying Impact and Building Community
4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions
Speakers: Dr. Adam Maltese, Indiana University-Bloomington; Dr. Merredith D. Portsmore, Tufts University

Many universities, businesses, and professional organizations have joined the effort of bringing engineering to P-12 students, hoping to encourage more students to enter the field. Our NSF-funded project has been studying how engineering disciplinary experts can make the greatest impact in working with students, particularly young females. This workshop will engage participants in discussing role models and role model theory, analysis of classroom video, and exploration of new resources we have developed to maximize the impact of outreach programs that connect engineering students and professionals with K-12 students.

W699M - VIRTUAL WORKSHOP: Applying for an NSF CAREER Award? Research-based Workshop to Support Early Career Faculty
4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions
Speakers: Dr. Jennifer Karlin, Minnesota State University, Mankato; Dr. Allison Godwin, Purdue University at West Lafayette

This workshop will be structured into two parts. The first part will focus on an interactive session presenting and reflecting in small groups on research-based practices from a collaborative inquiry retreat held with current and former engineering education CAREER awardees and from surveys sent to early career faculty in engineering education across the U.S. in March 2019. The topics will center around three areas: What makes a good CAREER proposal; tips and advice that prior awardees wished they had received when writing CAREER proposals; and resources for applicants. The learning goal for this part of the workshop is for early-career faculty to understand what is required for an NSF CAREER proposal and what elements are important for successful projects. The knowledge conveyed in this part of the session moves beyond what is contained in the Request for Proposals or Proposal and Award Policies and Procedures Guide on the NSF website. Broad sharing of this information will begin to create more equitable and widespread support for this award in engineering education.

The second part of the workshop will be an open work time and mentoring session for early career faculty to develop a one-page summary of their project idea to facilitate a discussion with the EEC Program Officer, Ed Berger, who will be present at the workshop for feedback. As a part of the project, a group of Lead Mentors have been identified. These Lead Mentors have been awarded NSF CAREER grants and are associate or full professors in engineering education fields. The Lead Mentors will facilitate mentoring circles to answer questions and provide individual feedback during the second half of the workshop. The learning goal for this portion of the session is to create a network of early career and more senior faculty in engineering education and to provide opportunities for targeted and specific feedback on ideas.
W699N - VIRTUAL WORKSHOP: Curriculum and Course Design for Mechatronics and Robotics Engineering Education

4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Sponsored Sessions

Speakers: Dr. Nima Lotfi, Southern Illinois University Edwardsville; Prof. Michael A. Gennert, Worcester Polytechnic Institute; Dr. Vikram Kapila, New York University Tandon School of Engineering; Dr. Carlotta A Berry, Rose-Hulman Institute of Technology; Dr. Kevin Stanley McFall, Kennesaw State University; Prof. Musa Jouaneh, The University of Rhode Island

This workshop is motivated by the rapid growth in mechatronics and robotics engineering (MRE) and therefore the need for students with a strong multidisciplinary theoretical and experimental skill set. These students are the future engineers who will design, develop, and implement transformative autonomous technologies that improve human health and welfare.

Recognizing the need for preparing highly educated MRE professionals, many universities and colleges are adopting MRE as a distinct degree program. However, there is not a well-defined and unified framework for such programs, which can cause confusion and ambiguity among instructors and future employers. To overcome this challenge, the authors, with financial support from NSF, have been engaged in holding several workshops on the future of mechatronics and robotics engineering education. These workshops have brought together more than 150 faculty, students, and industry professionals in the MRE field to share broad success stories; to develop concept inventories for MRE curricula and courses; to identify thought leaders; to learn the recent trends in industry; and to develop a roadmap for MRE education.

Capitalizing on the outcomes of these efforts and based on the feedback from prior workshop participants, this workshop aims to:

- Involve a broad range of colleges and universities
- Develop a unified set of courses for MRE curricula
- Prepare faculty to teach mechatronics and robotics courses through hands-on activities
- Further expand the community of MRE educators

W699O - VIRTUAL WORKSHOP: Reverse-engineering YouTube Videos to Develop Course Content

4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Sponsored Sessions

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

Today, most students enrolled in higher education were born in the 1980s or 1990s and have grown up with access to computers, the Internet, and many other electronic devices for daily use. Students making up this demographic are designated as digital natives. Numerous studies on the positives and negatives of these technology-savvy students—in education and in the work force—have been published. This workshop will show how a simple use of technology, specifically videos from YouTube, can engage this generation of students and be a source of new course material.

With textbooks, students have become accustomed to finding solutions manuals on the Internet, which let them focus just on getting the right answer. Our approach, originally called YouTube Fridays, devoted a small fraction of class time to student-selected videos related to the course topic; e.g., thermodynamics. Students then wrote and solved 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. Our National Science Foundation project examined the rigor of YouTube problems and their effect on the problem-solving skills of students. The results prove that using YouTube videos in this way generates problems equal in quality and rigor to those found in textbooks.

W699P - VIRTUAL WORKSHOP: Technology-Enhanced Active Learning - for Busy Skeptics and True Believers

4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Sponsored Sessions

Speakers: Dr. Michael J. Prince, Bucknell University; Dr. Milo Koretsky, Oregon State University; Dr. Brian P. Self, California Polytechnic State University, San Luis Obispo

Active learning has consistently been shown to be more effective than traditional instruction for promoting learning, motivation and student retention. Despite this overwhelming research support, instructors have a number of significant concerns about adopting active learning techniques in their own classes. Common concerns include worries about preparation time, content coverage, and student resistance to new teaching methods. This hands-on session is designed to introduce quick and simple active learning techniques that are effective, require little preparation or class time, and generate little or no student resistance.

The workshop will introduce an interactive web-based tool that will
enable interactive delivery of workshop content and give participants a direct way to use that content in practice. To facilitate adoption of the active learning pedagogies that are presented, participants will be provided continued access to conceptual questions and other instructional tools for core chemical and mechanical engineering classes, including: Material and Energy Balances, Thermodynamics, Fluid Mechanics, Heat Transfer, Kinetics and Reactor Design, Separations, Materials Science, Statics and Dynamics. The bank of over 2,500 conceptual questions, the easily navigable software interface, and the other available resources will substantially lower the activation barrier for instructors to integrate the pedagogical methods into instruction and assessment.

W699Q - VIRTUAL WORKSHOP: Reframing and Reimagining the Experiences of Doctoral Women of Color in Engineering

4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Sponsored Sessions

Speakers: Dr. Sharnnia Artis, University of California, Irvine; Dr. Stacie LeSure, American Society for Engineering Education; Dr. Marjorie C. Shavers, Heidelberg University

Many women of color in doctoral programs in engineering are often the only women of color or one of few women of color in their programs. They often define their experience as isolating and lonely, forcing them to go outside of their programs to find support to navigate their doctoral program. To help women of color thrive during their doctoral experience, this workshop will use research- and evidence-based practices to:

1) Increase the awareness and understanding of the specific issues facing women of color in doctoral programs in engineering

2) Increase cultural competence by participating in a privilege test and discussions aimed at better understanding marginalized communities

3) Identify strategies for creating doctoral environments where all identities, particularly those of women of color, are welcomed in academic engineering spaces

4) Develop an implementation plan to help cultivate a culture of inclusion for doctoral women of color in engineering at your institution.

Special attention will be given to case scenarios and critical incidents on the following themes:

1) Multiple Identities: Women of color have multiple identities that impact their experiences in engineering

2) STEM Identity: Some of their identities are accepted, but others are not accepted in academic and engineering spaces

3) Intersectionality: Recognizing the intersectionality of STEM, gender, and race identities

4) Interventions: Strategies for cultivating an environment where all of our identities are equally accepted, including cultural capital

After the discussion of case scenarios, critical incidents, and project themes, the presenters will facilitate small group discussions around how attendees' work can improve outcomes in the community they are trying to serve, with an emphasis on developing a deeper understanding of the community they serve. The workshop will conclude with attendees developing a strategic plan to address challenges women of color face in doctoral programs in engineering.


4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Sponsored Sessions

Speakers: Dr. Jan DeWaters P.E., Clarkson University; Prof. Stefan J. Grimberg P.E., Clarkson University

Background:

The average person in the United States and Canada disposes of approximately 2 kg (4.4 pounds) of solid waste every day. Food and yard waste represent 30% to 40% of the solid waste stream in the U.S. and Canada, respectively, contributing to multiple pressing issues, including gaseous emissions, leachate generation, and diminishing landfill capacity. Many states in the U.S. are in the process of revising waste-disposal regulations to more closely control the disposal of organic wastes. For example, New York State has mandated that as of 2022, facilities producing an annual average of at least two tons of food waste per week will no longer be allowed to landfill their organic wastes. In the greater Montreal area, residents living in buildings of less than nine residences per building are expected by 2025 to divert 60 percent of their organic waste to biological treatment processes (land farming, composting, or anaerobic digestion). Clearly, the time is ripe for educating students about the importance of diverting organic materials from the solid waste stream!

Organics removed from the solid waste stream can be treated aerobically (i.e. compost) or anaerobically, as long as the waste is void of contamination. While both produce valuable fertilizer, anaerobic digesters also recover energy. The biogas produced by anaerobic digestion can be used in a variety of energy systems as a substitute for fossil fuels. Digestate, the liquid effluent from the digester, retains most of the nutrients and can displace commercial fertilizers.

Workshop Details:

This proposed workshop will be both informational and hands-on. Participants will gain knowledge and understanding surrounding the topics of waste disposal, anaerobic digestion, and the relationship between our waste handling practices and our impact on global climate change. We will describe a successful public-school waste food separation program that was created through a partnership between school personnel, Clarkson University faculty and students, and the Cornell Cooperative Extension Service. Then, we will describe a variety of hands-on educational curricula we’ve developed and guide teachers through some of the activities related to solid-waste disposal options (“Where does my trash go?”), what happens when we landfill our trash (“Building a landfill”) and the science behind anaerobic digestion (“Creating Biogas from Food Waste”). Teachers will gain access to educational modules that can be adapted for...
their own classrooms. The activities are geared toward middle and high school level but can be adapted for elementary students.

**W699T - VIRTUAL WORKSHOP: Massification of Open-ended, Project-based Design Teaching for Any Class Size**

4:30 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Sponsored Sessions

**Speakers:** Dr. Robert V. Fleisig P.Eng., McMaster University; Elizabeth Hassan P.Eng., McMaster University

Engineering design is best learned when students have a genuine opportunity to work on design problems to which there is no immediate and obvious solution, and where students can interact with the clients, users, and environments that mimic real-world design context. An effective learning environment is created when students are challenged to deal with ambiguity, work with stakeholders, and ultimately are imposed upon to be creative in the pursuit of a design solution. The goal is to teach students to learn how to think and work like design engineers - not to simply build a device, system, or other outcome. On a small scale, design can be taught in a studio-based environment under the supervision and management of an expert instructor. As the class size grows, a traditional studio-based approach no longer is possible.

In this workshop, participants will experience designing for an open-ended, project-based course for a large class (up to 1,000 students), learn about effective means for massification for open-ended design learning, and discuss effective methods for teaching open-ended design for a large class size.

**W714 - ERM Annual Community Celebration & Awards Reception (Formerly the ERM Brouhaha)**

7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Educational Research and Methods Division

Enjoy an evening meeting and reconnecting with your fellow ERM division members while celebrating the accomplishments of this year’s Apprentice Faculty Grant Recipients and Best Paper award winners.

**W715 - ECE Division Networking Social**

7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Electrical and Computer Division

Take this opportunity to network with fellow ECE Division members virtually!

**W716 - Virtual Tour - Energy Facilities**

7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsors:** Energy Conversion and Conservation Division; Ocean and Marine Division; Instrumentation Division

Several educational virtual tours of energy facilities have been planned. Each one is 30 minutes with Q & A.

**W752 - Celebration of Engagement: Community Engagement Division Social**

7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Community Engagement Division

The ASEE Community Engagement Division welcomes members and guests who are interested in community engagement to join us at this annual event. This will be a fun opportunity to connect with others who are building service into their everyday careers.

**W755 - LEAD Division Social**

7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Engineering Leadership Development Division

Come join the LEAD Division members for an evening of networking and socializing!

**W763 - Campus Reps Reception & Awards Ceremony**

7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Campus Representatives

Campus representatives reception and awards ceremony.
W766 - INDUSTRY DAY: CMC and CIPD Virtual Kick-off
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Corporate Member Council

Corporate Member Council (CMC) and College-Industry Partnerships Division (CIPD) members and those interested in becoming members are invited to attend the CMC and CIPD joint virtual social to kick off Industry Day.
R203 - Biological and Agricultural Engineering Division Technical Session 2
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Biological and Agricultural Engineering Division
Moderators: Alicia Modenbach, University of Kentucky; Janie Moore, Texas A&M University
Work in Progress: I Didn’t Know You Did That: A Case Study of Learning Outcomes Across Multiple Engineering Disciplines Compared to Biological and Agricultural Engineering
Miss Cara London, Texas A&M University
Dr. Janie M. Moore, Texas A&M University
Work in Progress: Participants of the Cultivate ACCESS Program
Rachel Ibach, University of Nebraska, Lincoln
Dr. Jennifer Keshwani, University of Nebraska, Lincoln
Dr. Deepak R. Keshwani, University of Nebraska, Lincoln
Sydney E. Everhart, University of Nebraska, Lincoln
Leah Sandall, University of Nebraska, Lincoln
The Effect of Humanitarian Engineering on Female Learning and Confidence
Ms. Tara Gupte Wilson, Ohio State University
Dr. Derek Breid, Saint Vincent College
Dr. Ann D. Christy P.E., Ohio State University
Dr. Clarissa Belloni, Ohio State University
Work in Progress: Design and Implementation of Collaborative Problem-based Learning Laboratory Modules for Engineering and Nonengineering Students
Prof. Youngmi Kim, University of Wisconsin, River Falls
A Curriculum in Urban Agriculture and Sustainability, and Lessons Learned
Dr. Lisa Deane Morano, University of Houston, Downtown
Dr. Vassilios Tzouanas, University of Houston, Downtown

R204 - Introduction to the Field of Biomedical Engineering
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Biomedical Engineering Division
Moderators: Michael Rust, Western New England University; William Guilford, University of Virginia
Preparing Early-career Biomedical Undergraduates through Investigations of Stakeholder Needs: A Qualitative Analysis
Dr. Christian Poblete Rivera, University of Michigan
Dr. Aileen Huang-Saad, University of Michigan
Cassandra Sue Ellen Woodcock, University of Michigan
Annie Wang
A Coding Scheme for Measuring Biomedical Engineering Students’ Breadth of Exposure to the Discipline
Prof. Heidi A. Diefes-Dux, University of Nebraska, Lincoln
Dr. Nicole M. Iverson, University of Nebraska, Lincoln
CardioStart: Development and Implementation of a Tissue Engineering Summer High School Program
Jasmine Naik, University of California, Irvine
Emil Martin Lundqvist, University of California, Irvine
Prof. Christine E. King, University of California, Irvine
Prof. Anna Grosberg, University of California, Irvine
How Does Enrollment Management Affect Student Population Diversity in Biomedical Engineering?
Dr. Rachel C. Childers, University of Oklahoma
Dr. Handan A. Acar, University of Oklahoma
Introducing Neuroscience to High School Students through Low-cost Brain Computer Interface Technologies
Prof. Christine E. King, University of California, Irvine
Dr. Beth A. Lopour, University of California, Irvine

10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division
Moderator: Deborah Besser, University of St. Thomas
This session includes papers highlighting experiential learning opportunities using laboratories and interactive approaches.
Rationale and Design Approach for Full-scale Experiential Learning Opportunities in Structural Engineering
Dr. J. Chris Carroll P.E., Saint Louis University, Parks College of Engineering
Dr. Matthew D. Lovell P.E., Rose-Hulman Institute of Technology
Dr. Kyle Kershaw P.E., Rose-Hulman Institute of Technology
Dr. Shannon M. Sipes, Indiana University
Prof. Ronaldo Luna, Saint Louis University, Parks College of Engineering
Dr. John Aidoo, Rose-Hulman Institute of Technology
Prof. James H. Hanson P.E., Rose-Hulman Institute of Technology
Design and Implementation of Experiential Learning Modules for Structural Analysis
Alec Colin Derks, Saint Louis University
**ASEE’S VIRTUAL CONFERENCE**  
**THURSDAY, JUNE 25 SESSIONS**  

**#ASEEVC**

Dr. J. Chris Carroll P.E., Saint Louis University, Parks College of Engineering  
Prof. James H. Hanson P.E., Rose-Hulman Institute of Technology  
Dr. Matthew D. Lovell P.E., Rose-Hulman Institute of Technology  
Dr. Kyle Kershaw P.E., Rose-Hulman Institute of Technology  

**Implementation of a Laboratory Experience in Reinforced Concrete Courses**  
- Dr. Benjamin Z. Dymond, University of Minnesota Duluth  
- Dr. Matthew Swenty P.E., Virginia Military Institute  
- Dr. Christopher Ryan Shearer, South Dakota School of Mines and Technology

**Steel Frame Sculpture for Teaching Purposes**  
- Hadi Kazemiroodsari, Wentworth Institute of Technology  
- Mr. Austin Hart  
- Dr. Anuja Kamat, Wentworth Institute of Technology  
- William Jordan Cashel-Cordo, Wentworth Institute of Technology

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**R207 - College Industry Partnerships Division Technical Session 3**  
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE  
**Sponsor: College Industry Partnerships Division**  
**Moderators: David Schmueser, Clemson University; Charles Baukal, John Zink Co. LLC**

**Experiences, Issues, and Reflections of School-Enterprise Joint Training in Chinese Mainland under the Vision of PETOE Strategy: An Empirical Study Based on Small-N Cases**  
- Dr. Hang Zhang, Beihang University  
- Dr. Ming Li, Beijing Foreign Studies University  

**The Status of University-Industry Collaboration Participating in People-to-People and Cultural Exchanges in Engineering Technology Among the Belt and Road Initiative Participants**  
- Prof. Wei Yao, Zhejiang University  
- Mr. Shunshun Hu, Zhejiang University  
- Mr. Zhaowei Chu, Zhejiang University  
- Mr. Bifeng Zhang, Zhejiang University

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**R223 - Focus on ETAC Accreditation**  
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE  
**Sponsor: Engineering Technology Division**  
**Moderator: Michael Shenoda, State University of New York, College of Technology at Farmingdale**

**A Control System Design Approach to Improve the Attainability of Student Learning Outcomes in Engineering Technology Courses**  
- Dr. Chandra Bhushan Asthana P.E., Elizabeth City State University  
- Dr. Kuldeep S. Rawat, Elizabeth City State University  
- Dr. Akbar M. Eslami, Elizabeth City State University

**Engineering Technology Accreditation: Avoid the Pitfalls and Be Prepared**  
- Dr. Barbara L. Christie, State University of New York  
- Dr. Scott C. Dunning, University of Maine

**Landscape of Engineering Technology Programs as Seen from ASEE**  
- Aimee T. Ulstad, Ohio State University  
- Ms. Kathryn Kelley, Ohio State University

**Streamlining Continuous Improvement: Efficiently Creating Value While Satisfying ABET Criterion 4**  
- Dr. Thomas M. Hall Jr., Northwestern State University of Louisiana  
- Dr. Scott Danielson, Arizona State University  
- Ms. April Chit Cheung, Purdue University, West Lafayette

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**R224 - ENT Division Technical Session: Assessment Tools and Practices**  
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE  
**Sponsor: Entrepreneurship & Engineering Innovation Division**  
**Moderators: Sandra Clavijo, Stevens Institute of Technology (School of Engineering and Science); Jason Forsyth, James Madison University**

**An Approach to Assess Achievement of EML through Integrated e-Learning Modules**  
- Dr. Ronald S. Harichandan, University of New Haven  
- Aadityasinh Rana  
- Dr. Nadiye O. Erdil, University of New Haven

**Comparison of Entrepreneurial Mindset Course Learning Objectives: Evaluating Consistency and Clarity**  
- Laine E. Rumreich, Ohio State University

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Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
Faith Logan, Ohio State University
Zachary Dix, Ohio State University
Mr. Nicholas Rees Sattele, Ohio State University
Dr. Krista M. Keckesemety, Ohio State University
Dr. Ann D. Christy P.E., Ohio State University

Creating a Master “Entrepreneurial Mindset” Concept Map
Dr. Cheryl A. Bodnar, Rowan University
Mr. Siddharthsinh Jadeja, Rowan University
Dr. Elise Barrella P.E., Wake Forest University

Using Entrepreneurial Mindset Constructs to Compare Engineering Students and Entrepreneurs
Dr. William J. Schell IV P.E., Montana State University
Agieszka Kwapisz, Montana State University
Kregg Aytes, Montana State University
Dr. Scott E. Bryant, Montana State University
Dr. Brock J. LaMeres, Montana State University
Mrs. Elizabeth B. Varnes, Montana State University

“EMbedding” the KEEN Framework: An Assessment Plan for Measuring ABET Student Outcomes and Entrepreneurial Mindset
Dr. John K. Estell, Ohio Northern University

R225 - Innovative Approaches to Improving Student Learning
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Environmental Engineering Division
Moderators: Alexa Rihana Abdallah, University of Detroit Mercy; Amalia Kokkinaki, University of San Francisco; Veera Ganeswar Gude, Mississippi State University

Overcoming Affective and Cognitive Chemistry Challenges in an Introductory Environmental Engineering Course Using a Flint Water Crisis Case Study
Prof. Matthew James Scarborough, University of Vermont
Dr. Katherine D. McMahon, University of Wisconsin, Madison

Implementation of Real-world Class Activities in an Introduction to Environmental Engineering Class
Dr. Cara J. Poor, University of Portland
Dr. Heather Dillon, University of Portland
Jeffrey Matthew Welch, University of Portland
Dr. Nicole C. Ralston, University of Portland

Examining the Effectiveness of Short, Voluntary, Online Tutorials in a Large Undergraduate Class
Prof. Alison Cupples, Michigan State University

Course Outcome Assessment: Is Using the Average Good Enough?

Col. Phil Dacunto, United States Military Academy
Capt. Andrew Joseph Ng, United States Military Academy

R226 - Experimentation and Laboratory-oriented Studies Division Technical Session 5
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Experimentation and Laboratory-oriented Studies Division
Moderator: Natasha Smith, University of Virginia

Clay Ceramic Water Filter Performance for Stationary and Solid Body Rotation Conditions
Mr. Jacob Robert Huene, Oral Roberts University
Mr. Michael Stephen Huene, Oral Roberts University
Miss Esther Marie Spear, Oral Roberts University
Mr. Ezra Whitman Walblay, Oral Roberts University
Mr. Harley Craig, Oral Roberts University
Dr. John E Matsson, Oral Roberts University

An Improved Design for a Viscometer Apparatus
Mr. Joseph Michael Derrick, Indiana University - Purdue University Indianapolis
Mr. Michael Golub, Indiana University - Purdue University Indianapolis
Dr. Jing Zhang, Indiana University - Purdue University Indianapolis

Procurement of Undergraduate Transient Heat Transfer Lab Experiment at No Budget
Prof. Nihad Dukhan, University of Detroit Mercy

Operations Laboratory Module on Heat Exchangers
Dr. Courtney Pfluger, Northeastern University
Dr. Dayna Lee Martinez, Northeastern University

R227A - First-year Programs: Focus on Students
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-year Programs Division
Moderators: Ashish Borgaonkar, New Jersey Institute of Technology; Emma Tevaarwerk, Northwestern University

An Investigation into How Students Spend their Time During Study Breaks
Mr. Christopher Rennick, University of Waterloo
Dr. Carol Hulls P.Eng., University of Waterloo
Ms. Mary A. Robinson, University of Waterloo

Misunderstandings, Mistakes, and Dishonesty: A Post-hoc
ASEE’S VIRTUAL CONFERENCE
THURSDAY, JUNE 25 SESSIONS
#ASEEVC

Analysis of a Large-scale Plagiarism Case in a First-year Computer Programming Course
Dr. Philip Reid Brown, Rutgers, the State University of New Jersey
Dr. Ilene J. Rosen, Rutgers, the State University of New Jersey

Work in Progress: Openness, Conscientiousness, Self-direction, and Mindset in First-year Engineering Students
Dr. Matthew Cavalli, Western Michigan University
Ms. Anetra Grice, Western Michigan University

Work in Progress: First-year Engineering Students’ Study Strategies and their Academic Performance
Ahmed Ashraf Butt, Purdue University, West Lafayette
Saira Anwar, Purdue University, West Lafayette
Dr. Muhsin Menekse, Purdue University, West Lafayette

Relationship Between Gen Z Engineering Students’ Personality Types and Topics of Technical Interest
Dr. Goli Nossoni, University of New Haven
Dr. Ronald S. Harichandran, University of New Haven

R227B - First-Year Programs: Assessment in the First Year
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-year Programs Division
Moderators: Djedjiga Belfadel, Fairfield University; Jonathan Aurand, Dunwoody Institute

Extended Exam Wrappers: A Comparison of Approaches in a Learning Strategies Course
Ms. Abigail T. Stephan, Clemson University
Dr. Elizabeth Anne Stephon, Clemson University
Matthew K. Miller, Clemson University

Peer Sharing Presentations in a First-year Engineering Learning Strategies Course
Ms. Abigail T. Stephan, Clemson University
Dr. Elizabeth Anne Stephan, Clemson University
Laurel Whisler, Clemson University
Dr. Andrew I. Neptune, Clemson University

Algorithm for Consistent Grading in an Introduction to Engineering Course
Prof. Joshua A. Enszer, University of Delaware
Prof. Jenni M. Buckley, University of Delaware

Implementation of Mock Exam Structure for an Introductory Engineering Course
Miss Nisha Abraham, University of Texas at Austin
Dr. Nina Kamath Telang, University of Texas at Austin

Dr. Jamie R. Gurganus, University of Maryland, Baltimore County
Shannon M. Clancy
Mr. Richard Olaf Blorstad, DeMatha Catholic High School
Mr. Ryan Reinhardt,
Dr. Charles D. Eggleton, University of Maryland, Baltimore County
Prof. L. D. Timmie Topoleski, University of Maryland, Baltimore County

R228 - Online and Professional Graduate Programs
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Graduate Studies Division
Moderators: Kathleen Luchini Colbry, Michigan State University; Jeffrey Fergus, Auburn University

Scalable Synchronous Cohort-based International Education
Dr. Tilman Wolf, University of Massachusetts, Amherst
Dr. C. V. Hollot, University of Massachusetts, Amherst
Russell Tessier, University of Massachusetts, Amherst
Mr. George Bryan Polivka, Shorelight
Prof. Yadi Eslami, University of Massachusetts, Amherst

Integrated Mobile Learning Platform: Content, Delivery, and Experience - Five Years of Experiences from a Professional Graduate Program
Dr. Bharani Nagarathnam, Texas A&M University

Lessons Learned: A Comparison of Ph.D.’s in Technology Management Programs
Dr. James Nevin McKirahan Jr., Indiana State University
Dr. A. Mehran Shahhosseini, Indiana State University
Dr. M. Affan Badar, Indiana State University

Global Business Management Education to Industry Professionals: A Decade of Experiences from a Professional Graduate Program
Dr. Bharani Nagarathnam, Texas A&M University
Dr. Barry Lawrence, Texas A&M University
Dr. Frederick Barry Lawrence, Texas A&M University

A Doctorate That Works: Nontraditional Populations Served on Both Sides of the Atlantic
Dr. Michael J. Dyrenfurth, Purdue University, West Lafayette
Dr. Mitchell L. Springer, Purdue University, West Lafayette
Dr. Kathryn Newton, Purdue University, West Lafayette
Dr. Carmen Torres-Sánchez, Loughborough University
Dr. Timothy J. Jacobs, Texas A&M University
Charles M. Wolf, Texas A&M University
R229 - Industrial Engineering Division Technical Session 2
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Industrial Engineering Division
Moderator: Raymond Smith, East Carolina University

Multiplier Physical and Virtual Reality Games for Team-based Manufacturing Simulation
Dr. Richard Zhao, Pennsylvania State University
Dr. Faisal Aqlan, Pennsylvania State University
Dr. Lisa Jo Elliott, Pennsylvania State University
Ethan James Baxter, Pennsylvania State University

Strategies for Flipped Classroom Video Development: Educating Generation Z Engineering Students
Dr. Michelle Alvarado, University of Florida
Dr. Katie LeAnne Basinger, University of Florida
Mr. Diego Alvarado, University of Florida
Ms. Behshad Lahijanian, University of Florida

The CLICK Approach and Its Impact on Learning Introductory Probability Concepts in an Industrial Engineering Course
Christian Enmanuel Lopez, Lafayette College
Dr. Omar Ashour, Pennsylvania State University
Mr. James Devin Cunningham,
Dr. Conrad Tucker, Carnegie Mellon University
Dr. Paul C. Lynch, Pennsylvania State University

R230 - Computing and Information Technology Division Technical Session 5
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Computing and Information Technology Division
Moderators: 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.

Maintaining Dual ABET Accreditation in a Computer Science and Engineering Technology Program
Dr. Jared Oluch, University of Toledo

Make Your Data Work: Infusing CMMI Culture in Data Analysis for ABET Accreditation
Dr. Bin Cong, California State University at Fullerton
Dr. Christopher Ryu, California State University at Fullerton
Dr. Raman Menon Unnikrishnan, California State University at Fullerton

Internet of Things Forensics in Smart Homes: Design, Implementation, and Analysis of Smart Home Laboratory
Shinelle Hutchinson, Purdue University, West Lafayette
Yung Han Yoon, Purdue University, West Lafayette
Ms. Neesha Shantaram
Dr. Umit Karabiyyik, Purdue University, West Lafayette

Renewable Energy Engineering Technology (REET) Program
Dr. Alireza Kavianpour, DeVry University, Pomona

A Healthcare Case-study to Teach Simulation Techniques
Dr. Hassan Rajaei, Bowling Green State University

R233A - Pre-college Engineering Education Division Technical Session 7
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Kimberly Farnsworth, Arizona State University

Adding Local Cultural Relevance to Engineering Exploration Lessons for Middle School Students
Dr. Jacob R. Grohs, Virginia Polytechnic Institute and State University
Dr. Holly M. Matusovich, Virginia Polytechnic Institute and State University
Dr. Cheryl Carrico P.E., Cheryl Carrico Consulting, LLC
Ms. Karen J. Gilbert, Virginia Polytechnic Institute and State University

Talking About Design: Teacher Talk About Design Ideas with Teams of Middle Schools During Engineering Design Projects
Amanda Johnston, Purdue University, West Lafayette
Prof. Tamara J. Moore, Purdue University, West Lafayette

The Effectiveness of Using Robotics for Career Technology Education in a Middle School STE(A)M Course
Dr. Jennifer Parham-Mocello, Oregon State University
Mr. Ernie Bodle, Oregon State University

Understanding Design, Tolerating Ambiguity, and Developing Middle School Design-based Lessons
Prof. Reagan Curtis, West Virginia University
Prof. Darran Cairns, University of Missouri - Kansas City

Changes in Teacher Self-efficacy Through Engagement in an Engineering Professional Development Partnership
Malle R. Schilling, Virginia Polytechnic Institute and State University
Mrs. Tawni Paradise, Virginia Polytechnic Institute and State University
Dr. Jacob R. Grohs, Virginia Polytechnic Institute and State University
Dr. Holly M Matusovich, Virginia Polytechnic Institute and State University
Dr. Cheryl Carrico P.E., Cheryl Carrico Consulting, LLC
Ms. Holly Larson Lesko
Dr. Gary R. Kirk, Dickinson College

R233B - Pre-college Engineering Education Division Technical Session 8
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Anthony Butterfield, University of Utah

WIP: All-inclusive Outreach: A Long-term Cooperation Process Between a Finnish Mid-sized University and a Mid-sized Town
Dr. Johanna Kristiina Naukkarinen, Lappeenranta-Lahti University of Technology
Ms. Kati Maarit Koikkalainen, Lappeenranta-Lahti University of Technology

WIP: Building the Bioengineering Experience for Science Teachers (BEST) Program
Dr. Miiri Kotche, University of Illinois at Chicago
Dr. Jennifer D. Olson, University of Illinois at Chicago
Mr. Darrin Collins, University of Illinois at Chicago

WIP: Career Pathways
Mrs. Kayla R. Maxey, Purdue University, West Lafayette
Dr. Morgan M. Hynes, Purdue University, West Lafayette

WIP: Development and Implementation of a Bioengineering Module for NSBE SEEK
Dr. Anthony E. Felder, University of Illinois at Chicago
Dr. Miiri Kotche, University of Illinois at Chicago
Miss Amna Hoda, University of Illinois at Chicago

WIP: Development of a Mobile Application That Supports Less-obtrusive Peer Assessment in K-12 Engineering Education Using an Engineering Epistemic Frame
Dr. Tamecia R. Jones, North Carolina State University

R234 - Promoting Technical Communication Skills
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Liberal Education/Engineering & Society Division
Moderator: Robin Fowler, University of Michigan

A Partnership Model for Integrating Technical Communication Habits Throughout Undergraduate Engineering Courses
Dr. Kristine Horvat, University of New Haven
Prof. Judy Randi, University of New Haven

The Impact of Scaffolded Writing Instruction on Followup Course Assignments
Dr. Sarah Summers, Rose-Hulman Institute of Technology
Dr. Rebecca Bercich, Rose-Hulman Institute of Technology
Dr. Phillip Cornwell, Rose-Hulman Institute of Technology
Dr. Daniel Takashi Kawano, Rose-Hulman Institute of Technology
Dr. James E. Mayhew, Rose-Hulman Institute of Technology
Dr. Sean Moseley, Rose-Hulman Institute of Technology

The Way Things Work: Sketching and Building to Improve Visual Communication and Spatial Reasoning Skills
Dr. Vicki V. May P.E., Dartmouth College
David Alexander Macaulay

WIP: Online Tutorials to Help Undergraduates Bridge the Gap Between General Writing and Engineering Writing
Mr. Michael Alley, Pennsylvania State University
Dr. Joanna K. Garner, Old Dominion University
Ms. Kaitlyn Pigeon, Pennsylvania State University

R235 - Manufacturing Education Curriculum
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Manufacturing Division
Moderator: Yalcin Ertekin, Drexel University

A Strategy for Integrating Professional Skills Development into a Manufacturing Engineering Curriculum
Dr. Derek M. Yip-Hoi, Western Washington University
Dr. David Gill P.E., Western Washington University

Concurrent Education: A New Postsecondary Educational Model that Provides “Learning for Earning” as well as “Learning for Learning” in Rapidly Evolving Industries such as High Tech Electronic Product Design and Assembly
Tom Borkes, Jefferson Institute
Manufacturing Impact: Training the Trainers
Dr. Wayne P. Hung, Texas A&M University
Dr. Mathew Kuttalamadom, Texas A&M University
Prof. Bruce L. Tai, Texas A&M University
Ms. Shelly Tornquist, Texas A&M University

R236 - Materials Division
Technical Session 2
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Materials Division
Moderators: Matthew Cavalli, Western Michigan University; Lessa Grunenfelder, University of Southern California

Goal-setting as a Means of Improved Mental Health Outcomes for Materials and Mechanical Engineering Students
Dr. Nicole Johnson-Glauch, California Polytechnic State University
Dr. Lauren Anne Cooper, California Polytechnic State University, San Luis Obispo
Dr. Trevor Scott Harding, California Polytechnic State University, San Luis Obispo

Using Creative Writing as a Tool for Learning Professional Development in Materials Science and Engineering
Dr. Sabrina Starr Jedlicka, Lehigh University

Teaching Report Writing in Undergraduate Labs
Dr. Amber Genau, University of Alabama at Birmingham

Enhancement of Students’ Technical Writing through a Combination of Classroom Activities
Dr. Reihaneh Jamshidi, University of Hartford
Dr. Kamau Wright, University of Hartford
Dr. Paul E. Slaboch, University of Hartford

R238 - Mechanical Engineering
Technical Session: Pedagogy II - Best Teaching Practices
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Moderator: Thomas DeNucci, United States Coast Guard Academy

This session contains papers on best teaching practices within mechanical engineering. The impacts of the flipped classroom, ePortfolios, and note-taking will be presented.

Effects of Note Formatting on Student Learning: Implications for Accessibility and Diverse Minds
Elizabeth Rose Pollock, Michigan State University
Dr. Geoffrey Recktenwald, Michigan State University

Exploring Impacts of a Flipped-instruction Mode for a Disciplinary Computer Applications Course
Dr. J. Blake Hylton, Ohio Northern University
Dr. Lawrence Funke, Ohio Northern University

Transforming an Engineering Design Course into an Engaging Learning Experience Using ePortfolios
Miss Taylor Tucker, University of Illinois at Urbana-Champaign
Ms. Esinee Vernooij, University of Illinois at Urbana-Champaign
Catherine LaBore, University of Illinois at Urbana-Champaign
Dr. Ava R. Wolf, Center for Innovation in Teaching and Learning
Cheelan Bo-Linn, Center for Innovation in Teaching & Learning, University of Illinois
Dr. Robert Thomas Baird
Mr. Nattasit Dancholvichit, University of Illinois at Urbana-Champaign
Prof. Leon Liebenberg, University of Illinois at Urbana-Champaign

R239 - Improving Student Outcomes in Mechanics
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanics Division
Moderators: Sarah Wodin-Schwartz, Worcester Polytechnic Institute; Ron Averill, Michigan State University

The Influence of Active, Passive, and Mixed Classroom Activities on Student Motivation
Dr. Jennifer E. Holte, University of St. Thomas
Ryan J. Endres, University of St. Thomas
Dr. Deborah Besser P.E., University of St. Thomas
Dr. Doug Dunston, University of St. Thomas

Effect of Mastery-graded Exams on Student Outcomes in Statics and Mechanics of Solids Course
Dr. Hadas Ritz, Cornell University
Dr. Kathryn Dimiduk, Cornell University
Dr. Andrew van Paridon

Using Assessments to Improve Student Outcomes in Engineering Dynamics
Dr. Ahmad Ghasemloonia P.Eng., University of Calgary
Dr. Meera N.K. Singh, University of Calgary

WIP: Common Errors in Learning Strength of Materials Concepts as a Foundation to an Interactive Web-based Problem-solving Assessment Interface
Dr. Nicole P. Pitterson, Virginia Polytechnic Institute and State
**R240 - Minorities in Engineering Division Technical Session 4**

10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Minorities in Engineering Division

**Moderators:** Saundra Johnson Austin, Charis Consulting Group, LLC; Christopher Carr, George Mason University

**What's in a Story? Comparative Analysis of Role Model and Mentor Narratives**

- Dr. Kyle F. Trenshaw, University of Rochester
- Dr. Elif Miskioğlu, Bucknell University
- Derek Rushton, University of Rochester
- Dr. Philip Asare, Bucknell University

**Update on Academics with Diversity Education and Mentorship in Engineering (ACADEME) Activities and Fellows**

- Dr. Teresa J. Cutright, University of Akron
- Rebecca Kuntz Willits, University of Akron
- Dr. Linda T. Coats
- Prof. Debora F. Rodrigues, University of Houston
- Dr. Lakiesha N. Williams, University of Florida

**The Role of Connectedness for Minoritized Students at a Mentoring Conference**

- Ms. Carin Queener, University of Michigan
- Dr. Joi-Lynn Mondisa, University of Michigan
- Dr. Dorian Davis
- Dr. Renaldo C. Blocker, The "Why You?" Initiative, Inc.

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**R245 - Engineering Physics and Physics Division Technical Session 2**

10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Engineering Physics and Physics Division

**Moderators:** Paul Crilly, United States Coast Guard Academy; Robert Ross, University of Detroit Mercy

**A Preliminary Study to Define Limits of Active Learning Strategy Effectiveness in Physics Courses**

- Prof. C. Bauer-Reich, University of Jamestown
- Dr. Katrina Christiansen, University of Jamestown

**Applications of Quantum Entanglement in Modern Physics**

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

**Computational Modeling in Introductory Physics Courses and Across the Curriculum**

- Dr. Todd Zimmerman, University of Wisconsin

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**R255 - Designing and Implementing Leadership Development Experiences for Engineering Students**

10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Engineering Leadership Development Division

**Moderator:** David Nino, Massachusetts Institute of Technology

**Integrating Professional Skills and Leadership into an Undergraduate Engineering Program**

- Dr. Harold Ackler, Boise State University
- Dr. Heidi Reeder, Boise State University
- Mrs. Abbey Louie

**Military Leadership for Engineers: A Comprehensive Look at Leadership from Army Doctrine to Engineering Coursework**

- Lt. Col. Russell P. Lemler, U.S. Military Academy

**Using a Structured Approach to Reflective Journaling in Engineering Leadership Development**

- Dr. John Donald, University of Guelph
- Dr. Paul C. Hungler, Queen's University
- Kaitlyn Brant, Queen's University
- Ms. Stephanie Diane Shaw, University of Guelph

**Identifying Effective Student Leaders to Improve Capstone Design Team Assignments**

- Dr. Blake Everett Johnson, University of Illinois at
ASEE’S VIRTUAL CONFERENCE
THURSDAY, JUNE 25 SESSIONS

Urbana-Champaign
Dr. Molly H. Goldstein, University of Illinois at Urbana-Champaign
Dr. Joe Bradley, University of Illinois at Urbana-Champaign

R257 - Faculty Development
Evidence-based Practices!
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Faculty Development Division
Moderator: Justin Shaffer, Colorado School of Mines

This session highlights evidence-based practices in faculty development. Come share practices and learn from each other!

A Model for a Faculty Development Course Redesign Summer Working Group
Dr. Michelle M Blum, Syracuse University
Dr. Katie D. Cadwell, Syracuse University
Dr. Julie M. Hasenwinkel, Syracuse University

Building Communities of Engineering Faculty, Staff, and Students Engaged in Educational Research: The approach of UGA’s Engineering Education Transformations Institute
Dr. John Ray Morelock, University of Georgia
Dr. Nicola W. Sochacka, University of Georgia
Dr. Joachim Walther, University of Georgia

Designing a Streamlined Workshop for STEM-H Faculty Engaged in the Scholarship of Teaching and Learning
Ms. Jody Zhong, University of Louisville
Dr. Patricia A Ralston, University of Louisville
Ms. Teresa Lee Tinnell, University of Louisville
Dr. Thomas Tretter
Dr. Marie Brown

Year-Long Faculty Development Program for New Engineering Instructors: Description and Evaluation
Chris Migotsky, University of Illinois

R271 - NSF Grantees: Workforce Development
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderators: Amber Genau, University of Alabama at Birmingham; Bimal Nepal, Texas A&M University

Presentations from groups with current NSF "Advanced Technological Education" (ATE) grants.

Educating the Workforce in Cyber and Smart Manufacturing for Industry 4.0
Dr. Mathew Kuttolamadom, Texas A&M University
Dr. Jyhwen Wang, Texas A&M University
DeDe Griffith, Northwest Louisiana Technical Community College
Cheri Greer, Northwest Louisiana Technical Community College

An Advanced Technological Education Project for High Value Manufacturing: Lessons Learned
Dr. Michael Johnson, Texas A&M University
Dr. Bimal P. Nepal, Texas A&M University

A Successful Mentoring Approach for Encouraging New NSF...
Proposal Submissions from Community Colleges
Dr. Kathleen Alfano, College of the Canyons

The Future of Work: What is the Impact on Engineering Technicians?
Dr. Marilyn Barger, Florida Advanced Technological Education Center
Dr. Richard Gilbert, University of South Florida

R306 - Making Professionals: Methods to Build Success Skills
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division
Moderator: Jieun Hur, The Ohio State University

This session includes papers covering strategies to help students build professional success skills.

Listening to Community Voices as Part of Ethical Civil Engineering: Experiences in Civil Engineering Courses
Dr. Angela R. Bielefeldt, University of Colorado, Boulder

Deliberate Development of Creative Engineers
Lt. Col. Jakob C. Bruhl, United States Military Academy
Dr. James Ledlie Klosky P.E., United States Military Academy

Integrating World Structures Reports, Presentations, and Themed Notes
Dr. Anthony Battistini, Angelo State University

Bill and Ted's Excellent Adventure: Lessons Learned from Eight Years’ Instruction on the CEBOK
William D Lawson P.E., Ph.D., Texas Tech University
Theodore G. Cleveland, Texas Tech University
Dr. Ken Rainwater, Texas Tech University

Dr. Liyu Zhang, University of Texas Rio Grande Valley
Dr. Hansheng Lei, University of Texas Rio Grande Valley
Dr. Ala Qubbaj, University of Texas, Rio Grande Valley
Lei Xu, University of Texas, Rio Grande Valley
Dr. Emmett Tomai, University of Texas, Rio Grande Valley
Miss Yessica Rodriguez, University of Texas, Rio Grande Valley
Miss Yessenia Rodriguez, University of Texas, Rio Grande Valley

R308A - Computers in Education Division Technical Session 10: STEM Outreach
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Computers in Education Division
Moderators: Raghu Echempati, Kettering University; Joseph Lyon, Purdue University at West Lafayette

This session will highlight COED submitted papers that are related to STEM outreach.

Cybersecurity, Digital Forensics, and Mobile Computing: Building the Pipeline of Next-generation University Graduates through Focused High School Summer Camps
Dr. Mahmood K. Quweider, University of Texas Rio Grande Valley
Dr. Fitratullah Khan, University of Texas Rio Grande Valley

Dr. Afrin Naz, West Virginia University Institute of Technology
Dr. Mingyu Lu, West Virginia University Institute of Technology
Chase Broyles, West Virginia University Institute of Technology
Ms. Isabel Barrio Sanchez, West Virginia University Institute of Technology

STEM Ambassadress Program
Dr. Afrin Naz, West Virginia University Institute of Technology
Dr. Mingyu Lu, West Virginia University Institute of Technology
Mrs. Tommi Brooke Kenneda, West Virginia University Institute of Technology
R308B - Computers in Education Division Technical Session 7: Advanced CS courses
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Computers in Education Division
Moderators: Stephen Edwards, Virginia Polytechnic Institute and State University; Mahmoud Quweider, University of Texas Rio Grande Valley

This session will highlight COED submitted papers that are related to advanced-level Computer Science courses.

Code Hardening: Development of a Reverse Software Engineering Project
  Mr. Zachary Michael Steudel, Baylor University
  Ms. Cynthia C. Fry, Baylor University

No-Cost Implementation of Network Security Labs Utilizing AWS Educate in an Undergraduate Fundamental Network Security Course
  Dr. Karla Page Varnell, East Carolina University

Novel Simulation-Based Learning Modules for Teaching Database Concepts
  Dr. Sabahattin Gokhan Ozden, Penn State Abington
  Dr. Omar M. Ashour, Penn State Erie, the Behrend College
  Dr. Ashkan Negahban, Pennsylvania State University, School of Graduate Professional Studies

Reverse Software Engineering: A Sophomore-level Project in Computer Systems
  Ms. Cynthia C. Fry, Baylor University
  Kevin Kulda, Baylor University
  Gennie Mansi, Baylor University

R308C - Computers in Education Division Technical Session 11
11:40 A.M. - 12:00 P.M.
Sponsor: Computers in Education Division
Moderators: Alisa Gilmore, University of Nebraska - Lincoln; Alex Edgcomb

Constructing and Refining Computer Science Outreach Focused on Student Engagement
  Shaya Wolf, University of Wyoming
  Mr. Rafer Cooley, University of Wyoming
  Mr. Mason Johnson, University of Wyoming
  Dr. Andrea Carneal Burrows, University of Wyoming
  Dr. Mike Borowczak, University of Wyoming

Work in Progress: Pedagogical Effectiveness of Continuous vs. Discrete User Interaction with Computer Demonstrations
  Prof. James C. Squire P.E., Virginia Military Institute
  Prof. Gerald Sullivan P.E., Virginia Military Institute
  Dr. Tom McCormick, Virginia Military Institute

Work in Progress: An Online Journal Tool with Feedback for a Learning Assistant Program in Engineering
  Dr. Milo Koretsky, Oregon State University

R309A - Construction Engineering Division Technical Session 4
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Construction Engineering Division
Moderators: Kelli Kapocis-Herstein, University of Nebraska - Lincoln; Sanjeev Adhikari, Kennesaw State University; Rachel Mosier, Oklahoma State University; Norman Philipp, Pittsburg State University

Where Do All the Pre-Majors Go? A Self-Study of Student Stumbling Points in the Pre-Construction Curriculum
  Dr. Kimberly Grau Talley P.E., Texas State University
  Dr. Bobbi J. Spencer, Texas State University

Evaluation of Disaster Resilience Preparation in the Construction Education Curriculum
  Dr. Sanjeev Adhikari, Kennesaw State University
  Dr. Rachel D. Mosier, Oklahoma State University
  Dr. Sandeep Langar, University of Texas, San Antonio

Perceptions of Structures Coursework for Career Fulfillment from the Student and Practitioner Perspective
  Dr. Rachel Mosier P.E., Oklahoma State University
  Prof. Carisa H. Ramming, Oklahoma State University
  Dr. Sanjeev Adhikari, Kennesaw State University

Faculty Experience in Team Teaching in Construction Management Higher Education
  Dr. Luciana Debs, Purdue University Programs
  Dr. Bryan John Hubbard P.E., Purdue University, West Lafayette

The Implementation of BIM Application in University Teaching: Case Study of a Construction Management Program
  Dr. Sanjeev Adhikari, Kennesaw State University
  Dr. Pavan Meadati, Kennesaw State University
  Dr. Minsoo Baek, Kennesaw State University
R309B - Construction Engineering Division Technical Session 5
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Construction Engineering Division

Moderators: Saeed Rokooei, Mississippi State University; Norman Philipp, Pittsburg State University; Luciana de Cresce El Debs, Purdue University Programs; Rachel Mosier, Oklahoma State University

A Construction Management Competition as the Basis of a Capstone Culminating Event

Lt. Col. M. Scott Stanford P.E., United States Air Force Academy
Dr. Joel Sloan P.E., United States Air Force Academy
Dr. James B. Pocock, United States Air Force Academy
Lt. Col. M. Mark Russell P.E., DFCE

Learning in Engineering Project Management Classes: Does Technology Matter?

Dr. Long Duy Nguyen P.E., Florida Gulf Coast University
Dr. Robert O’Neill P.E., Florida Gulf Coast University
Dr. Simeon J. Komisar, Florida Gulf Coast University

An Educational Module to Increase Engineering Students’ Knowledge of Work Zone Safety in Highway Construction

Dr. Didier M. Valdes, University of Puerto Rico, Mayaguez
Dr. Carla Lopez del Puerto, University of Puerto Rico, Mayaguez
Dr. Alberto M. Figueroa-Medina, University of Puerto Rico at Mayaguez
Dr. Benjamin Colucci, University of Puerto Rico, Mayaguez
Ms. Rocío Juliana Sotomayor-Irizarry, University of Puerto Rico, Mayaguez

Construction Safety Training: Exploring Different Perspectives of Construction Managers and Workers

Dr. Mostafa Namian, East Carolina University
Dr. Sharareh Kermanshachi, University of Texas, Arlington
Mohammad Khalid, East Carolina University
Dr. Ahmed J. Al-Bayati, Lawrence Technological University

A Course in the Human Factors Approach to Construction Engineering and Management

Dr. Kelli R. Kopocis-Herstein, University of Nebraska, Lincoln
Dr. Terry L. Stentz, University of Nebraska, Lincoln

Student Construction Sustainability Evaluations: A LEED Lab Case Study

Dr. Jeyoung Woo P.E., California State Polytechnic University, Pomona
Dr. Hyun Woo Kim, Incheon National University
Dr. Elaine Rawley Goetz, Ohio University Office of Sustainability

R310B - CPDD Session 2 - Professional Development - Where Are We Going?
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Continuing Professional Development Division

Moderator: Keith Plemmons,

This session of the Continuing Professional Development Division will explore the changes happening in higher education, with a special twist on career and professional development. From demographics to growth through service, this session will cause you to think about the future in new and interesting ways. So, join in the fun of continuing and professional development!

Gen Y (Millennial) and Gen Z Cultural Cohort Demographics: Social, Political and Economic Perspectives and Implications

Dr. Mitchell L. Springer PMP, SPHR, SHRM-SCP, Purdue Polytechnic Institute
Dr. Kathryn Newton, Purdue Polytechnic Institute

Growth through Service – A Longitudinal Four-Phase Natural Evolutionary Study of an Administrative Online
R313A - Design in K-12 Education

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE

Organization
Dr. Mitchell L. Springer PMP, SPHR, SHRM-SCP, Purdue Polytechnic Institute
Dr. Kathryn Newton, Purdue Polytechnic Institute

Online Professional Development for Embedding Industry Credentials in Engineering Curricula
Dr. Susan J. Ely, University of Southern Indiana
Dr. Mathias J. Sutton, Purdue University at West Lafayette

R314A - Approaches to Curriculum and Policy

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Educational Research and Methods Division
Moderators: Vetria Byrd, Purdue University at West Lafayette; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Sustainable Collaboration Paradigms Between Math and Engineering
Dr. Afroditi Vennie Filippas, Virginia Commonwealth University
Dr. Rebecca Segal, Virginia Commonwealth University
Prof. Alen Docef, Virginia Commonwealth University

Program Assessment Through Product-based Learning in Undergraduate Engineering Programs in India
Dr. Venugopalan Kovaichelvan, TVS Institute for Quality and Leadership
Dr. Calvin Sophistus King Ph.D., Dr. Mahalingam College of Engineering and Technology

The New Engineering Education in China Based on 207 New Engineering Research and Practice Projects
Dr. Jinlu Shen, Zhejiang University
Dr. Tuoyu Li, Zhejiang University
Miss Chen Li, Zhejiang University

The Role of Prototyping in Design and Policy Making: Visual Stimuli, Selective Attention, and Decision Making
Hadi Ali, Arizona State University, Polytechnic campus

R314B - Degree Pathways and Cocurricular Experiences

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Educational Research and Methods Division
Moderators: Stephany Santos, University of Connecticut; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Impact of Self-efficacy and Outcome Expectations on First-year Engineering Students’ Major Selection
Baker A. Martin, Clemson University
Dr. Marisa K. Orr, Clemson University
Dr. Rachel McCord, University of Tennessee at Knoxville

Exploration of Degree Program Change: A Novel Use of Nearest Neighbor Classifiers
Dr. George D. Ricco, University Of Indianapolis
Megan Hammond, University Of Indianapolis

The Effect of Clusters of Participation in Engineering Cocurricular Activities on Student Outcomes
ASEE’S VIRTUAL CONFERENCE
THURSDAY, JUNE 25 SESSIONS

#ASEEVC

Dr. Joanna Mirecki Millunchick, University of Michigan
Yixian Zhou

What Affects Student Outcomes More: GPA or Participation in Co-curricular Activities?

Dr. Joanna Mirecki Millunchick, University of Michigan
Yixian Zhou, University of Michigan

Work in Progress: Survey Development of the Influence of Engineering Students’ Extracurricular Involvement on Career Aspirations and Professional Development
Beata Johnson, Purdue University, West Lafayette
Dr. Joyce B. Main, Purdue University, West Lafayette

R314C - Collaboration and Communication in Problem-based Learning

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Aaron Johnson, University of Colorado Boulder; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

The Impact of Scaffolding Prompts on the Collaborative Problem Solving of Ill-structured Tasks by Undergraduate Engineering Student Groups
Miss Taylor Tucker, University of Illinois at Urbana-Champaign
Mr. Saadeddine Shehab, University of Illinois at Urbana-Champaign
Dr. Emma Mercier, University of Illinois at Urbana-Champaign

Toward the Effective Implementation of Collaborative Problem Solving in Undergraduate Engineering Classrooms: Co-designing Guidelines for Teaching Assistants
Dr. Saadeddine Shehab, University of Illinois at Urbana-Champaign
Dr. LuEttaMae Lawrence, University of Illinois at Urbana-Champaign
Dr. Emma Mercier, University of Illinois at Urbana-Champaign
Mr. Anthony Salvatore Margotta, University of Illinois at Urbana-Champaign
Elizabeth Renee Livingston
Prof. Mariana Silva, University of Illinois at Urbana-Champaign
Miss Taylor Tucker, University of Illinois at Urbana-Champaign

Scaffolding a Team-based Active Learning Course to Engage Students: A Multidimensional Approach
Dr. Mohsen M. Dorodchi, University of North Carolina at Charlotte
Nasrin Dehbozorgi, University of North Carolina at Charlotte
Aileen Benedict, University of North Carolina at Charlotte
Erfan Al-Hossami, University of North Carolina at Charlotte

Alexandria Benedict, University of North Carolina at Charlotte

Problem-based Learning: Perceptions and Impact on Student Learning in a Sustainable Infrastructure Course
Dr. Nicole Barclay, University of North Carolina at Charlotte

Integrating Evidence-based Learning in Engineering and Computer Science Gateway Courses
Dr. Xiang Zhao, Alabama A&M University
Dr. Showkat Chowdhury, Alabama A&M University
Prof. Tamara Chowdhury, Alabama A&M University

R314D - Student Approaches to Problem Solving

11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Jakob Bruhl, United States Military Academy; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Making Assumptions and Making Models on Open-ended Homework Problems
Dr. Jessica E. S. Swenson, University at Buffalo
Dr. Aaron W. Johnson, University of Colorado Boulder
Ms. Mary Rola, University at Buffalo
Dr. Hoda Koushyar,

Development and Insights from the Measure of Framing Agency
Dr. Vanessa Svihla, University of New Mexico
Amber Gallup, University of New Mexico
Dr. Sung "Pil" Kang, University of New Mexico

Work in Progress: Understanding Ambiguity in Engineering Problem Solving
Marah B. Berry, University of Florida
Dr. Elliot P. Douglas, University of Florida
Dr. David J. Therriault, University of Florida
Dr. Jeremy A. Magruder Waisome, University of Florida

Operationalizing Jonassen’s Design Theory of Problem Solving: An Instrument to Characterize Educational Design Activities
Dr. Ada Hurst, University of Waterloo
Mr. Gregory Litster, University of Waterloo
Mr. Christopher Rennick, University of Waterloo

Work in Progress: Testing an Assessment of Problem Solving in Introductory Chemical Process Design Courses
Dr. Eric Burkholder, Stanford University
Prof. Carl E. Wieman

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
ASEE’S VIRTUAL CONFERENCE
THURSDAY, JUNE 25 SESSIONS

R314E - Educational Research and Methods Division (ERM) Best Paper Finalists
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Elizabeth Cady, National Academy of Engineering; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

The Influence of Connecting Funds of Knowledge to Beliefs about Performance, Classroom Belonging, and Graduation Certainty for First-generation College Students
Dr. Dina Verdín, Purdue University, West Lafayette
Dr. Jessica Mary Smith, Colorado School of Mines
Dr. Juan C. Lucena, Colorado School of Mines

Redefining Retention in STEM Education: New Perspectives on a Student-centered Metric of Success
Dr. Andrew Forney, Loyola Marymount University
Dr. Sunai Kim, Loyola Marymount University

“Adversary or Ally”: Undergraduate Engineering Students’ Perceptions of Faculty
Mr. H. Ronald Clements III, Purdue University, West Lafayette
Ms. Brianna Shani Benedict, Purdue University, West Lafayette
Ms. Dina Verdín, Purdue University, West Lafayette
Dr. Allison Godwin, Purdue University, West Lafayette
Ms. Jacqueline Ann Rohde, Purdue University, West Lafayette
Sherry Chen

Effects of Test Anxiety on Engineering Students’ STEM Success
Mr. Justin Charles Major, Purdue University, West Lafayette
Mr. Matthew Scheidt, Purdue University, West Lafayette
Dr. Allison Godwin, Purdue University, West Lafayette
Dr. Edward J. Berger, Purdue University, West Lafayette
Dr. John Chen, California Polytechnic State University, San Luis Obispo

It’s the End of the World as We Know It, and I Need a Job: A Qualitative Exploration of Mid-year Engineering Students’ Future Possible Careers
Dr. Catherine McGough, Minnesota State University, Mankato
Dr. Lisa Benson, Clemson University

R315A - New Developments in ECE
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Electrical and Computer Division
Moderators: Jennifer Bonniwell, Milwaukee School of Engineering; Huihui Wang, Jacksonville University

A Pedagogical Approach for Developing an Entrepreneurial Mindset in Engineering Students
Dr. Salman Mohagheghi, Colorado School of Mines

Work in Progress: Implementing Sophomore Cornerstone Courses in Electrical and Computer Engineering
Prof. Branimir Pejcinovic, Portland State University
Dr. Melinda Holtzman, Portland State University
Mr. Phillip Wong, Portland State University

Electrical and Computer Engineering Course
Dr. Alan Johnston, Villanova University
Prof. Edward Stephen Char Jr.

Charge Up! Wireless Power Transfer Activity for High School Students
Mr. Akshay Sarin, University of Michigan
Mr. Sung Yul Chu, University of Michigan
Prof. Heath Hofmann, University of Michigan
Prof. Al-Thaddeus Avestruz, University of Michigan

R315B - Active and Cooperative Learning in ECE
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Electrical and Computer Division
Moderators: Jennifer Bonniwell, Milwaukee School of Engineering; Huihui Wang, Jacksonville University

Work in Progress: Incorporating Active Learning and the Entrepreneurial Mindset into a First-level Electrical Circuits Course
Ms. Marnie Wong, Arizona State University
Dr. Lindy Hamilton Mayled, Arizona State University

A Project-based Learning Alternative for First-year Engineering Students
Dr. Werner Creixell, Texas A&M University
Rachelle M. Pedersen, Texas A&M University
Dr. Susan Niki Ritchey, Texas A&M University

An Investigation of the Effectiveness of Project-based Learning on Students’ Skills in Engineering Modeling and Design Courses
**R318 - Engineering Design Graphics Division Technical Session 3**

11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Engineering Design Graphics Division

**Moderator:** Ranjeet Agarwala, East Carolina University

Strategies and Use of Instructional Aids to Improve Design Graphics Instruction

**Development of a Spatial Visualization Assessment Tool for Younger Students Using a Lego™ Assembly Task**

- Prof. Nathan Delson, UC San Diego
- Dr. Lelli Van Den Einde, UC San Diego and eGrove Education Inc.
- Mrs. Jessica Tuazon
- Mr. Daniel Yang, UC San Diego

Enhancing Learning of Engineering Graphics Through Gamification

- Dr. Lulu Sun, Embry-Riddle Aeronautical University

**NOT Reinventing the Wheel: Product Data Management (PDM) Software Utilized as a Feedback System for Students in an Introductory Engineering Graphics Course**

- Mr. David Torick, Washington State University
- Dr. Nandita Biswas, Washington State University

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**R319 - Engineering Economy Division Technical Session 1**

11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsors:** Engineering Economy Division; Industrial Engineering Division; Engineering Management Division; Systems Engineering Division

**Moderator:** James Burns, Western Michigan University

Engineering Economy: Special topics, including teaching across engineering disciplines and open textbooks for engineering economics.

**Development of an Open Textbook for Engineering Economics**

- Mr. Bradley James Schmid, University of Saskatchewan

**Work in Progress: Engineering Economy Taught Across Engineering Disciplines**

- Dr. Brian Auferheide, Hampton University
- Dr. Otsebele E. Nare, Hampton University

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**R320 - New Areas of Ethical Inquiry**

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Engineering Ethics Division

**Moderator:** Nebojsa Sebastijanovic, Milwaukee School of Engineering

Ethics in Undergraduate Construction Curricula: A Two-stage Exploratory Sequential Approach to Developing and Piloting the HETC Survey

- Dr. Kenneth Stafford Sands II, Florida Gulf Coast University
- Dr. Annie R. Pearce, Virginia Polytechnic Institute and State University
- Dr. Denise Rutledge Simmons P.E., University of Florida
- Dr. Min Jae Suh, Sam Houston State University
- Dr. Christine Marie Fiori, Drexel University
- Ms. Victoria A. Mouras, Virginia Polytechnic Institute and State University

**Curriculum Development for Cyber Ethics with a Focus on Law Enforcement**

- Dr. Joseph Benin, U.S. Coast Guard Academy
- Mr. William Randall, U.S. Coast Guard Academy

**Ethics in Data Science Education**

- Dr. Karen C. Davis, Miami University

**Work in Progress: Ethical Responsibility Formation of Students in a Nuclear Engineering Course Through Inquiry Learning**

- Ms. Minha R. Ha, York University
- Mr. Joshua Racette, McMaster University
- Prof. Shinya Nagasaki, McMaster University

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**R321 - Opening Up: Data, Open Access, and Open Educational Resources**

10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Engineering Libraries Division

**Moderators:** Anne Graham, University of Massachusetts Amherst; Anna Sackmann, University of California, Berkeley

Open Mines: Launching a Mini-grant Program to Incentivize Open Educational Resource Development for STEM Disciplines

- Ms. Emily A. Bongiovanni, Colorado School of Mines
- Ms. Brianna B. Buljung, Colorado School of Mines

**Library Facilitation of eTextbooks in Engineering Classes:**
R322A - Engineering Management Division 3: Teaching and Learning in Engineering Management
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Management Division
Moderator: Sandra Furterer, University of Dayton

One of two sessions that include papers related to curricular, classroom, and teaching improvements and innovations.

Engineering Safety and Risk Management: A Structured Case Study Approach to Investigating Chemical Process Safety
- Prof. Marnie V. Jamieson, University of Alberta
- Dr. Lianne M. Lefsrud P.Eng., University of Alberta
- Fereshteh Sattari
- Dr. John Donald, University of Guelph

Incorporating Conflict Negotiation Training in a Senior Engineering Project Management (Capstone Projects I) Course
- Dr. Michael Sollitto, Texas A&M University, Corpus Christi
- Dr. Mehrube Mehrubeoglu, Texas A&M University, Corpus Christi

Using a Paper-based Supply Chain Game to Introduce Blockchain Concepts
- Dr. Scott Abney, East Carolina University
- Dr. Mark Angolia, East Carolina University
- Natalie Aman, East Carolina University

R322B - ET Curriculum and Programs II
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Technology Division
Moderator: Vukica Jovanovic, Old Dominion University

The papers in this session focus on undergraduate-level ET curriculum development.

An Alternative Method of Teaching Process Control Courses in Electrical Engineering Technology Programs
- Dr. Yoonill Lee, Purdue University Northwest

Curriculum Development for Robotics Technology Program
ASEE’S VIRTUAL CONFERENCE
THURSDAY, JUNE 25 SESSIONS

R324 - ENT Division Technical Session: Competitions, Challenges, and Teams
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Entrepreneurship & Engineering Innovation Division
Moderators: Nassif Rayess, University of Detroit Mercy; Jason Forsyth, James Madison University
A Scalable Approach to Student Team Formation for Innovation-based Learning
Ryan Striker P.E., North Dakota State University
Mr. Enrique Alvarez Vazquez, North Dakota State University
Mary Pearson, North Dakota State University
Ms. Lauren Singelmann, North Dakota State University
Ms. Ellen M. Swartz, North Dakota State University

A Summer Program Focused on Developing an Entrepreneurial Mindset in the Context of the NAE Grand Challenges for Engineering
Dr. Jared Schoepf, Arizona State University
Dr. Stephanie M. Gillespie, University of New Haven
Amy Trowbridge, Arizona State University
Dr. Alison Cook-Davis, Arizona State University
Mrs. Kristen Peña, Arizona State University
Ms. Courtney Argenti, Arizona State University
Dr. Daniel J. Laxman, Arizona State University

KEEN Engineering Skill Set and Competition Teams Success: Creating Value Through the Co-curriculum
Dr. Julia M. Williams, Rose-Hulman Institute of Technology
Dr. William A. Kline, Rose-Hulman Institute of Technology

The Relationship Between Teamwork and Innovation Outcomes in an Engineering Thermal Science Course: An Entrepreneurial Mindset Simulation
Ms. Thien Ngoc Y. Ta, Arizona State University
Dr. Gary Lichtenstein, Arizona State University
Dr. Ryan James Milcarek, Arizona State University

To Start or Not: Impact of Engineering Students’ Engagement in Entrepreneurship Competitive Activities on Their Entrepreneurial Intentions
Miss Yaxin Huang, Shanghai Jiao Tong University
Prof. Jiabin Zhu, Shanghai Jiao Tong University
Dr. Zhinan Zhang, Shanghai Jiao Tong University

Insights About an Academic Elevator Pitch Competition in Undergraduate Engineering Curricula
Mrs. Sandra Furnbach Clavijo, Stevens Institute of Technology
Matthew Wade, Stevens Institute of Technology
Dr. Kishore Pochiraju, Stevens Institute of Technology

R323C - ET Pedagogy II
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Technology Division
Moderator: Carmen Cioc, The University of Toledo
An Ethics Case Study for Engineering Technology Students
Dr. Barbara L. Christe, State University of New York

Flipped Classroom Approach Comparison on Perception, Motivation, and Outcomes of Students in Engineering Technology Instruction Between Assisted Flip versus Complete Flip
Dr. Yang Zhang, Western Carolina University
Dr. Nelson A. Granda Marulanda, Western Carolina University

Incorporating Information Literacy in MET Design Project: Pilot Implementation
Dr. Carmen Cioc, University of Toledo
Prof. John B. Napp, University of Toledo
Dr. Sorin Cioc, University of Toledo
Dr. Noela A. Haughton

Introducing Engineering Technology Students to Ethical Engineering Decision Processes
Dr. Carmen Cioc, University of Toledo
Dr. Sorin Cioc, University of Toledo
Prof. Richard Arthur Springman, University of Toledo

Making the Connection: Encouraging Technology-specific Reading Skills Through Structured Readings of Texts
Dr. Vigyan Jackson Chandra, Eastern Kentucky University

Development of Senior Design Sequence with Integration of Undergraduate Research Component
Dr. Ilya Y. Grinberg, SUNY Buffalo State

FEA Taught the Industry Way
Dr. John L. Irwin, Michigan Technological University
Dr. David Michael Labyak, Michigan Technological University

Redesign of an Embedded System Course for Electrical Engineering Technology Undergraduate Program
Dr. Sunanj Panigrahi, Purdue University, West Lafayette

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
R327A - First-Year Programs: Unique Projects & Pedagogies
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division
Moderators: Andrew Bartolini, University of Notre Dame; Rebekah Dupont,

Learn about innovative projects and pedagogies being implemented in the first year.

Creation of "The Engineering Student Experience Podcast" to Enhance Engineering Student Readiness for School and the Workforce
- Dr. Paul Morrow Nissenson, California State Polytechnic University, Pomona
- Dr. Jessica Ohanian Perez, California State Polytechnic University, Pomona
- Mr. Cesar Moreno

Work in Progress: Inquiry-Based Lessons for Introduction to Engineering Instruction
- Dr. Michelle M. Blum, Syracuse University

Introducing Industrial Systems Engineering to First-Year Students via Mr. Potato Head
- Tyler Milburn, Ohio State University
- Cassie Wallwey, Ohio State University
- Dr. Michael Parke, Ohio State University

Work in Progress - Integration of Voice Technology into the First-Year Engineering Curriculum
- Dr. Jaskirat Sodhi, New Jersey Institute of Technology
- Dr. Ashish D. Borgaonkar, New Jersey Institute of Technology
- Mr. Ludvik Alkhoury, New Jersey Institute of Technology
- Nicole Bosca

Complete Evidence-Based Practice Paper: The Impact of Information Literacy Instruction on the Synthesis Level of First-Year Engineering Students
- Dr. Jessica Ohanian Perez, California State Polytechnic University, Pomona
- Mr. Paul R. Hottinger, California State Polytechnic University, Pomona

R327B - First-Year Programs: Design in the First Year
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division
Moderators: Mirna Mattjik, Colorado School of Mines; Ann Saterbak, Duke University

Work in Progress: Development of a General Education First-Year Design Course
- Dr. Courtney Hollar, Boise State University
- Dr. Sondra M Miller, Boise State University

Work in Progress: Project and Design-Based Introductory Engineering Course using Arduino Kits
- Dr. Demetris Geddis, Hampton University
- Dr. Brian Auferheide, Hampton University
- Mr. Herman W. Colquhoun Jr., IBM Canada Ltd.

Walking on Water Term Design Project in Fundamentals of Engineering
- Dr. Djedjiga Belfadel, Fairfield University
- Dr. Michael Zabinski, Fairfield University
- Dr. Ryan Munden, Fairfield University

Work in Progress: Introducing Design Thinking in First-Year Engineering Education
- Dr. Keyanoush Sadeghipour, Temple University
- Dr. David Brookstein, Temple University
- Dr. Shawn Fagan, Temple University
- Cory Budischak, Temple University

Teaching Human-centered Design to Engineers: Continuous Improvement in a Cornerstone Course
- Prof. Catalina Cortázar, P. Univ. Católica de Chile

R327C - First-Year Programs: Metacognition, Self-Efficacy, and Motivation #1
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division
Moderators: Scott Streiner, Rowan University; Philip Brown, Rutgers, The State University of New Jersey

A Multidimensional Approach to Understanding the Development of Design Skills, Knowledge, and Self-Efficacy
- Dr. Vanessa Svhila, University of New Mexico
- Dr. Pil Kang, University of New Mexico
- Dr. Yan Chen, University of New Mexico
Chen Qiu, University of New Mexico
Jordan Orion James, University of New Mexico

Examining the Connection Between Student Mastery Learning Experiences and Academic Motivation
Cara Mawson, Rowan University
Dr. Cheryl A. Bodnar, Rowan University
Dr. Scott Streiner, Rowan University

Work in Progress: Formation of an Engineering Identity in First-year Students through an Intervention Centered on Senior Design Projects
Dr. Abigail M. Richards, Montana State University
Dr. Ryan Anderson, Montana State University
Dr. Carrie B. Myers, Montana State University

Investigation of Sense of Belonging to Engineering in Introductory-Level Pre-Engineering Classes
Jill Davishahl, Western Washington University
Dr. Sura Alquudah, Western Washington University

Qualitative and Quantitative Impact of Metacognitive Interventions in Supplemental Instruction Sessions
Miss Nisha Abraham, University of Texas at Austin
Dr. Nina Kamath Telang, University of Texas at Austin

Prof. Didem Ozervin P.E., University of Illinois at Chicago
Prof. Jeremiah T. Abiade, University of Illinois at Chicago

Effectiveness of Undergraduate Teaching Assistants in a First-Year Design Course
Ms. Lakshmy Mohandas, Purdue University
Prof. Nathan Mentzer, Purdue University
Ms. Aparajita Jaiswal, Purdue University
Mr. Shawn Farrington, Purdue University

Friendly Mentor or Former Consultant: Peer Mentors in First-Year Engineering Courses
Dr. Leila Keyvani Someh, Northeastern University
Brian Patrick O’Connell, Northeastern University
Dr. Kathryn Schulte Grahame, Northeastern University
Mr. Jake Levi, Northeastern University
Whitney Elise Hansbery
Mr. Vishrudan Swami

R327E - First-Year Programs: Metacognition, Self-Efficacy, and Motivation #2
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Why Motivation Matters: The Relationship Between Motivation to Go to College, Effort, and Academic Performance in Early Engineering Courses
Woo J. Kim, Miami University
Ms. Brielle Nikole Johnson, Miami University
Dr. Jennifer Blue, Miami University
Dr. Amy Summerville, Miami University
Dr. Brian P. Kirkmeyer, Miami University

Work-In-Progress: Engineering Self-Efficacy in First-Year Design
Megan Gray, Duke University
Dr. Ann Saterbak, Duke University
Dr. Sophia T. Santillian, Duke University
Michael Rizk, Duke University
Dr. Jessica Sperling, Duke University

How Do Student Perceptions of Engineers and Engineering as a Career Relate to their Self-Efficacy, Career Expectations, and Grittiness?
Dr. Melissa Lynn Morris, University of Nevada, Las Vegas
Mr. Joseph Dygert, West Virginia University
Dr. Robin A.M. Hensel, West Virginia University

**Developing Metacognition in First-Year Students through Interactive Online Videos**

Dr. Peter M. Ostafichuk, University of British Columbia, Vancouver
Dr. Susan Nesbit, University of British Columbia, Vancouver
Prof. Naoko Ellis P.Eng., University of British Columbia, Vancouver
Mr. Gerald Tembrevilla, University of British Columbia, Vancouver

**Self-Efficacy Development in Students in a Declared Engineering Matriculation Structure**

Dr. Racheida S. Lewis, University of Georgia
Dr. Holly M. Matusovich, Virginia Polytechnic Institute and State University

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**R330A - Computing and Information Technology Division Technical Session 6**

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Computing and Information Technology Division

Moderators: Reza Sanati-Mehrizy, Utah Valley University; Vetria Byrd, Purdue University at West Lafayette

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

**Deploying a Network Management Overlay for Education Video Conferencing Services**

Ciprian Popoviciu, East Carolina University
Dr. Philip J. Lunsford II, East Carolina University
Dr. John Pickard, East Carolina University
Mr. Colby Lee Sawyer, East Carolina University
Mr. Jarvis Woodburn
Mr. Zachary Ryan Zynda, East Carolina University
Mr. Dale Drummond, East Carolina University

**Developing Information Technology Labs on Google Cloud Platform**

Dr. Peng Li, East Carolina University

**Drawn Together: Integrating Words with Visuals While Annotating Textbooks and Articles for Strengthening Competencies in Computer Networking Technology**

Dr. Vigyan Jackson Chandra, Eastern Kentucky University

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**R330B - Computing and Information Technology Division Technical Session 7**

11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Computing and Information Technology Division

Moderators: Awatif Amin, Johnson C. Smith University; Chandra Asthana, Elizabeth City State University

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

**Exploring Ethical Hacking from Multiple Viewpoints**

Dr. Radana Dvorak, University of Portland
Dr. Heather Dillon, University of Portland
Dr. Nicole Ralston, University of Portland
Jeffrey Matthew Welch, University of Portland

**An Empirical Study for Multilevel Cache Associativity**

Dr. Hassan Rajaei, Bowling Green State University

**The CAHSI INCLUDES Alliance: Realizing Collective Impact**

Dr. Elsa Q. Villa, University of Texas at El Paso
Dr. Ann C. Gates, University of Texas at El Paso
Dr. Sanga Kim, University of Texas at El Paso
Prof. David S. Knight, University of Washington

**Curri: A Curriculum Visualization System that Unifies Curricular Dependencies with Temporal Student Data**

Dr. Stephen Michael MacNeil, University of California, San Diego
Dr. Mohsen M. Dorodchi, University of North Carolina at Charlotte
Erfan Al-Hossami, University of North Carolina at Charlotte
Aileen Benedict, University of North Carolina at Charlotte
Mr. Devansh Desai, University of North Carolina at Charlotte
Mohammad Javad Mah zoo, Core Compete Inc.

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**R332A - International Research Experiences Intl Div Tech Session 8**

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: International Division

Moderators: Amal Kabalan, Bucknell University; Yanjun Yan, Western Carolina University

This session discusses lessons learned in past international research experiences and specific programs in Korea and the United Kingdom.

**Undergraduate Students as Visiting Students in the United Kingdom**

Prof. Ali Mehrizi-Sani, Virginia Tech
Dr. Chen-Ching Liu P.E., Virginia Tech
Prof. Stephen McArthur, University of Strathclyde

Work in Progress: Design Considerations for an International Research Program for Students: Learning from Existing Programs
Dr. Nicole P. Sanderlin, Virginia Tech
Ms. Kirsten Davis, Virginia Tech
Dr. David B Knight, Virginia Tech

Work in Progress: NSF IRES – Interdisciplinary Research in Korea on Applied Smart Systems (IRiKA) for Undergraduate Students
Dr. Gloria J. Kim, University of Florida
Prof. Yong Kyu Yoon, University of Florida
Prof. Jin-Woo Choi, Louisiana State University

R332B - Factors Influencing Curriculum Development: International Division Technical Session 4
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: International Division
Moderators: Sanjay Tewari, Missouri University of Science and Technology; Phillip Sanger, Purdue University at West Lafayette

This session covers issues that impact curriculum development, such as social interaction, the importance of reflection, and group dynamics.

A Comparative Study of Curricular Differences and Their Influence on Students’ Formation as Engineers
Dr. Ashish Agrawal, University of Cape Town
Dr. Johnson Carroll, University of Johannesburg
Dr. Jennifer M. Case, Virginia Polytechnic Institute and State University
Dr. Nicole P. Pitterson, Virginia Polytechnic Institute and State University

Lessons Learned from the NSF IGERT Program: Cultivating Student Motivation in the Interdisciplinary and International Contexts
Congying Wang, Purdue University, West Lafayette
Caitlyn M. Clarkson, Purdue University, West Lafayette
Mr. Joseph Andler, Purdue University, West Lafayette
Mr. Matthew Korey, Purdue University
Ms. Kali D. Frost, Purdue University
Dr. Melissa S. Reeves, Tuskegee University
Carol A. Handwerker, Purdue University

Research on the Construction of Excellent Classes for College Students in the New Era
Mrs. Zhi Fang, Beihang University
Prof. Qing Lei, Beihang University

Role of Social Interaction in the Barriers Facing First-year International Students in the United States
Mr. Johnny Crayd Woods Jr., Virginia Polytechnic Institute and State University
Dr. Homero Murzi, Virginia Polytechnic Institute and State University
Ms. Maia Greene-Havas, Virginia Polytechnic Institute and State University
Mr. Abram Diaz-Strandberg, Virginia Tech Department of Engineering Education
Sophia Vicente, Virginia Polytechnic Institute and State University

R333A - Pre-college Engineering Education Division Technical Session 9
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Manuel Figueroa, The College of New Jersey

WIP: First-graders’ Computational Thinking in Informal Learning Settings
Ms. Hoda Ehsan, Purdue University, West Lafayette
Ms. Barbara Fagundes, Purdue University, West Lafayette
Prof. Tamara J. Moore, Purdue University, West Lafayette
Kristina Maruyama Tank, Iowa State University
Dr. Monica E. Cardella, Purdue University, West Lafayette

WIP: Initial Investigation of Effective Teacher Professional Development Among Experienced and Nonexperienced Engineering Teachers
Dr. Jennifer L. Kouo, Towson University
Dr. Medha Dalal, Arizona State University
Dr. Brum T. Berhaney, Florida International University
Dr. Jumoke ‘Kemi’ Ladeji-Osias, Morgan State University
Dr. Kenneth Reid, Virginia Polytechnic Institute and State University
Prof. Cheryl Beauchamp, Regent University
Dr. Adam R. Carberry, Arizona State University
ASEE'S VIRTUAL CONFERENCE
THURSDAY, JUNE 25 SESSIONS

WIP: Relationship Between Students' Demographics and Manufacturing Career Perceptions
Miss Chidubem Nuela Enebechi, Purdue University, West Lafayette
Dr. Greg J. Strimel, Purdue University, West Lafayette
Ms. Liesl Krause, Purdue University, West Lafayette
Miss Sydney Taylor Serban, Purdue University, West Lafayette

WIP: Roll-the-Roller 3-D Printing Design Contest: The Experience-based Summer Bridge Program to Improve the Success of Incoming Engineering Freshmen Students
Dr. Hitesh D. Vora, Oklahoma State University
Mr. Aaron Alexander, Oklahoma State University
Dr. Ilcheung Park, Oklahoma State University
Dr. Chunho Yang, Oklahoma State University
Dr. Avimanyu Sahoo, Oklahoma State University
Dr. Young Bae Chang P.E., Oklahoma State University

WIP: Student Dispositions Toward STEM: Exploring an Engineering Summer Camp for Underrepresented Students
Dr. Jeanna R. Wiesemann, Southern Methodist University
Prof. Richard Duschl, Southern Methodist University
Miss Kristine Reiley, Southern Methodist University
Dr. Kenneth Berry, Southern Methodist University

WIP: A Summer Outreach Program in Chemical Engineering Emphasizing Sustainable Technologies Related to Plastic Materials
Dr. Diane L. Nelson, Carnegie Mellon University
Dr. Ilhem F. Hakem, Carnegie Mellon University

WIP: Young Adolescent Perceptions of Engineers Within a Summer Outreach Program
Ms. Selene Y. Willis, University of South Florida
Dr. Tonisha B. Lane, Virginia Polytechnic Institute and State University
Dr. Eugenia Vomvoridi-Ivanović
Salam Ahmad
Dr. Jonathan Elliot Gaines, University of South Florida
Mrs. Ahmirah Samayah Muhammad, BullsEYE Head Program Coordinator

Children's Perceptions of Manufacturing Careers: Examining the Influence of Industry-Public Education Initiatives
Dr. Greg J. Strimel, Purdue University, West Lafayette
Ms. Liesl Krause, Purdue University, West Lafayette
Miss Sydney Taylor Serban, Purdue University, West Lafayette

R333C - Pre-college Engineering Education Division Technical Session 11
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Andrea Burrows, University of Wyoming

Using Computer-generated Concept Maps in the Engineering Design Process to Improve Physics Learning
Mr. Michael S. Rugh, Texas A&M University
Mr. Donald Joseph Beyette, Texas A&M University
Dr. Mary Margaret Capraro, Texas A&M University
Dr. Robert M. Capraro, Texas A&M University

Teaching Science Using Dye-sensitized Solar Cell Kit
Mr. Thomas Neil Dempsey, Forestville Central School
Mr. M. Raymond Ng, Cathedral Preparatory School
Mr. Zachary Rhodes
Dr. Jiawei Gong, Pennsylvania State University
Dr. Faisal Aqlan, Pennsylvania State University

Broadening the Participation of Rural Students in Engineering: Exploring Community Perspectives
Stacey L. Vaziri, Virginia Polytechnic Institute and State University
Dr. Marie C. Paretti, Virginia Polytechnic Institute and State University
### R333D - Pre-college Engineering Education Division Technical Session 12

**11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor:** Pre-College Engineering Education Division  
**Moderator:** Mike Borowczak, University of Wyoming

#### An Integrated Three-year High School STEM Curriculum Based on the Global Grand Challenges (Resource Exchange)

- Dr. Katherine Levenick Shirey, Knowles Teacher Initiative

#### Art Bots (Resource Exchange)

- Ms. Emma Michelle Monson, University of St. Thomas
- Dr. Deborah Besser P.E., University of St. Thomas
- Dr. AnnMarie Thomas, University of St. Thomas
- Dr. Debra Monson, University of St. Thomas

#### Boat Float Engineering Design (Resource Exchange)

- Ms. Krista Schumacher, University of St. Thomas
- Dr. Deborah Besser P.E., University of St. Thomas
- Dr. AnnMarie Thomas, University of St. Thomas

#### Chemical Engineering for Middle School Girls (Resource Exchange)

- Ayse Asatekin, Tufts University
- Ms. Isadora Shamah, Tufts University
- Miss Abigail Anne Klotz,
- Dr. Merredith D. Portsmore, Tufts University

### R334A - Ethical and Global Concerns

**11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor:** Liberal Education/Engineering & Society Division  
**Moderator:** Juan Lucena, Colorado School of Mines

#### Emergence and Evolution of Humanitarian Engineering Education in Australia

- Ms. Ellen Lynch, Australian National University  
- Dr. Jeremy Ingle Smith, Australian National University

#### Ethics by the Dose: Medical Treatment Metaphor for Ethics in Engineering

- Dr. Elizabeth A. Reddy, Colorado School of Mines  
- Dr. Stephen Campbell Rea, Colorado School of Mines  
- Dr. Qin Zhu, Colorado School of Mines

#### Teaching Ethical Photography to Deepen Global Engineering Competency

- Dr. Robert S. Emmett, Virginia Polytechnic Institute and State University  
- Dr. Homero Murzi, Virginia Polytechnic Institute and State University  
- Dr. Natasha B. Watts, Virginia Polytechnic Institute and State University

#### WIP: Liberal Arts Help Engineering Students Change the World

- Dr. Alison Wood, Franklin W. Olin College of Engineering  
- Dr. Robert Martello, Franklin W. Olin College of Engineering

### R334B - Programmatic Integration of Liberal Education

**11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor:** Liberal Education/Engineering & Society Division  
**Moderator:** Judith Norback, Georgia Institute of Technology

#### Exploring an Active-learning Focus in a Liberal Arts Engineering Curriculum

- Dr. David Robert Bruce P.E., Fulbright University Vietnam  
- Dr. Sebastian Dziallas, Fulbright University Vietnam

#### Introducing an Engineering Program in an Emphatically
Liberal Arts Institution
Prof. Michael Oudshoorn, High Point University
Dr. Claire Lynne McCullough P.E., High Point University

The Sociotechnical Core Curriculum: An Interdisciplinary Engineering Studies Degree Program
Dr. Jenn Stroud Rossmann, Lafayette College
Dr. Kristen L. Sanford P.E., Lafayette College
Prof. Julia Nicodemus, Lafayette College
Benjamin Cohen, Lafayette College

Program: Study Design
Ms. Rebecca Balakrishnan, University of Manitoba
Dr. Jillian Seniuk Cicek, University of Manitoba
Prof. Priya Subra Mani

R335A - Learning Strategies
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Manufacturing Division
Moderator: Zhenhua Wu, Virginia State University

Teaching Geometric Dimensioning and Tolerancing by Using an Algorithm to Implement the Datum-based Model
Dr. Wangping Sun, Oregon Institute of Technology
Prof. Yanqing Gao, Oregon Institute of Technology

Improvement of Students’ Performance in Manufacturing Processes Laboratory by Applying Spaced Practice Strategy
Ms. Yareni P. Lara-Rodriguez, University of Puerto Rico, Mayaguez Campus
Mr. Rafael Jose Baez, University of Puerto Rico, Mayaguez Campus
Dr. Pedro O. Quintero, University of Puerto Rico, Mayaguez Campus

Using Kaizen Process to Improve Learning Outcomes
Dr. Zhenhua Wu, Virginia State University
Mr. Amir Javaheri, Virginia State University

Using Kaizen Process to Improve Learning Outcomes
Dr. Zhenhua Wu, Virginia State University

R335B - Advances in Additive, Hybrid, and Digital Manufacturing Education
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Manufacturing Division
Moderator: Aditya Akundi, The University of Texas Rio Grande Valley

MAKER: Designing and Building the Classical Inverted Pendulum on a Cart
Dr. Khalifa H. Harib, United Arab Emirates University
Dr. Sangarappillai Sivaloganathan, United Arab Emirates University
Mr. Adewale Oriyomi Oseni, United Arab Emirates University

The Manufacturing Education Dilemma: Operating Efficiency vs. Productivity
Prof. Robert Simoneau

Remotely Accessible Injection Molding Machine for Manufacturing Education: Lessons Learned
Dr. Sheng-Jen “Tony” Hsieh, Texas A&M University

Teaching High School Students Innovative Topics Related to Advanced Manufacturing and 3-D Printing
Dr. Sameer Hamoush, North Carolina A&T State University

R336 - Materials Division Technical Session 3
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Materials Division
Moderators: Alison Polasik, The Ohio State University; Lessa Grunenfelder, University of Southern California

Enhancing Student Learning Through Pre-lab Assignments and Virtual Reality/Simulation Components in the Strength of Materials Laboratory Experiments
Dr. Afshin H. Zahraee, Purdue University Northwest

Impact of Integrating Computation into Undergraduate Curriculum: New Modules and Long-term Trends
Ms. Grace M. Lu, University of Illinois at Urbana-Champaign
Prof. Dallas R. Trinkle, University of Illinois at Urbana-Champaign
Prof. Andre Schleife, University of Illinois at Urbana-Champaign
Dr. Cecilia Leal, University of Illinois at Urbana-Champaign
Prof. Jessica Krogstad, University of Illinois at Urbana-Champaign
Prof. Robert Maass, University of Illinois at Urbana-Champaign
ASEE’S VIRTUAL CONFERENCE
THURSDAY, JUNE 25 SESSIONS
#ASEEVC

Dr. Pascal Bellon, University of Illinois at Urbana-Champaign
Pinshane Y. Huang, University of Illinois at Urbana-Champaign
Prof. Nicola H. Perry, University of Illinois at Urbana-Champaign
Prof. Matthew West, University of Illinois at Urbana-Champaign
Prof. Timothy Bretl, University of Illinois at Urbana-Champaign
Dr. Geoffrey L. Herman, University of Illinois at Urbana-Champaign

Software Support for Materials-related Active Learning
  Dr. Kaitlin Tyler, ANSYS Inc.
  Dr. Claes Fredriksson, ANSYS Granta
  Dr. Kaitlin Tyler, ANSYS Inc.

The Final Straw: Incorporating Accessibility and Sustainability Considerations into Material Selection Decisions
  Dr. Laura Ann Gelles, University of San Diego
  Dr. Susan M. Lord, University of San Diego

R338A - Mechanical Engineering Technical Session: The Remote World
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Moderator: Diane Peters, Kettering University

This technical session address the timely topic of remote learning and presents ideas on how to improve the educational experience through video lectures, virtual office hours, and out-of-class assignment frequency.

Effects of Out-of-Class Assignment Frequency on Course Performance in Mechanical Engineering Undergraduates
  Dr. Kevin Skenes, The Citadel
  Dr. Jason Howison, The Citadel
  Dr. Emily Kate Bierman, The Citadel

Faculty Perspectives on the Impact of Virtual Office Hours in Engineering Courses
  Ms. Brooke-Lynn Caprice Andrade,
  Dr. Krishna Pakala, Boise State University
  Dr. Diana Bairaktarova, Virginia Polytechnic Institute and State University
  Mr. Douglas Hagemeier, Boise State University
  Prof. Harish Subbaraman, Boise State University

A Curriculum-spanning Review Video Library to Improve Retention of Prerequisite Course Material
  Dr. Hope Leigh Weiss, California State University, Fullerton
  Dr. John W. Sanders, California State University, Fullerton

R338B - Mechanical Engineering Technical Session: Curriculum and Education
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Moderator: Maryam Darbehesht, University of Colorado Denver

This technical session focuses on mechanical engineering curriculum and education. An overview of mechanical engineering in the U.S. will first be presented followed by papers on revolutionizing the mechanical engineering curriculum and the impacts of shifting student perspectives.

Mechanical Engineering Undergraduate Education in the United States
  Dr. Chean Chin Ngo, California State University, Fullerton
  Dr. Sang June Oh, California State University, Fullerton

Revolutionizing Mechanical Engineering Undergraduate Curriculum
  Shelby Ann McNeilliy, Boise State University
  Dr. Krishna Pakala, Boise State University
  Dr. Donald Plumlee P.E., Boise State University

Shifting Perspectives on Acceptable Classroom Behavior
  Dr. Randall D. Manteufel, University of Texas at San Antonio
  Dr. Amir Karimi P.E., University of Texas at San Antonio

WIP: Design of Polymer Processing Learning Module in a Manufacturing Course for Mechanical Engineers
  Dr. Michele Miller, Campbell University

R338C - Mechanical Engineering Technical Session: Feeling the Heat - Thermodynamics and Heat Transfer
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Moderator: Matt Gordon, University of Denver

All things thermodynamics and heat transfer. This session considers pedagogy, assessment, and projects all in the context of thermodynamics and heat transfer.

A Visual and Intuitive Approach to Teaching and Learning the Concept of Thermodynamic Entropy
  Dr. Daniel Raviv, Florida Atlantic University
  Mr. Daniel Ryan Barb, Florida Atlantic University

Examining Knowledge Transfer Between Thermodynamics and Mathematics
  Dr. Alexander John De Rosa, Stevens Institute of Technology

Implementing Competency-based Assessment in an
Undergraduate Thermodynamics Course
Dr. Nicole Okamoto, San Jose State University

Thermal Analysis of Heat Sinks with Metal 3-D Printer
Dr. Haejune Kim, Texas A&M University

Increasing Student Curiosity with Cooling Systems
Dr. Jordan Farina, University of Portland
Dr. Heather Dillon, University of Portland
Rebecca D. Levison, University of Portland
Dr. Nicole Ralston, University of Portland

Dr. Ajit D. Kelkar, North Carolina A&T State University
Dr. John P. Kizito, North Carolina A&T State University

Why Don't Undergraduate STEM Students Pursue Combined (4+1) B.S./M.S. Degrees?
Ms. Mais Kayyali, Florida International University
Dr. Mohamed ElZomor, Florida International University
Mr. Piyush Pradhanang, Florida International University

The Pitt STRIVE Program: Adopting Evidence-Based Principles "The Meyerhoff and PROMISE Way"
Ms. Deanna Christine Easley Sinex, University of Pittsburgh
Dr. Mary E. Besterfield-Sacre, University of Pittsburgh
Dr. Wendy Carter-Veale, University of Maryland, Baltimore County
Drew G. Yohe, University of Pittsburgh
Dr. Steven Abramowitch, University of Pittsburgh
Dr. Sylvanus N. Wosu, University of Pittsburgh

R339 - Learning Mechanics Through Experimentation
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanics Division
Moderators: Brian Self, California Polytechnic State University, San Luis Obispo; Amie Baisley, University of Florida

Work in Progress: Developing Mechanics of Materials Skills through an Integrated Prototyping Project
Dr. Ethan Hilton, Louisiana Tech University

Simple Lab Exercises Using Composite Materials
Dr. William E. Howard, East Carolina University
Dr. Colleen Janeiro, East Carolina University

Effective PocketLab Sensor Use in an Engineering Dynamics Course
Dr. Timothy Aaron Wood, The Citadel

Play-Doh and Pendulums: Making Mass Moment of Inertia Fun
Dr. Kathleen Bieryla, University of Portland
Ms. Nikolene A. Schulz P.E., University of Portland
Rebecca D. Levison, University of Portland
Dr. Heather Dillon, University of Portland

R340A - Minorities in Engineering Division Technical Session 5
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Minorities in Engineering Division
Moderator: Yvette Pearson, Rice University

Minority STEM Doctoral Student Success (Experience)
Dr. Keith A. Schimmel P.E., North Carolina A&T State University
Dr. C. Dean Campbell, North Carolina A&T State University
Dr. Marcia Gumpertz, North Carolina State University
Dr. Yvette Maria Huet, University of North Carolina, Charlotte

Why Don't Undergraduate STEM Students Pursue Combined (4+1) B.S./M.S. Degrees?
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Dr. Wendy Carter-Veale, University of Maryland, Baltimore County
Drew G. Yohe, University of Pittsburgh
Dr. Steven Abramowitch, University of Pittsburgh
Dr. Sylvanus N. Wosu, University of Pittsburgh

R340A - Minorities in Engineering Division Technical Session 5
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Minorities in Engineering Division
Moderator: Yvette Pearson, Rice University

Minority STEM Doctoral Student Success (Experience)
Dr. Keith A. Schimmel P.E., North Carolina A&T State University
Dr. C. Dean Campbell, North Carolina A&T State University
Dr. Marcia Gumpertz, North Carolina State University
Dr. Yvette Maria Huet, University of North Carolina, Charlotte

Why Don't Undergraduate STEM Students Pursue Combined (4+1) B.S./M.S. Degrees?
Ms. Mais Kayyali, Florida International University
Dr. Mohamed ElZomor, Florida International University
Mr. Piyush Pradhanang, Florida International University

The Pitt STRIVE Program: Adopting Evidence-Based Principles "The Meyerhoff and PROMISE Way"
Ms. Deanna Christine Easley Sinex, University of Pittsburgh
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Dr. Wendy Carter-Veale, University of Maryland, Baltimore County
Drew G. Yohe, University of Pittsburgh
Dr. Steven Abramowitch, University of Pittsburgh
Dr. Sylvanus N. Wosu, University of Pittsburgh
R341A - Mechatronics and Robotics II
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Multidisciplinary Engineering Division
Moderators: Carlotta Berry, Rose-Hulman Institute of Technology; Leah Newman, Milwaukee School of Engineering

This session highlights efforts to define and expand the diverse field of mechatronics and robotics and includes examples of projects and workshops. It is the second of two sessions devoted to the topic; discussion between authors and attendees is anticipated.

Workshops for Building the Mechatronics and Robotics Engineering Education Community

Prof. Michael A. Gennert, Worcester Polytechnic Institute
Dr. Nima Lotfi, Southern Illinois University, Edwardsville
Dr. James A. Mynderse, Lawrence Technological University
Dr. Monique Jethwani, Columbia School of Social Work
Dr. Vikram Kapila, New York University

Promoting Open-source Hardware and Software Platforms in Mechatronics and Robotics Engineering Education

Dr. Nima Lotfi, Southern Illinois University, Edwardsville
Mr. Kenechukwu Churchill Mbanisi, Worcester Polytechnic Institute
Dr. David M. Auslander, University of California, Berkeley
Dr. Carlotta A. Berry, Rose-Hulman Institute of Technology
Dr. Luis Alberto Rodriguez, Milwaukee School of Engineering
Dr. Majid Molki, Southern Illinois University, Edwardsville

Robot Racing from Targeted Kit-based Components to a Functional System

Dr. Luis Alberto Rodriguez, Milwaukee School of Engineering
Dr. Michael D. Cook, Milwaukee School of Engineering
Dr. William C Farrow, Milwaukee School of Engineering

WIP: Mechatronics and Robotics Engineering Definitions Among Students, Educators, and Industry Professionals

Dr. James A. Mynderse, Lawrence Technological University
Dr. Nima Lotfi, Southern Illinois University, Edwardsville
Dr. Nikhil Bajaj, University of Pittsburgh
Dr. Vishesh Vikas, University of Alabama
Prof. Michael A. Gennert, Worcester Polytechnic Institute

R341B - Multidisciplinary Curriculum and Course Development
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Multidisciplinary Engineering Division
Moderators: John Foo, Columbia University in the City of New York; Sveta Lee, University of Illinois at Urbana - Champaign

Development and Implementation of an Integrative Engineering Program at Lafayette College

Dr. David Brandes, Lafayette College
Dr. Lauren Sefcik Anderson, Lafayette College

Building a New University at the Intersection of Liberal Arts and Engineering

Dr. Sebastian Dziallas, Fulbright University Vietnam
Prof. Naoko Ellis P.Eng., University of British Columbia
Dr. David Robert Bruce P.E., Fulbright University Vietnam

Implementing the NEET Ways of Thinking at MIT and Assessing Their Efficacy

Dr. Edward F. Crawley, Massachusetts Institute of Technology
Prof. Mark Bathe, Massachusetts Institute of Technology
Dr. Rea Lavi, Massachusetts Institute of Technology
Dr. Amitava "Babi" Mitra, Massachusetts Institute of Technology

Self-initiative Undergraduate Research

Dr. Chris A. O'Riordan-Adjah, Wake Technical Community College

Using an Education Ideas Forum to Foster Institutional Innovation Starting from the Grassroots Level

Dr. Adeel Khalid, Kennesaw State University
Dr. Tris Utschig, Kennesaw State University

R342 - New Engineering Educators 2: Success In and Out of the Classroom
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: New Engineering Educators Division
Moderators: Vimal Viswanathan, San Jose State University; Kerry Widder, Milwaukee School of Engineering

A Literature-based Perspective Towards Learning and Pedagogy of Computational Thinking

Ms. Huma Shoaib, Purdue University, West Lafayette
Dr. Sean P. Brophy, Purdue University, West Lafayette

Implementation of a Future Faculty Development Program:
ASEE’S VIRTUAL CONFERENCE
THURSDAY, JUNE 25 SESSIONS

Impact and Evaluation of Years 1 & 2
Dr. David Gau, University of Pittsburgh
Ms. Deanna Christine Easley Sinex, University of Pittsburgh
Dr. Mary E. Besterfield-Sacre, University of Pittsburgh
Dr. Steven Abramowitch, University of Pittsburgh
Dr. Sylvanus N. Wosu, University of Pittsburgh

What No One Tells You About Writing a CAREER Proposal: Advice from a Former Program NSF Officer
Dr. Julie P. Martin, Ohio State University

What No One Tells You About Writing a CAREER Proposal: Advice from a Former Program NSF Officer
Dr. Julie P. Martin, Ohio State University

Writing Good Reflection Questions: Testing Brookfield’s Critical Incident Questionnaires’ Effectiveness in Improving Student Learning
Dr. Elizabeth Payne Toñé, South Dakota State University
Dr. Albena Yuliyanova Yordanova, South Dakota State University

R351 - Women in Engineering Division Technical Session 4
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Women in Engineering Division
Moderators: Lisa Volpatti, Massachusetts Institute of Technology; Pitiporn Asvapathanagul, California State University, Long Beach

Unpacking the Elevator Pitch: Women’s Narratives in Engineering
Sarah Appelhans, University at Albany-SUNY

Engineering Students’ Views on the Effectiveness of Peer Tutors in Scholars Assisting Scholars Program
Dr. Yang Yang, Kansas State University
Dr. Bette Grauer PE, Kansas State University
Mrs. Jennifer Renee Thornburg, Kansas State University
Dr. Amy Rachel Betz, Kansas State University

The Impacts on Peer Tutors of Leading Group Supplemental Instruction for First-Year Engineering Students
Ms. Caroline Ghio, Northeastern University
Ms. Sydney Anne Morris, Northeastern University
Ms. Hannah Marie Boyce, Northeastern University
Mr. Bradley Joseph Priem, Northeastern University
Dr. Paul A. DiMilla, Northeastern University
Ms. Rachelle Reisberg, Northeastern University

Promoting an Inclusive Lab Culture through Custom In-Person Trainings within an Engineering Department
Lisa R. Volpatti, Department of Chemical Engineering, Massachusetts Institute of Technology
Kara Rodby, Department of Chemical Engineering, Massachusetts Institute of Technology
Gurleen Kaur Singh, Massachusetts Institute of Technology

Impact and Evaluation of Years 1 & 2
Dr. David Gau, University of Pittsburgh
Ms. Deanna Christine Easley Sinex, University of Pittsburgh
Dr. Mary E. Besterfield-Sacre, University of Pittsburgh
Dr. Steven Abramowitch, University of Pittsburgh
Dr. Sylvanus N. Wosu, University of Pittsburgh

What No One Tells You About Writing a CAREER Proposal: Advice from a Former Program NSF Officer
Dr. Julie P. Martin, Ohio State University

Writing Good Reflection Questions: Testing Brookfield’s Critical Incident Questionnaires’ Effectiveness in Improving Student Learning
Dr. Elizabeth Payne Toñé, South Dakota State University
Dr. Albena Yuliyanova Yordanova, South Dakota State University

R357 - Learnin' Lessons about Faculty Development
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Faculty Development Division
Moderator: Muruganantham Ponnusamy, Saintgits College of Engineering

This session will highlight new and innovative elements of faculty development. Come learn some lessons from your fellow Faculty Developers!

ASME Early Career Leadership Intern Program to Serve Engineering (ECLIPSE): A Talent Pipeline Model for Developing Early Career Mechanical Engineers into Future Leaders
Dr. Khosro Shirvani, Farmingdale State College

Lessons Learned: Teaching and Learning Academy Workshop to Promote Asset-based Mindset among STEM Faculty
Dr. Daniel Galvan, California State University, Los Angeles
Dr. Jianyu "Jane" Dong, California State University, Los Angeles
Dr. Lizabeth T Schlemer P.E., California Polytechnic State University, San Luis Obispo
Dr. Emily L. Allen, California State University, Los Angeles

Lessons Learned about Fostering Curricular Change
Dr. Laura Ann Gelles, University of San Diego
Prof. Michelle M. Camacho, University of San Diego

The Benefits of Discipline-based Communities for Faculty Teaching Development
Dr. Margret Hjalmarson, George Mason University
Prof. Jill K. Nelson, George Mason University

R360 - FOCUS ON EXHIBITS: Virtual Showcase
12:00 P.M. - 1:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters

Live interaction with sponsors and exhibitors.
R371A - NSF Grantees: First Year Programming (2)
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderators: Amber Genau, University of Alabama at Birmingham; Robin Hensel, West Virginia University

Presentations from groups with current NSF-funded projects focused on engineering students during their first year of higher education, including summer bridge programs.

Impacts Resulting from a Large-scale First-year Engineering and Computer Science Program on Students' Successful Persistence Toward Degree Completion
Dr. Gisele Ragusa, University of Southern California
Dr. Emily L. Allen, California State University, Los Angeles
Prof. Gustavo B. Menezes, California State University, Los Angeles

Longitudinal Memos Investigating First-year Engineering Pathways
Cassie Wallwey, Ohio State University
Abigail Clark, Ohio State University
Miss Soundouss Sassi, Mississippi State University
Katherine Elmore, Mississippi State University
Dr. Rachel Louis Kajfez, Ohio State University
Dr. Mahnas Jean Mohammadi-Aragh, Mississippi State University
Anastasia Nicole Doty, Ohio State University

Sustainable Bridges from Campus to Campus: Aggregate Results for Engineering Ahead Cohorts One to Three (#1525367)
Dr. Catherine L. Cohan, Pennsylvania State University, University Park
Dr. Pradip K. Bandyopadhyay, Pennsylvania State University, Berks
Dr. Ryan Scott Hassler, Penn State University, Berks
Prof. Mark William Johnson, Pennsylvania State University, Altoona
Dr. Michael Kagan, Pennsylvania State University, Abington
Dr. Ann Marie Schmiedekamp
Dr. Peter J. Shull, Pennsylvania State University, Altoona
Dr. Peter J. Butler, Pennsylvania State University
Dr. Tonya L. Peeples, Pennsylvania State University

Engendering Community to Computer Science Freshmen through an Early Arrival Program
Prof. Alark Joshi, University of San Francisco
Mr. Gian Bruno

Xornam Apedoe, University of San Francisco
Prof. Sophie Engle, University of San Francisco
Sami Rollins, University of San Francisco
Prof. Matthew Malensek, University of San Francisco

R371B - NSF Grantees: Sustainability
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderators: Amber Genau, University of Alabama at Birmingham; Sarah Bauer, Rowan University

Presentations from groups with current NSF-funded projects focused on curricula and research experiences related to issues of environmental sustainability.

Incorporating Sustainability and Resiliency Content into the Civil Engineering Undergraduate Curriculum
Prof. Bhaskar Chittoori P.E., Boise State University
Dr. Noah Salzman, Boise State University
Dr. Robert Hamilton P.E., Boise State University
Dr. Debakanta Mishra, Oklahoma State University
Dr. Sondra M. Miller, Boise State University

Design and Assessment of Architecture/Engineering/Construction (AEC) Curricula for Resilient and Sustainable Infrastructure
Dr. Carla Lopez del Puerto, University of Puerto Rico, Mayaguez Campus
Prof. Humberto Eduardo Cavallin
Prof. Oscar Marcelo Suarez, University of Puerto Rico, Mayaguez Campus
Dr. Jonathan Munoz Barreto,
Dr. Jose L. Perdomo, University of Puerto Rico
Dr. Drianfel E. Vázquez, University of Puerto Rico, Ponce Campus
Prof. Fabio Andrade Rengifo P.E., University of Puerto Rico, Mayaguez Campus
Dr. Luisa Guillellar, University of Puerto Rico, Myagüez Campus
Miss Ormari Troche

Broadening Participation Research Project: Charting a Path to Transdisciplinary Collaborative Design
Prof. Mason Andrews, Hampton University
Mujde Erten-Unal, Old Dominion University
Ms. Carol L. Considine, Old Dominion University

NRT-INFEWS: The DataFEWSion Traineeship Program for Innovations at the Nexus of Food Production, Renewable Energy, and Water Quality
Dr. Sarah M. Ryan, Iowa State University
R371C - NSF Grantees: Entrepreneurship
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderators: Amber Genau, University of Alabama at Birmingham; Dominic Dal Bello, Allan Hancock College

Presentations from groups with current NSF-funded projects focused on entrepreneurship.

Impact of an I-Corps Site Program on Engineering Students at a Large Southwestern University: Year 3
Ms. Magdalini Z. Lagoudas, Texas A&M University
Dr. So Yoon Yoon, University of Cincinnati
Mr. Rodney Boehm, Texas A&M University
Miss Samantha Asbell, Texas A&M University

Promoting Innovation and Entrepreneurship Education in Physics: The PIPELINE Network
Dr. Crystal Bailey, American Physical Society

Fostering Entrepreneurial Mindset and Innovation in a Cross-Listed Science and Engineering Course
Dr. Bahram Roughani, Loyola University Maryland

R371D - NSF Grantees: First Year Programming (1)
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderators: Amber Genau, University of Alabama at Birmingham; Marilyn Barger, National Science Foundation ATE Centers

Presentations from groups with current NSF-funded projects focused on engineering students during their first year of higher education.

Zip to Industry: A First-year Corporate-STEM Connection Program
Dr. Donald P. Visco Jr., University of Akron
Nidaa Makki, University of Akron
Dr. Linda M. Subich, University of Akron
Prof. David Steer, University of Akron
Ms. Erin R. Stevic, University of Akron

Results of a Pilot Effort with First-year Students
Mr. Brett Tallman P.E., Montana State University
Miss Tessa Sybesma, Montana State University
Dr. William J. Schell IV P.E., Montana State University
Dr. Bryce E. Hughes, Montana State University
Monika Kwapisz, Montana State University
Emma Annand, Montana State University
Shannon Ranch, Montana State University

Identifying Deficiencies in Engineering Problem-solving Skills
Dr. Lizzie Santiago, West Virginia University
Mrs. Anika Coolbaugh Pirkey, West Virginia University

Change in Student Understanding of Modeling During First-year Engineering Courses
Dr. Farshid Marbouti, San Jose State University
Dr. Kelsey Joy Rodgers, Embry-Riddle Aeronautical University - Daytona Beach
Dr. Matthew A. Verleger, Embry-Riddle Aeronautical University - Daytona Beach

R378 - Mental Health Revisited
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Undergraduate Experience Committee
Moderators: Ronald Welch, The Citadel; Jeffrey Ray, Western Carolina University
Speakers: Dr. Steven W McLaughlin, Georgia Institute of Technology; Dr. Jim A Nicolling, McGill University; Dr. Alec Gallimore, University of Michigan

Call to Action with an Action Plan … Mobilize action across universities on this important issue. Mental health issues among students at the undergraduate and graduate levels is a much wider phenomenon than just what we observe in our home institutions. We can’t fix all the issues that lead to mental health crises among our youth. However, we must recognize that we, in our capacities as deans, department heads, and faculty, have a role to play in mental health and wellness. As a group, we need to focus on identifying the key pain points that contribute to mental health problems. We can work as a community to figure out various best strategies for how we might deal with specific issues that are within our scope of influence. Call on ASEE for a “Year of Wellness” theme!

R399 - SPONSOR TECHNICAL SESSION: Presented by the University of Maryland
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions
ASEE’S VIRTUAL CONFERENCE
THURSDAY, JUNE 25 SESSIONS

R399A - SPONSOR TECHNICAL SESSION - Presented by STMicroelectronics
11:40 A.M. - 12:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions

R399B - SPONSOR TECHNICAL SESSION: Presented by IEEE
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions

R402 - Architectural Engineering Division Business Meeting
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Architectural Engineering Division
The Architectural Engineering Division will hold its annual business meeting to discuss topics focusing on the current and future ASEE Annual Conferences and on topics of importance to architecture, engineering and construction education, and industry. We will also conduct elections for division leadership positions. The meeting is open to all members of the Architectural Engineering Division of ASEE.

R404 - BME Design in the COVID-19 Era and How to Share Your Findings
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Biomedical Engineering Division
Moderators: Rachael Schmedlen, University of Michigan; Aileen Huang-Saad, University of Michigan
Experts will lead an active discussion on best practices for teaching design courses in the current environment. This session will also present ideas on how to share research findings within the biomedical engineering education community.

R405 - CHED Business Meeting
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Chemical Engineering Division

R409 - Construction Engineering Division Business Meeting
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Construction Engineering Division

R411 - Joint Panel: Leveraging Experiential Education to Become an Engineering Education Leader
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Cooperative and Experiential Education Division
Moderators: Mary Andrade, University of Louisville; Katherine McConnell, University of Colorado Boulder
Speakers: Dr. Amitava ‘Babi’ Mitra, Massachusetts Institute of Technology; Dr. Wael Mokhtar, Grand Valley State University; Prof. Anette Kolmos, Aalborg University
Given industry feedback and recent engineering accreditation changes, STEM educators have been driving curricular changes to better meet the needs of student populations and surrounding business communities. As a result, higher learning institutions, particularly in the STEM fields, have been implementing proactive and innovative steps to design and deliver a curriculum that is outcomes-based, provides discipline-specific knowledge, and is informed by real-world business needs and applications. This 30-minute interactive, joint panel session will be delivered in a live (synchronous) format. Speakers will give a brief presentation, followed by an opportunity for the panelists to respond to prompts. The session will conclude with the opportunity for attendees to discuss topics of interest with the individual speakers in a large group setting. The presentation will include topical coverage from three university perspectives: regional/comprehensive, research-based, and international.

Curriculum-Based Experiential Education Opportunities: This discussion will be targeted toward faculty or practitioners who are interested in learning about a wide range of hands-on, experiential learning opportunities throughout the curriculum that focus on “problem identification” as well as “problem solution.” These opportunities are typically supported by innovative maker spaces and team working areas, with assistance from longstanding industry partnerships.

Integration of Design Application throughout the Curriculum: This discussion will be targeted toward faculty and practitioners who are interested in integrating design applications throughout the curriculum, with mindfulness toward entrepreneurial ventures, social responsibilities, and a global skill set (skills to be effective in a global environment and to work across nationalities and cultures).

The following discussion points will be considered and addressed:
• What prompted your institution to implement this innovation in education?
• What are the specifics of the innovation—the name of the major/programmatic/class-based/institutional educational innovation as well as an articulation of the innovation itself?
• What was learned from this educational innovation (including what you would do differently)?
• What is the planned path ahead?
ASEE’S VIRTUAL CONFERENCE
THURSDAY, JUNE 25 SESSIONS
#ASEEVC

R423 - Engineering Technology Council
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Engineering Technology Division; Engineering Technology Council
ETC Business Meeting

R424 - ENT Business Meeting
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Entrepreneurship & Engineering Innovation Division
Business meeting to discuss ENT Division matters, including program overview and election of officers.

R430 - Computing and Information Technology Business Meeting
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Computing and Information Technology Division
All interested members and guests of the CIT Division are invited to this annual meeting, at which next year's officers are elected.

R434 - LEES Division Business Meeting
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Liberal Education/Engineering & Society Division
LEES Business Meeting

R445 - Engineering Physics and Physics Panel Discussion Related to Accreditation
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Physics and Physics Division
Moderators: Bala Maheswaran, Northeastern University; Robert Ross, University of Detroit Mercy
Speakers: Dr. Baha Jassemnejad, ASRC Federal System Solutions, Federal Aviation Administration; Dr. Paul Benjamin Crilly, United States Coast Guard Academy; Dr. David K. Probst P.E., Greenville College; Dr. Steve H. Cobb P.E., Murray State University; Dr. Evan C. Lemley, University of Central Oklahoma
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.

1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Student Division
Moderator: Cassandra Woodcock, University of Michigan
Speakers: Dr. Courtney S. Smith-Orr, University of North Carolina at Charlotte; Dr. Cheryl A. Bodnar, Rowan University; Dr. Erin McCave, University of Houston
As the field continues to grow, more and more people are challenged with finding academic engineering education research (EER) positions that align with their broad abilities and interests. In the context of academia, EER positions most commonly exist in engineering education departments, traditional engineering departments (e.g., mechanical, civil), and non-degree granting programs (e.g., centers for teaching and learning, first-year engineering programs). These positions vary with regard to their emphasis on engineering education research, and provide access to different resources and mechanisms to impact engineering education.

This panel session is designed to help better understand the academic EER job market as it relates to what applicants (i.e., graduates and postdocs) experience as they navigate the academic job-search and decision-making process. During the sessions, panelists will (1) discuss what academic job opportunities existed for early-career engineering education researchers during the past 2.5 job-search cycles covering jobs posted to the ERM listserv from July 2017 through December 2019; (2) provide insight into the academic job search and decision-making process based on interviews conducted with seven early-career EER faculty members.

R451 - Computing -- Increasing Participation of Women and Underrepresented Minorities
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Women in Engineering Division; Minorities in Engineering Division; Pre-College Engineering Education Division
Moderator: Laura Dillon, Michigan State University
Speakers: Prof. Linda Ott, Michigan Technological University; Prof. Wendy Powley, Queen’s University; Dr. Andrea E Johnson, Spelman College; Prof. Maureen Doyle,
Ambitious national programs to increase diversity of the computing and information technology workforce are already well known in academic circles. Since 2013, Code.org has included 15 million young women.
Since 2006, AnitaB.org has offered annual Grace Hopper conferences featuring prominent women and people of color in computing and technology. Attendance at these conferences has grown to more than 25,000. Other organizations include the National Center for Women and Information Technology, the Association for Computing Machinery, the Computing Research Association, the Richard Tapia Conferences, Black Girls Code, and Girls Who Code.

In contrast, effective regional programs are less well known. Programs involving a half-dozen or more institutions and targeting narrower geographical regions can often be more cost effective than national ones, especially in engaging marginalized populations. This panel brings together four academic leaders to discuss their experiences in organizing and participating in regional programs to increase the meaningful participation of women and underrepresented minorities in computing. Panelists will address questions about goals, costs and benefits, building partnerships, lessons learned, and the impact on their careers from participating in these programs. Participants will come away with ideas for programs that may be effective in their regions. They will also receive pointers on building the necessary partnerships.

### Panel Discussion on Regional Programs to Increase Participation of Women and Underrepresented Minorities in Computing: Experiences, Partnerships, and Lessons Learned

- Prof. Laura K. Dillon, Michigan State University
- Prof. Maureen Doyle, Northern Kentucky University
- Prof. Linda Ott, Michigan Technological University
- Prof. Wendy Powley, Queen’s University
- Dr. Andrea E. Johnson, Spelman College

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**R466A - INDUSTRY DAY: Hearing from Diverse Voices from the Classroom**

**1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor: Corporate Member Council**

**Moderator: Cynthia Murphy, University of Texas at Austin**

Hear from a diverse group of recent graduates to learn why they decided to change the world as engineering students. What does it mean to these new engineers to see diversity in the classroom and how can it help to drive innovation in the workplace?

Learn what educators, academic institutions, and industry need to do to nurture creativity in high school and maintain excitement throughout the college experience. Be a part of the discussion on increasing different perspectives in the global family of engineers and innovators.

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**R466B - Corporate Member Council - Board Meeting**

**2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor: Corporate Member Council**

All attendees from CMC member companies are welcome and encouraged to attend the annual board meeting. We would love to see more of you. We will be electing our new board members, reporting on the past year’s accomplishments, and planning our future activities.

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**R469 - Building a Research Scholarship Program**

**1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE**

**Sponsor: Engineering Research Council**

**Moderator:** Carrie Berger, Purdue University at West Lafayette

**Speakers:**
- Dr. Pamela Marie Norris, University of Virginia;
- Dr. Edward J. Berger, Purdue University at West Lafayette;
- Dr. Elliot P. Douglas, University of Florida

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.
R477A - Equity and Inclusion Advocacy: Diversity, Equity & Inclusion 200
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Commission on Diversity, Equity & Inclusion
Moderators: Jean Sanders, North Carolina State University at Raleigh; Jenna Carpenter, Campbell University; Meagan Pollock, Engineer Inclusion; Lynn Albers, Hofstra University; Andrea Havercamp, Oregon State University
Speakers: Mrs. Kayla R. Maxey, Purdue University at West Lafayette; Dr. Alisha L. Sarang-Sieminski, Franklin W. Olin College of Engineering

DEI 200: 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.

R479 - ABET Session: Making an Impact on STEM Education - Become an ABET Program Evaluator!
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ABET Sponsored Sessions
Moderator: Tom Walker,
Speaker: Dr. Jennifer McFerran Brock, University of Alaska Anchorage

Each year, more than 2,000 academic administrators and faculty, industry and government officials, and technical professionals serve as ABET program evaluators, making initial accreditation recommendations and working together to ensure quality and confidence in technical education worldwide. These volunteer experts play a key role in ensuring that today’s college students are prepared to develop solutions that address some of the pressing sustainability challenges facing our planet. This session will provide important and timely information for prospective ABET Program Evaluators, including:
I) the impact of an ABET program evaluator on STEM education
II) an overview of ABET’s international growth and increasing need for program evaluators
III) the scope of program evaluator responsibilities
IV) requirements for service as an ABET program evaluator and an overview of the selection process
V) the program evaluator training process

R506 - Civil Engineering Division Planning Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division
Planning meeting to develop session ideas and draft the call for papers for the 2021 Annual Conference.

R507 - CIPD Business Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: College Industry Partnerships Division
Business meeting for anyone interested in CIPD.

R509 - Round Table 1 - COVID in the Spring
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Construction Engineering Division
Moderators: John Tingerthal, Northern Arizona University; Nicholas Tymvios, Bucknell University; Rachel Mosier, Oklahoma State University; Kimberly Talley, Texas State University

What happened in the spring of 2020? Discussion will include technologies used in the transition due to COVID-19.

R510 - CPDD Executive Board Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Continuing Professional Development Division
Business meeting of the Continuing Professional Development Division Executive Board

R517 - Engineering and Public Policy Division Business Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering and Public Policy Division
Business meeting for Engineering and Public Policy Division. Open to all, even if you are not a current member of the division.

R523A - Engineering Technology Leadership Institute
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Engineering Technology Division; Engineering Technology Council
ETLI business meeting and marketing discussion
R523B - Focus on ETAC Accreditation
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Technology Division
Meeting to address ETAC accreditation issues in preparation for the newest revision.

R526 - Experimentation and Laboratory-Oriented Studies Division Business Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Experimentation and Laboratory-Oriented Studies Division

R538 - ME Division Business Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division

R542 - Jump-start Your Grant Search: Help in Identifying and Applying for NSF Sponsored Grants
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: New Engineering Educators Division
Moderators: Katie Basinger, University of Florida; Jennifer Keshwani, University of Nebraska - Lincoln
Speakers: Michelle Camacho, National Science Foundation; Dr. Paige E. Smith, National Science Foundation; Edward Berger, National Science Foundation; Monica Cardella, National Science Foundation

R563 - Campus Rep. Business Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Campus Representatives
Campus Rep. Business Meeting

R577 - Safe Zone Level 3: Deep Dive
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: ASEE Commission on Diversity, Equity & Inclusion; First-Year Programs Division
Moderators: Karin Jensen, University of Illinois at Urbana - Champaign; Robyn Paul, University of Calgary
Speakers: Dr. Alisha L. Sarang-Sieminski, Franklin W. Olin College of Engineering; Dr. Brian P. Kirkmeyer, Miami University

The engineering education community includes educators, industry practitioners, and professional organizations working collaboratively to attract, recruit, and retain a diverse group of students in engineering who can strengthen the U.S. economy and benefit society. The National Science Foundation (NSF) supports this community through multiple programs that invest in leading-edge engineering education research that advances our understanding of teaching, learning, and institutional change in engineering education at the K-12 and college levels. NSF serves as a catalyst for divergent thinking, innovation, and collaboration among engineering faculty and practitioners, resulting in bold and innovative solutions to engineering education challenges. Determining where your research focus fits into this infrastructure can be a daunting task, especially for new engineering educators.

This mini-workshop will help direct new engineering educators toward the most appropriate opportunities available within the NSF. This session will include an overview of funding opportunities, with a focus on those in the Division of Undergraduate Education (DUE). Discussion of some of the common pitfalls will provide educators with insights that will aid them in their application process.

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.
R604 - Diversity, Equity, and Inclusion in Biomedical Engineering: Best Practices and Future Directions
5:00 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Biomedical Engineering Division
Moderators: Brian Helmke, University of Virginia; Renata Ramos, Rice University
Speakers: Dr. Brian P. Helmke, University of Virginia; Dr. Michele J. Grimm, Michigan State University; Dr. Karin Jensen, University of Illinois at Urbana-Champaign; Dr. Rachel C. Childers, University of Oklahoma; Dr. Sara Schley, Rochester Institute of Technology

Experts will present the current state and best practices related to diversity, equity, and inclusion in BME programs, then lead an active discussion to support participants interested in enhancing their programs and to identify possible areas of collaboration and opportunities to drive educational research in this field.

R606 - Civil Engineering Division Business Meeting
5:00 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division
Annual business meeting of the Civil Engineering Division. Discussion and voting on issues facing the Division.

R609 - Round Table 2 - COVID-19 in the Fall
4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Construction Engineering Division
Moderators: John Tingerthal, Northern Arizona University; Nicholas Tymvios, Bucknell University; Rachel Mosier, Oklahoma State University; Kimberly Talley, Texas State University

What will happen to our classes in the fall and how do faculty and universities expect to react?

R621 - ELD Extended Executive Committee Meeting
4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Libraries Division
Annual meeting of the Engineering Libraries Division Extended Executive Committee and interested members to debrief from the conference, discuss pressing issues, and start planning for next year’s conference.
R642A - Rx for Active Learning Success
5:00 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: New Engineering Educators Division
Moderators: Kerry Widder, Milwaukee School of Engineering; Derek Breid, Saint Vincent College
Speakers: Dr. Rebecca Brent, Education Designs, Inc; Dr. Richard M. Felder, North Carolina State University at Raleigh

Many engineering instructors have heard of active learning, but they're not really sure how to do it in their classes. Others think they know how to do it, but they often make mistakes that cause problems and are tempted to give up on it. In this highly interactive session, Drs. Rebecca Brent and Richard Felder will explore a variety of effective ways to get students actively engaged in engineering classes (both face-to-face and online) while minimizing those problems or avoiding them completely.

R642B - Pathways into Engineering Education Research: Where Do I Get Started?
4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: New Engineering Educators Division
Moderators: Robert Schaffer, Mission College; Kerry Widder, Milwaukee School of Engineering
Speakers: Dr. Kelly J. Cross, University of Nevada, Reno; Dr. Karin Jensen, University of Illinois at Urbana-Champaign; Allyson Barlow, University of Nevada Reno

In this workshop, we will explore how engineering faculty can become involved in the engineering education research community. Engineering faculty bring an important perspective to engineering education research (EER), yet they rarely receive formal training or mentorship in EER or in approaches to implement research-based instructional strategies (RBIS). STEM faculty exploring teaching innovation have been linked to improved student development and outcomes, therefore it is important to understand how engineering faculty implement EER paradigms and practices to promote synergistic activities between these two communities that result in improved teaching and learning in engineering.

The practice of conducting EER by engineering faculty requires the acquisition of skills and knowledge, engagement in the community, and overcoming barriers of implementation. Some barriers include knowledge gaps in the scholarship of teaching and learning, engagement in the community, and overcoming barriers of implementation. The workshop will address two main goals: 1) Promote strategies to identify an engineering education researcher mentor, and 2) promote approaches to establishing a relationship with an experienced engineering education researcher.

By using an interactive approach, attendees will be able to identify potential EER mentors or intellectual neighbors, discover potential collaborative relationships to become integrated into the EER community, and develop strategies for collaborating more effectively across disciplinary boundaries, including on writing grant proposals.

R656 - Military and Veterans Division Business Meeting
5:00 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Military and Veterans Division

R657 - Faculty Development Division Business Meeting
4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Faculty Development Division

This is the awesome and exciting BUSINESS MEETING of the Faculty Development Division. Everyone is welcome!

R660A - Christian Faculty Meeting
5:00 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters

Please join us for an encouraging talk from an engineering faculty member sharing about their faith within the university marketplace, followed by discussion and prayer. Faculty and students from all religious or nonreligious backgrounds are welcome.

R660B - EDC Data Committee Meeting
5:00 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters

Business meeting of the EDC Data Committee to discuss modifications to Profiles plus issues related to COVID-19.

R668 - EDC Business Meeting
4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Deans Council

Breakfast
R677 - Inclusive Practices for Implementing Collaborative Learning in Large Classes
4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Commission on Diversity, Equity & Inclusion
Moderators: Federica Robinson-Bryant, Embry-Riddle Aeronautical University - Daytona Beach; Homero Murzi, Virginia Polytechnic Institute and State University
Speaker: Dr. Brian P. Helmke, University of Virginia

As instructors of medium-to-large engineering courses (defined here as more than 50 students) move away from traditional lectures and toward evidence-based practices to support student learning, they face challenges associated with providing equitable access to learning activities. For example, students identifying with underrepresented groups, first-generation students, transfer students, women in a majority male class, and students with cognitive challenges may experience anxiety in group activities, impostor syndrome, or fear of approaching instructors for help. Students with physical challenges may be limited in their participation by modes of content delivery and physical setup or access in the classroom.

The overall goals of this workshop are to highlight challenges to successful classroom group-work activities presented by learner variability and to provide resources that support best practices for inclusive teaching in this setting. The workshop will be designed to model aspects of Universal Design for Learning (UDL) (Burgstahler, 2015; Moore, 2007). Participants will experience inclusive practices during the workshop activities. Workshop activities will include collaborative learning, interactive lecture, and a case study. The workshop facilitator has previously led workshops on group work in large courses (Helmke, 2019) and on inclusive teaching practices (Benkeser, 2019).

The workshop leader will demonstrate inclusive practices. Handouts will include prompts for workshop group activities, a list of collaborative learning techniques, reflection questions to support designing a group activity for participants’ classes, and a list of references and additional resources to support continued learning. Slides will incorporate UDL principles. The facilitator will use a microphone and will record the workshop session in case some participants cannot fully participate live. The recording will be transcribed and/or captioned using software available at the facilitator’s home institution.

R677B - CDEI Round Table Conversations on Diversity, Equity, and Inclusion
5:00 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Commission on Diversity, Equity & Inclusion
Moderators: Susan Walden, University of Oklahoma; Elizabeth Litzler, University of Washington; Rebecca Bates, Minnesota State University, Mankato
Speakers: Dr. Susan E. Walden, University of Oklahoma; Dr. Elizabeth Litzler, University of Washington; Prof. Rebecca A. Bates, Minnesota State University, Mankato

A popular session that has become a CDEI tradition, the CDEI Round Table includes conversations on a variety of topics or issues on the minds of participants. The moderator will lead a structured idea generation period, then instruct participants to move to the conversation that interests them most. Each conversation group reports to the whole group the highlights or suggested solutions that arose.

R678 - UEC: Undergraduate Experience Committee Business Meeting
4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Undergraduate Experience Committee
UEC Business Meeting
Organizers: Dr. Jerome Lavelle, Associate Dean, North Carolina State University; Dr. Jenna Carpenter, Dean, Campbell University

R711 - ASEE-CEED Social
4:30 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Cooperative and Experiential Education Division
Get to know your fellow Cooperative and Experiential Education Division (CEED) members at our evening social. This event will be available to all CEED members and invited guests.

R716 - Social: Energy Conversion & Conservation Division and Manufacturing Division
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE, TBA
Sponsors: Energy Conversion and Conservation Division; Manufacturing Division
This year, our dinner event will be online. We can talk to each other while each of us enjoys a meal.

This social event, hosted jointly by the Energy Conversion and
Conservation and Manufacturing divisions, provides an opportunity for members of these two divisions to talk about Green Energy Manufacturing and Energy Saving in Manufacturing.

We also encourage the members of other divisions to join us if interested.

### R724 - ENT Reception and Award Ceremony
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Entrepreneurship & Engineering Innovation Division

Division social with poster presentations and awards for best paper.

### R725 - Environmental Engineering Division Social
5:00 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Environmental Engineering Division

Division Social

### R727 - First-year Programs Division Social
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division

Join the First-year Programs Division members for a virtual social. This is an excellent time to meet other members of the FPD community! We will present our division awards, including Best Paper, Best Presentation from the 2019 Conference, and the FPD Distinguished Service Award.

### R729 - Joint Divisions Social Event
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Industrial Engineering Division; Engineering Economy Division; Engineering Management Division; Systems Engineering Division

Social and awards ceremony for the Industrial Engineering Division, Engineering Economy Division, Engineering Management Division, and Systems Engineering Division.

### R732 - International Division Social Event
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: International Division

The International Division invites all members of the division and those interested in becoming a member to a social gathering.

### R734 - LEES Social Event
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Liberal Education/Engineering & Society Division

Informal social gathering for members and friends of LEES.

### R739 - Mechanics Division Virtual Awards Banquet
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE, TBD
Sponsor: Mechanics Division

Members of the Mechanics Division and guests are invited to attend this online event, where we grab our favorite meal and drink, join other colleagues next to our computer screens, and enjoy our very first virtual awards banquet.

### R740 - PCEE/MIND/WIED Mixer
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsors: Minorities in Engineering Division; Pre-College Engineering Education Division

Join the Minorities in Engineering Division, Pre-College Engineering Education Division, and Women in Engineering Division for our annual social mixer.

### R742 - NEE Division Networking Social
7:00 P.M. - 9:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: New Engineering Educators Division

An opportunity to network with other new engineering educators, learn from other's experiences, and identify potential collaborators for future projects. Please join us if you would like to get involved!
F205A - Work in Progress: Hands-on Activities

10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Chemical Engineering Division

Moderators: Michael Barankin, Colorado School of Mines; Erin Jablonski, Bucknell University

Faculty Feedback on Hub-based Approach to National Dissemination of Low-cost Desktop Learning Modules
Katelyn Dahlke, Washington State University
Prof. Bernard J. Van Wie, Washington State University
Jacqueline Burgher Gartner, Campbell University
Dr. Olusola Adesope, Washington State University
Dr. Prashanta Dutta, Washington State University
David B. Thiessen, Washington State University

Work in Progress: Kinesthetic Learning of Network Mechanics Using Force Feedback Technology
Dr. Ilhem F. Hakem, Carnegie Mellon University
Mr. Richard Tang, Carnegie Mellon University
Dr. Michael R. Bockstaller, Carnegie Mellon University

Design Philosophy and System Integrity for Propagation of Hands-on Desktop Learning Modules for Fluid Mechanics and Heat Transfer
Negar Beheshti Pour, University of California - Berkeley
David B. Thiessen, Washington State University
Prof. Bernard J. Van Wie, Washington State University
Kitana Kaiphanliam, Washington State University
Aminul Islam Khan P.E., Washington State University
Dr. Prashanta Dutta, Washington State University
Mrs. Olivia Reynolds, Washington State University
Katelyn Dahlke, University of Wisconsin - Madison
Prof. Olusola Adesope, Washington State University
Olufunso Oje, Washington State University
Jacqueline Burgher Gartner, Campbell University

Work in Progress: Hands-on Learning Devices for Exposure to Biomedical Applications within Chemical Engineering
Kitana Kaiphanliam, Washington State University
Mrs. Olivia Reynolds, Washington State University
David B. Thiessen, Washington State University
Dr. Olusola Adesope, Washington State University
Prof. Bernard J. Van Wie, Washington State University

F206 - High-impact Learning Practices

10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Civil Engineering Division

Moderator: Charles Riley, Oregon Institute of Technology

This session includes papers describing high-impact learning practices (HILP), including internships, undergraduate research, and competitions.

Implementation of a Civil Engineering High-impact Learning Practice (HILP) Requirement in Support of ASCE Body of Knowledge (BOK) Outcomes
Dr. Kelly Brumbelow, Texas A&M University
Dr. Luciana R. Barroso, Texas A&M University
Greg Stadler, Texas A&M University

Analyzing the Effectiveness of Competition and Interdisciplinary Teams in Student Learning
Col. Aaron T. Hill Jr., United States Military Academy
Lt. Col. Kevin P. Arnett P.E., United States Military Academy
Cosme Alejandro Lopez Jr.
Mr. James Anthony Baglino, United States Military Academy
Mr. Nicholas Perovich, United States Military Academy
Adriel Evan Moran
Adam Thomas Hebert, United States Military Academy
Anthony Bradley, United States Military Academy

The Impact of Internships on Civil Engineering Students’ Exploration of Learning Styles
Hwangbo Bae, University of Florida
Dr. Madeline Polmear, University of Florida
Dr. Denise Rutledge Simmons P.E., University of Florida

Effective Methods to Promote Undergraduate Research in Civil Engineering
Prof. Jieun Hur P.E., Ohio State University
Prof. Nathan Hyungsk Choe, Ohio State University

F208 - Computers in Education Division Technical Session 8: Modulus Topics

10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Computers in Education Division

Moderators: Enrique Alvarez Vazquez, North Dakota State University; Ashkan Negahban, Pennsylvania State University

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.
The Effect of Person and Thing Orientation on the Experience of Haptics
  Prof. Ida B. Ngambeki, Purdue University, West Lafayette
  Dr. Alejandra J. Magana, Purdue University, West Lafayette

The Effects of Mind Maps on Computational Thinking
  Mrs. Safia Malallah, Kansas State University
  Dr. Joshua Levi Weese, Kansas State University

Work in Progress: Collect, Carve, Classify
  Dr. Aneet Dharmavaram Narendranath, Michigan Technological University

What is the Derivative of Music?
  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

F211 - Cooperative and Experiential Education Division
Technical Session 3 - Co-op Recruitment and Factors Affecting Success
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Cooperative and Experiential Education Division
Moderators: Mary Andrade, University of Louisville; Katherine McConnell, University of Colorado Boulder

This session will provide a best-practices overview of co-op recruitment and factors that affect success. This live (synchronous delivery) session will include a brief overview from each presenter, followed by an interactive question-and-answer session that allows for focused audience engagement. Before participating in this session, it is advised that the online technical session content (pre-recorded, asynchronous delivery) be reviewed.

Free ticketed event

Guiding Student Engineers in the Co-op Obtainment Process: Exploring Methods of Motivation
  Ms. Brandy Maki, Minnesota State University, Mankato
  Cody Mann, Minnesota State University, Mankato

Design-Based Research: Students Seeking Co-op in New Educational Model
  Dr. Dennis Rogalsky, Minnesota State University, Mankato
  Dr. Bart M. Johnson, Itasca Community College
  Dr. Ronald R. Ulseth, Iron Range Engineering

A Design-Thinking Approach to Increasing Student Efficacy in the Internship Search Process
  Dr. Katherine McConnell, University of Colorado Boulder

Learning to Talk the Talk – Preparing Students for Success during Internships through Communication Workshops

Exploring how Innovation Self-efficacy Measures Relate to Engineering Internship Motivations and Outcomes
  Amy Huynh, University of California, Irvine
  Dr. Helen L. Chen, Stanford University
  Dr. Krishnaswamy Venkatesh Prasad, Ford Motor Company
  Dr. Sheri Sheppard, Stanford University

F214A - Engineering Education Research Practices and Community
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach; Gwen Lee-Thomas, Quality Measures

Impact of the Emerging Engineering Education Research and Innovation Community
  Dr. Audeen W. Fentiman, Purdue University, West Lafayette
  Dr. Donna M. Riley, Purdue University, West Lafayette
  Dr. Elizabeth Litzler, University of Washington
  Dr. Jeremi S. London, Virginia Polytechnic Institute and State University
  Dr. Julia M. Williams, Rose-Hulman Institute of Technology
  Dr. Jennifer M. Case, Virginia Polytechnic Institute and State University

Understanding How Novice Indian Faculty Engage in Engineering Education Research
  Mr. Javeed Kittur, Arizona State University
  Dr. Brooke Charae Coley, Arizona State University
  Dr. Nadia N. Kellam, Arizona State University

Developing an Instrument to Measure Engineering Education Research Self-efficacy
  Javeed Kittur, Arizona State University
  Dr. Samantha Ruth Brunhaver, Arizona State University

Measuring Links Between Awareness and Implementation of Engineering Education Research in Practice
  Ms. Samantha N. Cruz, Arizona State University
  Dr. Jeremi S. London, Virginia Polytechnic Institute and State University
  Ms. Taylor Lightner, Virginia Polytechnic Institute and State University
F214B - Graduate Education Expectations, Preparation, and Pathways
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Margo Cousins, University of Texas at Austin; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Projections as Preparation for Persistence: Exploring Expectations for Engineering Graduate School
Ellen Zerbe, Pennsylvania State University
Gabriella M. Sallai, Pennsylvania State University
Dr. Catherine G.P. Berdanier, Pennsylvania State University

Nonacademic Career Pathways for Engineering Doctoral Students: An Evaluation of an NSF Research Traineeship Program
Ms. Maya Denton, University of Texas at Austin
Dr. Maura Borrego, University of Texas at Austin
Dr. Chi-Ning Chang, University of Kansas
Dr. Audrey Boklage, University of Texas at Austin
Dr. Raymundo Arroyave, Texas A&M University

Optimal Sequencing of Graduate Funding in a Chemical Engineering Department: Maximizing Completion and Persistence Rates
Ms. Maya Denton, University of Texas at Austin
Dr. Nathan Hyungsok Choe, Ohio State University
Dr. Maura Borrego, University of Texas at Austin
Dr. David B. Knight, Virginia Polytechnic Institute and State University

Examining Pathways into Graduate School through Stewardship Theory
Mr. Kanembe Shanachilubwa, Pennsylvania State University
Dr. Catherine G.P. Berdanier, Pennsylvania State University

F214C - Perspectives and Evaluation of Engineering Design Education
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Linjue Wang, Ohio State University; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Characterizing Students’ Design Strategies During Simulation-based Engineering of Sustainable Buildings
Dr. Tugba Karabiyik, Purdue University, West Lafayette

Dr. Alejandra J. Magana, Purdue University, West Lafayette
Dr. Paul Parsons, Purdue University, West Lafayette
Ms. Ying Ying Seah, Purdue University, West Lafayette

A Service-oriented Learning Approach for the Electrical Engineering Capstone Design Course
Dr. Radian G. Belu, Southern University and A&M College
Prof. Lucian Ionel Cioca, Lucian Blaga University of Sibiu
Dr. Fred Lacy, Southern University and A&M College

Evaluating the Impacts of Community Service on Student Learning Outcomes
Dr. Jennifer Lyn Benning, Virginia Tech
Miss Alexis J. Long, South Dakota School of Mines and Technology
Dr. Stuart D. Kellogg, South Dakota School of Mines and Technology
Dr. William "Bill" C. Oakes, Purdue University, West Lafayette

Developing Contextual Social Awareness in Engineering: Placing Human Diversity and Social Justice at the Center of the Engineering Process
Mrs. Greses Pérez, Stanford University
Mr. Patrick Marcel Danner, Technical University of Munich
Dr. Shannon Katherine Gilmartin, Stanford University
Dr. Carol B. Muller, Stanford University
Dr. Sheri Sheppard, Stanford University

Solution Diversity in Engineering Computing Final Projects
Ms. Sara Willner-Giwerc, Tufts University
Dr. Kristen B. Wendell, Tufts University
Prof. Chris Buergin Rogers, Tufts University
Dr. Ethan E. Danahy, Tufts University
Isabella Stuopis, Tufts University

Work in Progress: Veterinary Medicine as a Context for Student Reasoning in a Mechanical Engineering Capstone Design Course
Isabella Stuopis, Tufts University
Dr. Kristen B. Wendell, Tufts University
Dr. Melissa R. Mazan, Tufts University
F215 - New ECE Laboratories

10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Electrical and Computer Division
Moderators: Jennifer Bonniwell, Milwaukee School of Engineering; Huihui Wang, Jacksonville University

Effectiveness of Using MyFPGA Platform for Teaching Digital Logic
  Dr. Junfei Li P.E., University of Texas Rio Grande Valley
  Cara Li
  Dr. Jae Sok Son, University of Texas Rio Grande Valley
  Dr. Weidong Kuang, University of Texas Rio Grande Valley
  Mr. Edgar Gil, University of Texas Rio Grande Valley

Experience of IoT Transceiver with Affordable Software-defined Radio Platform
  Dr. Liang Hong, Tennessee State University

Development of a Printed Circuit Board Design Laboratory Course
  Dr. Pelin Kurtay, George Mason University

Designing Introductory, Hands-on, Open Source Power Electronics Lab Exercises
  Mr. Mark William Thoren, Analog Devices Inc.
  Dr. Taufik, California Polytechnic State University, San Luis Obispo

F218 - Engineering Design Graphics Division Technical Session 5

10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Design Graphics Division
Moderator: Yaël-Alexandra Monereau, University of South Florida

Extending bridges between design graphics and engineering technology.

Forming a Strong Association Between Dimensional Data in Sketches and Engineering Drawings
  Dr. Theodore J. Branoff, Illinois State University
  Dr. Kevin L. Devine, Illinois State University

Students’ Understanding of Datum Reference Frame Concepts in a GD&T Course: Student Outcomes Across Multiple Semesters
  Dr. Farshid Zabihian, California State University, Sacramento

Teaching Thermodynamics Online: Instructor and Student Perspectives
  Dr. Farshid Zabihian, California State University, Sacramento

Graded Homework vs. Quizzes on Homework Material: Impacts on Student Performance in a Thermodynamics Course
  Dr. John R. Reisel, University of Wisconsin, Milwaukee

F222 - Engineering Management Division 4: Teaching and Learning in Engineering Management

10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Management Division
Moderator: Christopher Rowe, Vanderbilt University

The second of two sessions includes papers related to curricular, classroom, and teaching improvements and innovations.

An Innovative Project-based Learning Approach to Teach Project Management
  Dr. Yi-hsiang Isaac Chang, Illinois State University
  Dr. Dave Yearwood, University of North Dakota

An Integrated Platform of Active Learning Techniques in a Supply Chain Management Program
  Dr. Jena Shafai Asgarpoor, University of Nebraska - Lincoln

Applying Systems Engineering Tools to Model a Food Justice System in an Engineering Management Course
  Dr. Sandra L. Furterer, University of Dayton

A Study of the Effectiveness of Using Hands-on Active Learning Exercises in a Production Operations Management Course
  Major Steven Hoak, United States Military Academy

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information.
F223A - ET Pedagogy III
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Technology Division
Moderator: Kevin Cook, Montana State University - Bozeman

How Extra Credit Quizzes and Test Corrections Improve Student Learning While Reducing Stress
Dr. Brian Scott Rice, Rochester Institute of Technology

Impact of Pre-lab Videos on Improving Students’ Learning Outcomes
Ms. Resmi KrishnankuttyRema, Bowling Green State University
Mr. Mikhail Shilov, Bowling Green State University

Moving an Agenda of Active Learning in Engineering Forward through a Model of Distributed Expertise
Dr. Sonia Travaglini, Stanford University
Dr. Sheri Sheppard, Stanford University
Dr. Helen L. Chen, Stanford University

Profile of Motivation in Project-based Robotics Experience
Dr. John R. Haugbery, Iowa State University

Testing Students’ Knowledge Gain in an Active Learning “Lab-similar” Environment through Pre- and Post-lab Questionnaires
Dr. Maher Shehadi, Purdue University

F223B - STEM Issues in ET II
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Technology Division
Moderator: Anne Lucietto, Purdue Polytechnic Institute

Purdue Mission to Mars 2.0: A Learn-by-Doing Approach to Recruiting
Dr. Rustin Webster, Purdue University, New Albany
Dr. Matthew Turner, Purdue University, New Albany

Math Anxiety: Engineering Technology Students’ Problem Solving through Rational or Experiential Contexts
Dr. Anne M. Lucietto, Purdue University, West Lafayette
Miss Meher Rusi Taleyarkhan, Purdue University, West Lafayette
Dr. Natalie Hobson, Sonoma State University
Therese M. Azevedo, Sonoma State University

Math Anxiety in Female and Underrepresented Minority Students: A Literature Review
Dr. Anne M. Lucietto, Purdue Polytechnic Institute
Miss Meher Rusi Taleyarkhan, Purdue Polytechnic Institute
Therese M. Azevedo, Sonoma State University

Dr. Natalie Hobson, Sonoma State University

Sensing and Measuring the Environment Workshop as Exposure to Engineering Technology for High School Students in a Summer Residential Camp
Dr. Vukica M. Jovanovic, Old Dominion University
Dr. Ottilia Popescu, Old Dominion University
Dr. Murat Kuzlu, Old Dominion University
Mujde Erten-Unal, Old Dominion University
Prof. Balša Terzić, Old Dominion University
George McLeod, Old Dominion University
Dr. Tysha Batts, Virginia Space Grant Consortium
Dr. Cynthia Tomovic, Old Dominion University

F224 - ENT Division Technical Session: EM Across the Curriculum II
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Entrepreneurship & Engineering Innovation Division
Moderator: Jason Forsyth, James Madison University

A Vertically Integrated Portfolio Process to Foster Entrepreneurial Mindset Within an Undergraduate Biomedical Engineering Curriculum
Dr. Cristi L. Bell-Huff, Georgia Institute of Technology
Dr. Kali Lynn Morgan, Georgia Institute of Technology
Prof. Joseph M. LeDoux, Georgia Institute of Technology

An Entrepreneurially Minded Learning (EML) Module Involving Global Markets for Medical Devices Implemented in an Engineering Physiology Course
Dr. Michael J. Rust, Western New England University

Work in Progress: Entrepreneurially Minded Learning in a Physiological Signals Analysis Lab
Jennifer Bailey, Rochester Institute of Technology
Dr. Michael Scott Richards

Work in Progress: Integrating the Entrepreneurial Mindset into a Software Requirements Course
Dr. Walter W. Schilling Jr., Milwaukee School of Engineering

Using the Entrepreneurial Mindset to Master Kinematics and Human Body Motion in a Biomechanics Course
Dr. Andrea T. Kwaczala, Western New England University
F227A - First-year Programs: Cornucopia #1
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division
Moderators: John Burkhardt, United States Naval Academy; Haritha Malladi, Lafayette College

Explore a wide range of topics related to first-year programs. There's a taste of everything!

Fourth Time Around: Do Classes Get Better with Instructor Repetition?
   Dr. Joshua L. Hertz, Northeastern University
   Dr. Richard Whalen, Northeastern University
   Prof. Constantine Mukasa, Northeastern University
   Dr. John Sangster P.E., Northeastern University

Work in Progress: An Evaluation of a First-year Chemical Engineering Module on Students’ Curiosity and Connectivity
   Dr. Julianne Vernon, Vanderbilt University
   Mr. Yin Huang, Vanderbilt University

Work in Progress: Incorporating Sustainable Development Fundamentals in the First-year Engineering Program
   Dr. Jorge R. Lara, Texas A&M University
   Dr. Mark Weichold, Texas A&M University
   Prof. Patrick Linke, Texas A&M University at Qatar

Work in Progress: A Holistic Approach to the First-year Engineering Experience
   Mr. Kevin J. Lindsay, University of North Carolina at Charlotte
   Mrs. Meg Harkins, University of North Carolina at Charlotte
   Dr. Rachael Ohu, University of North Carolina at Charlotte
   Mr. Sherman Mumford, University of North Carolina at Charlotte
   Mrs. Linda A. Thurman, University of North Carolina at Charlotte

Choose Your Own Adventure: Introducing Student Choice into a First-year Experience Course
   Stacie Edington, University of Michigan
   Dr. Claudia G. Cameratti-Baeza, University of Michigan
   Raven Knudsen, Kennesaw State University
   Dr. Frank J. Marsik, University of Michigan

F227B - First-Year Programs: Cornucopia #2
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division
Moderators: Michelle Jarvie-Eggart, Michigan Technological University; Jaskirat Sodhi, New Jersey Institute of Technology

Explore a wide range of topics related to First-Year Programs. There's a taste of everything!

The Impact of Depression on Academic Success and Academic Help-Seeking Attitudes
   Dr. Mary E. Goodwin, University of South Florida

Work in Progress: Parsons Problems as a Tool in the First-Year Engineering Classroom
   Brooke C. Morin, Ohio State University
   Dr. Krista M. Kecskemety, Ohio State University
   Dr. Kathleen A. Harper, Ohio State University
   Mr. Paul Alan Clingan, Ohio State University

Work in Progress: Students Find Active Learning Beneficial in Intro Programming Course
   Dr. Tonya Whitehead, Wayne State University

ACT Preparation and the Percent of Variability in First-Year Engineering Student GPA Explained by ACT Scores
   Ms. Teresa Lee Tinnell, University of Louisville
   Dr. Nora Honken, University of Cincinnati
   Dr. Patricia A. Ralston, University of Louisville

Work in Progress: Transitioning to Two Semesters: The Development of a Full-Year Cornerstone
   Ms. Uma Lakshman, NYU’s Tandon School of Engineering
   Dr. Jack Bringardner, NYU’s Tandon School of Engineering

F232 - International STEM Education: International Division Technical Session 6
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: International Division
Moderator: Sanjeev Adhikari, Kennesaw State University

This session contains papers on STEM education in South America and Africa.

Changing Third-world Lives Through STEM Education in Honduras
   Dr. Sanjeev Adhikari, Kennesaw State University

Project Drawdown
   Dr. Rachel A. Brennan, Pennsylvania State University, University Park
ASEE’S VIRTUAL CONFERENCE
FRIDAY, JUNE 26 SESSIONS

Prof. Julio Urbina, Pennsylvania State University, University Park
Prof. Jose F. Oliden, Universidad Nacional de Ingeniería
Prof. Juan Martín Rodríguez, Universidad Nacional de Ingeniería

Systematic Approach to Diversifying Botswana’s STEM Population
Dr. Cameron Denson, North Carolina State University
Dr. Tamecia R. Jones, North Carolina State University

F233A - Pre-college Engineering Education Division Technical Session 13
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Jorge Kurita, Universidad Nacional de Asunción

Computer Coding Scavenger Hunt Using Quick Response Codes (Resource Exchange)
Dr. Stephany Coffman-Wolph, Ohio Northern University
Dr. Kimberlyn Gray, West Virginia University Institute of Technology

Engaging High School Students in Building Prefabrication (Resource Exchange)
Luciana Debs, Purdue University, West Lafayette
Dr. Yunfeng Chen, Purdue University, West Lafayette
Prof. Jiansong Zhang

Enhancing STEM Education: Learning About Biomedical Engineering with 3-D Pens (Resource Exchange)
Dr. Perihan Fidan, Tennessee Tech University
Dr. Stephanie L. Wendt, Tennessee Tech University
Dr. Jeremy Wendt, Tennessee Tech University
Dr. Ismail Fidan, Tennessee Tech University

Make Way for Trains: A Community-connected Elementary Geotechnical Engineering Unit (Resource Exchange)
Dr. Chelsea J. Andrews, Tufts University
Nicole Alexandra Batrouny, Tufts University
Dr. Kristen B. Wendell, Tufts University
Dr. Tejaswini S. Dalvi, University of Massachusetts, Boston

Reservoir Rescue: A Community-connected Elementary Water Filtration Engineering Unit (Resource Exchange)
Dr. Chelsea J. Andrews, Tufts University
Nicole Alexandra Batrouny, Tufts University
Dr. Kristen B. Wendell, Tufts University
Dr. Tejaswini S. Dalvi, University of Massachusetts, Boston

F233B - Pre-college Engineering Education Division Technical Session 14
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Marcelo Caplan, Columbia College

Rosie Revere, Engineer Ecorbrick Challenge, Student-Developed Lesson Plan (Resource Exchange)
Ms. Krista Schumacher, University of St. Thomas

Teaching Concepts of ‘Scale-up’ from Chemistry to Chemical Engineering Using Process Flow Diagrams (Resource Exchange)
D’Andre Jermaine Wilson-Ihejirika P.Eng., BrainSTEM Alliance

Teaching ‘Diversity in Design’ and the Design-thinking Process Through Hands-on, In-classroom Prototyping (Resource Exchange)
D’Andre Jermaine Wilson-Ihejirika P.Eng., BrainSTEM Alliance

Code + Chords: Engaging with Coding, Music, Art, and Technology (Resource Exchange)
Alyssa Marie Eggersgluss, Playful Learning Lab
Dr. AnnMarie Thomas, University of St. Thomas
Dr. Deborah Besser P.E., University of St. Thomas
Dr. Jeff Jalkio, University of St. Thomas
Mr. Cullen Charles Kittams, University of St. Thomas
Grace Kubista

K-12 Engineering and the Next Generation Science Standards: A Network Visualization and Analysis (Resource Exchange)
René F. Reitsma, Oregon State University
Mr. Brian Gordon Hoglund, Oregon State University
Ms. Dua Chaker, University of Colorado, Boulder
Ms. Andrea Marks, Oregon State University
Dr. Michael Soltys, University of Colorado, Boulder

Work. Study. Play!
James R. McCusker, Wentworth Institute of Technology
Mr. Alex Spiro Burch
Ms. Jasmine Maya Andrade, Wentworth Institute of Technology
F234 - Sustainability and Social Responsibility
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Liberal Education/Engineering & Society Division
Moderator: Sean Ferguson, University of Virginia

Counteracting the Social Responsibility Slump? Assessing Changes in Student Knowledge and Attitudes in Mining, Petroleum, and Electrical Engineering
- Dr. Jessica Mary Smith, Colorado School of Mines
- Dr. Greg Rulifson P.E., Colorado School of Mines
- Courtney Paige Stanton
- Dr. Carrie J. McClelland P.E., Colorado School of Mines
- Emily Sarver
- Dr. Linda A. Battalora, Colorado School of Mines
- Dr. Stephanie Claussen, Colorado School of Mines
- Dr. Susan K. Peterson, Marietta College
- Dr. Nicole M. Smith, Colorado School of Mines
- Dr. Elizabeth Holley
- Dr. Rennie B. Kaunda, Colorado School of Mines

Engineering for People and Planet: A Multidisciplinary Course Proposal for Engineers on the UN Sustainable Development Goals
- Ms. Jessica Taylor, Iowa State University
- Dr. Rebekah Oulton P.E., California Polytechnic State University, San Luis Obispo

F247 - Student Division Technical Session 3
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Student Division
Moderator: Adrianne Wheeler, Project SYNCERE

When Teams Misunderstand: Ambiguous Language and Teamwork
- Ms. Elizabeth Ann Strehl, University of Michigan
- Dr. Robin Fowler, University of Michigan

Predicting Team Project Score: It’s More about Team Harmony and Less about Individual Performance
- Mr. Jeong Hin Chin, University of Michigan
- Mr. Yuan Gao, University of Michigan
- Herbert Li, University of Michigan

Mr. Magel P. Su, California Institute of Technology
Dr. Robin Fowler, University of Michigan

Gender Differences in Students’ Team Expectations and Experiences in Introductory Team-based Courses
- Margaret Carroll
- Mr. James A. Coller, University of Michigan
- Dr. Laura K. Alford, University of Michigan
- Ms. Roxanne Pinsky, University of Michigan
- Mr. Sangam Munsiff, University of Michigan
- Mr. Charles William Schertzing, University of Michigan
- Ms. Julia T. Toye, University of Michigan
- Mr. Magel P. Su, California Institute of Technology
- Dr. Robin Fowler, University of Michigan

Mentoring Undergraduate Students in Engineering
- Dr. Jayanta K. Banerjee, University of Puerto Rico, Mayaguez Campus

Paper: Using Qualitative Techniques to Understand the Types of Undergraduate Research Mentorship
- Karina Sylvia Sobieraj, Ohio State University
- Dr. Rachel Louis Kajfez, Ohio State University

F252 - Community Engagement Division Technical Session 3
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Community Engagement Division
Moderators: Juan Lucena, Colorado School of Mines; James Huff, Harding University

Building Engaged Engineering in Curriculum - A Review of Brazilian and Australian Cases
- Prof. John Bernhard Kleba, ITA - Aeronautics Technological Institute (Brazil)
- Dr. Cristiano Cordeiro Cruz, Aeronautics Technological Institute (Brazil)

Can Community Development Projects in Engineering Education Be Both Responsible and Sustainable?: Theory, Education, and Praxis
- Dr. Juan C. Lucena, Colorado School of Mines

Creation of a Paradigm Shift in Student Humanitarian Service – An Experience of One Third Century
- Dr. Robert M. Brooks, Temple University
- Mr. Sangram Shinde, Department of Mechanical Engineering, Jazan University, Jazan KSA
- Hamza Alayaydah

Parents’ Perceptions of STEM Education in Black Churches
- Dr. Whitney Gaskins, University of Cincinnati
- Dr. Tracy Pritchard, University of Cincinnati
F271 - NSF Grantees: S-STEM 2
10:20 A.M. - 10:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees
Moderators: Amber Genau, University of Alabama at Birmingham; Elizabeth Cady, National Academy of Engineering

Presentations from groups with current NSF S-STEM grants (Scholarships in Science, Technology, Engineering and Math).

Launching the Urban STEM Collaboratory
- Prof. Katherine Goodman, University of Colorado Denver
- Dr. Stephanie S. Ivey, University of Memphis
- Craig O. Stewart, University of Memphis
- Shani O’Brien, University of Colorado Denver
- Dr. Maryam Darbeheshti, University of Colorado Denver
- William Schupbach, University of Colorado Denver
- Dr. Karen D. Alfrey, Indiana University - Purdue University Indianapolis

Year 3 of an S-STEM Summer Scholarship for a Sophomore Bridge Program
- Dr. Katie Evans, Louisiana Tech University
- Mitzi Desselles Ph.D., Louisiana Tech University
- Dr. Marisa K. Orr, Clemson University

STEM Graduation Outcomes of the Rice University Emerging Scholars STEM Intervention and Summer Bridge Program
- Ms. Brittany Bradford, Rice University
- Dr. Margaret E. Beier, Rice University
- Ms. Megan McSpedon, Rice University
- Prof. Michael Wolf, Rice University
- Dr. Matthew Taylor, Rice University

CS/M Scholars Program - an NSF S-STEM Project
- David Hartenstine, Western Washington University
- Dr. Perry Fizzano, Western Washington University
- Dr. Joseph Arthur Brobst, Old Dominion University
- Dr. Elizabeth Litzler, University of Washington
- Regina Barber DeGraaff, Western Washington University

Leading Educational and Academic Directions to Enhance Retention in STEM
- Dr. Ronald B. Bucinell, Union College
- Dr. Samuel Amanuel, Union College
- Dr. Rebecca Cortez, Union College
- Dr. Holli M. Frey, Union College
- Prof. Joanne D. Kehlbeck, Union College
- Prof. Michael E. Hagerman, Union College
- Dr. David A. Cotter, Union College

An Integrated Program for Recruitment, Retention, and Graduation of Academically Talented Low-income Engineering Students
- Prof. Houshang Darabi, University of Illinois at Chicago
- Rezvan Nazempour, University of Illinois at Chicago
- Dr. Shanon Marie Reckinger, University of Illinois at Chicago
- Dr. Peter C. Nelson, University of Illinois at Chicago
- Dr. Renata A. Revelo, University of Illinois at Chicago
- Prof. Jeremiah Abiade, University of Illinois at Chicago
- Prof. Didem Ozevin P.E., University of Illinois at Chicago
- Dr. Anthony E. Felder, University of Illinois at Chicago
- Betul Bilgin, University of Illinois at Chicago
- Yeow Siow, University of Illinois at Chicago

F271B - NSF Grantees: S-STEM 1
10:00 A.M. - 10:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees
Moderators: Amber Genau, University of Alabama at Birmingham; Scott Steinbrink, Gannon University

Presentations from groups with current NSF S-STEM grants (Scholarships in Science, Technology, Engineering, and Math).

NSF S-STEM EPIC Scholarship Program
- Dr. Sara A. Atwood, Elizabethtown College
- Dr. Kurt M. DeGoede, Elizabethtown College

A Student Success Program for Engineering Undergraduate Students to Improve Retention and Graduation
- Prof. Heather Shipley, University of Texas at San Antonio
- Dr. Rena Bizios, University of Texas at San Antonio
- Dr. Krystel K. Castillo-Villar, University of Texas at San Antonio
- Prof. Ruyan Guo, University of Texas at San Antonio
- Dr. Timothy Yuen, The University of Texas at San Antonio

Comparing Effectiveness of Peer Mentoring for Direct Admit and College-Ready Freshmen
- Dr. Teresa J. Cutright, University of Akron
- Dr. Rebecca Kutz Willits, University of Akron
- Dr. Donald W. Ott
Supporting Excellent Engineers (SEE)
Dr. Daina Briedis, Michigan State University
Mr. Theodore Demetrius Caldwell, Michigan State University
Lisa Linnenbrink-Garcia, Michigan State University
Dr. Emily A. Bovee, Marquette University
Mr. Harrison Douglas Lawson, Michigan State University
Dr. Mark Urban-Lurain, Michigan State University
Alexandra Anderson Lee, Michigan State University
Ms. Amalia Krystal Lira, Michigan State University
Dr. Kristy A. Robinson, McGill University
Prof. S. Patrick Walton, Michigan State University

S-STEM Becoming Engaged Engineering Scholars (BEES): Insights from Year 1
Dr. Sura Alqudah, Western Washington University
Dr. Elizabeth Litzler, University of Washington
Dr. Joseph Arthur Brobst, Old Dominion University
Ms. Jill Davishahl, Western Washington University
Prof. Andrew G. Klein, Western Washington University

F305 - Perceptions, Reflections, Collaborations, and Student Support in Chemical Engineering
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Chemical Engineering Division
Moderators: Marina Miletic; Jennifer Pascal, University of Connecticut

Pre- and Post-Tenure: Perceptions of Requirements and Impediments for Chemical Engineering Faculty
Dr. Elif Miskioglu, Bucknell University
Dr. Nicholas Tymvios, Bucknell University
Dr. Eliana Christou, University of North Carolina at Charlotte
Dr. Benjamin B. Wheatley, Bucknell University

Student Confidence and Metacognitive Reflection with Correlations to Exam Performance in a FE Review Course in Chemical Engineering
Sheima J. Khatib, Texas Tech University
Dr. Roman Taraban, Texas Tech University
William D. Lawson P.E., Ph.D., Texas Tech University

Collaborative Project-based Learning Approach to the Enculturation of Senior Engineering Students into the Professional Engineering Practice of Teamwork
Ms. Yu Xia, Pennsylvania State University
Dr. Stephanie Cutler, Pennsylvania State University
Prof. Dawn McFadden, Pennsylvania State University

From Assessment to Research: Evolution of the Study of a

Two-Day Intervention for ChemE Sophomores
Dr. Bradley Cicciarelli, Louisiana Tech University
Eric A. Sherer, Louisiana Tech University
Baker A. Martin, Clemson University
Dr. Marisa K. Orr, Clemson University

Supporting the Mental Health and Wellness of Chemical Engineering Students at the Department and College Levels
Dr. Andrew Maxson, The Ohio State University
Dr. David L. Tomasko, The Ohio State University

F306 - Around the Water Cooler: Ideas and Issues in Civil Engineering Education
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Civil Engineering Division
Moderator: Steven Burian, University of Utah

This session includes papers covering important topics related to citizen science, the identity of an engineer and civil engineering students, understanding the identities of students leaving civil engineering, and introducing high school students to engineering.

Introducing High School Students to Engineering Disciplines: Activities and Assessment
Dr. Nicolas Ali Libre, Missouri University of Science and Technology
Dr. Stuart Werner Baur, Missouri University of Science and Technology
Dr. Mark Fitch, Missouri University of Science and Technology
Prof. William Eric Showalter P.E., Missouri University of Science and Technology

Work in Progress: Citizen Scientists’ Description of an Engineer
Dr. Kenneth Stewart, Angelo State University
Dr. Daniel Ivan Castaneda, James Madison University
Dr. Azadeh Bolhari P.E., Angelo State University

Pre- and Post-Tenure: Perceptions of Requirements and Impediments for Faculty in Civil Engineering, Architectural Engineering, and Construction Disciplines
Dr. Nicholas Tymvios, Bucknell University
Dr. Elif Miskioglu, Bucknell University
Dr. Eliana Christou, University of North Carolina, Charlotte
Dr. Benjamin B. Wheatley, Bucknell University

Leaving Civil Engineering: Examining the Intersections of Gender, Disability, and Professional Identity
Dr. Cassandra J. McCall, Virginia Tech
Dr. Marie C. Paretti, Virginia Tech
Dr. Lisa D. McNair, Virginia Tech
ASEE’S VIRTUAL CONFERENCE
FRIDAY, JUNE 26 SESSIONS

#ASEEVC

Dr. Ashley Shew, Virginia Tech
Dr. Denise Rutledge Simmons P.E., University of Florida
Ms. Courtney Zongrone, Virginia Tech

F314A - K-12 and Bridge Experiences in Engineering Education
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Hoda Ehsan, Purdue University at West Lafayette; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Measuring Student Computational Thinking in Engineering and Mathematics: Development and Validation of a Non-programming Assessment
Mr. Timothy Ryan Duckett, University of Toledo
Dr. Gale A. Mentzer, Acumen Research and Evaluation, LLC

Work in Progress: What Does it Mean to Mentor? Conceptions of Mentoring in K-12 Outreach Programs
Ms. Sabina Anne Schill, University of Colorado, Boulder
Dr. Angela R. Bielefeldt, University of Colorado, Boulder

The Use of Engineering Notebooks in an RET Experience
Dr. Matthew T. Stimpson, North Carolina State University
Dr. Jerome P. Lavelle, North Carolina State University
Dr. Laura Bottomley, North Carolina State University

Participatory Action Research (PAR) as Formative Assessment of a STEM Summer Bridge Program
Dr. Susan Thomson Tripathy, University of Massachusetts, Lowell
Prof. Kavitha Chandra, University of Massachusetts, Lowell
Diane Reichlen, University of Massachusetts, Lowell

F314B - Cognitive Skills Development
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Michele Miller, Campbell University; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Analyzing Changes in Student Graph Reasoning and Comprehension Regarding Graph Axis Presentation
Mr. Justin Cory Willis, University Of Maine
Dr. Brett D. Ellis, University of Maine

Cognitive Skills Development Among Undergraduate Engineering Students
Miss Hannah Smith, Queen's University

Dr. Brian M. Frank, Queen's University

Usability of Data Visualization Activity Worksheets in the Context of a Critical Data Visualization Workshop: Findings from a Usability Survey
Dr. Vetria Byrd Ph.D., Purdue University, West Lafayette
Dr. Kendall Roark, Purdue University, West Lafayette
Brent T. Ladd, Purdue University

Work in Progress: Intuiting Intuition Through First-year Interviews
Ms. Bria M. Booth, Embry-Riddle Aeronautical University
Dr. Elif Miskioglu, Bucknell University
Dr. Kaela M. Martin, Embry-Riddle Aeronautical University

F314C - Approaches to Encouraging Student Engagement
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division
Moderators: Ruth Ochia, Temple University; James Pembridge, Embry-Riddle Aeronautical University - Daytona Beach

Use of Adaptive Learning in an Engineering Technology Course: A Case Study
Dr. Nicole Barclay, University of North Carolina at Charlotte
Dr. Carl D. Westine, University of North Carolina at Charlotte
Angie Claris, University of North Carolina at Charlotte
Prof. Florence Martin, University of North Carolina at Charlotte

A Student Engagement Evaluation Methodology Inspired from Usability Engineering for Extracting Course Design Requirements
Ms. Sitong Wang, University of Cincinnati
Dr. Panagiotis Apostolellis, University of Virginia

Board Game Development as a Pedagogical Approach to Teaching Undergraduate Students in an Interdisciplinary Course that Addresses Contemporary Societal Issues
Michael N. Littrell, Tennessee Technological University
Dr. George Chitiyo, Tennessee Technological University
Dr. Lauren A. Michel, Tennessee Technological University
Dr. Steven R. Anton, Tennessee Technological University

Attendance and Social Interdependence in Game Development Labs
Brantly Edward McCord, Purdue University, West Lafayette
Dr. Ronald Erdei, University of South Carolina
Dr. David M. Whittinghill, Purdue University, West Lafayette
Dr. Marisa Exter, Purdue University, West Lafayette
F320 - Reimagining Engineering Ethics
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Ethics Division
Moderators: Sahithya Reddivari, Georgia State University; Nebojsa Sebastijanovic, Milwaukee School of Engineering

Ethics in Engineering or Engineering in Ethics?
Mr. Grant A. Fore, Indiana University Purdue University, Indianapolis
Dr. Justin L. Hess, Purdue University
Dr. Andrew Katz, Virginia Tech

Conceptualizing a Theory of Ethical Behavior in Engineering
Mr. Luan Minh Nguyen, Iowa State University
Dr. Cristina Poleacovschi, Iowa State University
Dr. Kasey M. Faust, University of Texas at Austin
Kate Padgett Walsh, Iowa State University
Dr. Scott Grant Feinstein, Iowa State University
Dr. Cassandra Rutherford, Iowa State University

What Can We Learn from Character Education? A Literature Review of Four Prominent Virtues in Engineering Education
Dr. Jessica Koehler, Wake Forest University
Dr. Olga Pierrkakos, Wake Forest University
Dr. Michael Lamb, Wake Forest University
Alana Demaske, Wake Forest University
Mr. Carlos Santos, Wake Forest University
Dr. Michael D. Gross, Wake Forest University
Mr. Dylan Franklin Brown, Wake Forest University

Many Facets of Imagination: What Really Matters in Engineering Ethics Instruction?
Mr. Yousef Jalali, Virginia Tech
Prof. Scott A. Civjan, University of Massachusetts Amherst

F323 - A Technology Potpourri I
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Technology Division
Moderator: Mary Johnson, Purdue University at West Lafayette

A diverse range of topics will be presented in this session.

Bioreactor Design, Automation, and Optimization - A Multidisciplinary Approach
Dr. Vassilios Tzouanas, University of Houston, Downtown
Dr. Lisa Deane Morano, University of Houston, Downtown
Steely Earl Varon Falar, University of Houston, Downtown
Hung Pham
Mr. Anish Khatiwada, University of Houston, Downtown
Mr. Jonathan Lopez

Design and Implementation of a Smart and Cost-effective Indoor Irrigation System (SCEIIS)
Dr. Reg Pecen, Sam Houston State University
Dr. Faruk Yildiz, Sam Houston State University
Megan Gibson

Expanding Engineering and Technology Opportunities to Students in the Border Region Through International Collaboration
Dr. Jesus A. Gonzalez-Rodriguez, University of Texas Rio Grande Valley
Dr. Immanuel Edinbarough P.E., University of Texas Rio Grande Valley
Ms. Adriana Rios Santiago, Texas Southmost College
Dr. Anabel Pineda-Briseño, Tecnologico Nacional de Mexico / Instituto Tecnologico de Matamoros

Using ePortfolios to Facilitate Transfer Student Success
Prof. Elaine M. Cooney, Indiana University Purdue University, Indianapolis
Elizabeth Freije, Indiana University Purdue University, Indianapolis
Ms. Mengyuan (Alice) Zhao, Indiana University Purdue University, Indianapolis

F324 - ENT Division Technical Session: Making and Maker Spaces
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Entrepreneurship & Engineering Innovation Division
Moderator: Jason Forsyth, James Madison University

"Teams Teaching Engineering": A Flexible, Hands-on Project Promoting Maker Space Usage in Large Introductory Lecture Classes
Dr. Kimberly B. Demoret P.E., Florida Tech

B-Fab: Cultivating Student Learning in the Maker Space Through Faculty Development
Dr. Margot A. Vigeant, Bucknell University
Dr. Alan Cheville, Bucknell University
Prof. Donna M. Ebenstein, Bucknell University
Matthew Lamparter, Bucknell University
Ms. Sabrina Shankar, Bucknell University
Dr. Nathan P. Siegel P.E., Bucknell University
Prof. Stu Thompson, Bucknell University
Creating a Maker Space for Crossdisciplinary Teaching and Collaboration with Limited Funding

Dr. David G. Alexander, California State University, Chico
Dr. Colleen Robb, Florida Gulf Coast University

F327A - First-year Programs: Teams and Teamwork
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division
Moderators: Robin Fowler, University of Michigan; Randy Brooks, Texas A&M University

Developing and Piloting a Survey to Assess Dissatisfaction of Women in Student Teams

Dr. Laura Hirshfield, University of Michigan
Dr. Robin Fowler, University of Michigan
Ms. Emily A. Madden, University of Michigan

Work in Progress: Structured Teamwork for Learning Equity in First-year Engineering Design

Dr. Emma Tevararwerk DeCosta, Northwestern University
Kathleen Carmichael, Northwestern University
Dr. Lisa M. Davidson, Northwestern University
Dr. Ordel Brown, Northwestern University
Elise Gruneisen, Northwestern University

Effectiveness of Techniques to Develop and Assess the Teamwork Skills of First-year Engineering Students

Dr. Jean Carlos Batista Abreu, Elizabethtown College
Dr. Brenda Read-Daily, Elizabethtown College

Work in Progress: A Study on Motivation in Teams Using Self Determination Theory

Prof. Mirna Mattjik, Colorado School of Mines
Dr. Megan Sanders, Colorado School of Mines

Work in Progress: Automating Anonymous Processing of Peer Evaluation Comments

Mr. Siqing Wei, Purdue University, West Lafayette
Mr. Rui Wang, Purdue University, West Lafayette
Dr. Matthew W. Ohland, Purdue University, West Lafayette
Dr. Gaurav Nanda, Purdue University, West Lafayette

F327B - First-year Programs: Core Skills
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: First-Year Programs Division
Moderators: Katie Cadwell, Syracuse University; Sondra Miller, Boise State University

Physics, chemistry, statics, Matlab: How do we teach them effectively?

Effectiveness of Media Modules for Blended Delivery of a Statics Course: A Preimplementation Study

Dr. Seach Chyr (Ernest) Goh P.Eng., University of British Columbia, Okanagan
Dr. Claire Yan P.Eng., University of British Columbia, Okanagan
Dr. John M. Hopkinson, University of British Columbia, Okanagan

MCS1: A MATLAB Programming Concept Inventory for Assessing First-year Engineering Courses

Ada E. Barach, Ohio State University
Connor Jenkins, Ohio State University
Ms. Serendipity S. Gunawardena, Ohio State University
Dr. Krista M. Kecskemety, Ohio State University

Increasing Motivation and Enhancing the Chemistry Enrichment Experience of Incoming Students Through the Use of Lectures Related to Chemistry in Engineering and ALEKS® System

Dr. Wujie Zhang, Milwaukee School of Engineering
Ms. Gina Elizabeth Mazzone, Milwaukee School of Engineering
Dr. Anne Alexander, Milwaukee School of Engineering
Dr. Jill Meyer, Milwaukee School of Engineering

Results of an Intro to Mechanics Course Designed to Support Student Success in Physics I and Foundational Engineering Courses

Prof. Gustavo B. Menezes, California State University, Los Angeles
Prof. Paul S. Nerenberg, California State University, Los Angeles
Ni Li, Northwestern Polytechnical University
Dr. Emily L. Allen, California State University, Los Angeles

Work in Progress: First-year Curricular Change in Engineering at a Texas A&M University Through Partnering with Physics

Dr. Anthony T. Cahill, Texas A&M University
Dr. Andrea M. Ogilvie P.E., Texas A&M University
Dr. Mark Weichold, Texas A&M University

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information.
F327C - First-year Programs: Research and Spatial Skills  
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE  
Sponsor: First-Year Programs Division  
Moderators: Leila Keyvani Someh, Northeastern University; Brooke Morin, Ohio State University  
Undergraduate research in the first year and integrating spatial skills.  
You Had Me at “Undergraduate Research”: How One Institution Achieved Incredible Results in the First Year of a Formal Program to Place Freshmen (and Sophomores) in Research Labs, While Helping Students Chip Away at the Cost of College  
Susan Elaine Benzel, Colorado State University  
Using Origami and CAD as Tools for Spatial Ability Training for First-year Female Engineering Students  
Ing. Mayari Illarrij Serrano Anazco, Purdue University, West Lafayette  
Dr. Suzanne Zurn-Birkhimer, Purdue University, West Lafayette  
Infographic Pedagogy for First-year College Students  
Asefeh Kardgar, Purdue University, West Lafayette  
Dr. Rajeswari Sundararajan, Purdue University, West Lafayette  
Work in Progress: Spatial Visualization Intervention in a First-semester Engineering Course  
Dr. Emily J. Schiavone, Viterbo University  
Exposing First-year Engineering Students to Research-based Technical Communication Through the Use of a Nanotech Project  
Cassie Wallwey, Ohio State University  
Ms. Tara Gupte Wilson, Ohio State University  
Mr. Paul Alan Clingan, Ohio State University  
Mr. Alexander James Egyed, Ohio State University  
Olivia Vick, Ohio State University  
Dr. Michael Parke, Ohio State University  
Michael Dailey, University of Michigan  
Parameterizing Major Discernment for First- and Second-year Engineering Students  
Brian J. Smith, University of Notre Dame  
Elizabeth Kerr, University of Notre Dame  
Parent and Family Influence on First-year Engineering Major Choice  
Dr. Michelle E. Jarvie-Eggart, Michigan Technological University  
Miss Amanda Marie Singer, Michigan Technological University  
Jason Mathews, Michigan Technological University  
Venturing into Discipline-specific Activities for Different Sections of the Same Introductory Engineering Design Course  
Amanda Christine Bordelon, Utah Valley University  
Dr. Susan L. Thackeray, Utah Valley University  
Dr. Sean S. Tolman, Utah Valley University  
Prof. Jane M. Loftus, Utah Valley University  
Technology Interests of First-year ECE Students  
Dr. J.W. Bruce, Tennessee Technological University  
Dr. Mahnas Jean Mohammadi-Aragh, Mississippi State University  

F327D - First-Year Programs: Major Choice  
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE  
Sponsor: First-Year Programs Division  
Moderators: John Sangster, Northeastern University; Laura Bottomley, North Carolina State University at Raleigh  
Papers about how students make decisions about their major.  
It's All About the Feels: How and Why Students' Feelings about their Engineering Program Change  
Dr. Laura Hirshfield, University of Michigan  
Stacie Edington, University of Michigan  
Michael Dailey, University of Michigan  
Parameterizing Major Discernment for First- and Second-year Engineering Students  
Brian J. Smith, University of Notre Dame  
Elizabeth Kerr, University of Notre Dame  
Parent and Family Influence on First-year Engineering Major Choice  
Dr. Michelle E. Jarvie-Eggart, Michigan Technological University  
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Venturing into Discipline-specific Activities for Different Sections of the Same Introductory Engineering Design Course  
Amanda Christine Bordelon, Utah Valley University  
Dr. Susan L. Thackeray, Utah Valley University  
Dr. Sean S. Tolman, Utah Valley University  
Prof. Jane M. Loftus, Utah Valley University  
Technology Interests of First-year ECE Students  
Dr. J.W. Bruce, Tennessee Technological University  
Dr. Mahnas Jean Mohammadi-Aragh, Mississippi State University  

F330 - Computing and Information Technology Division  
Technical Session 8  
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE  
Sponsor: Computing and Information Technology Division  
Moderators: Reza Sanati-Mehrizy, Utah Valley University; Mudasser Wyne, National University  
This session includes papers on a variety of topics pertaining to computing and information technology.  
A Real-time Attendance System Using Deep-learning Face Recognition  
Dr. Weidong Kuang, University of Texas Rio Grande Valley  
Mr. Abhijit Baul, University of Texas Rio Grande Valley  
Change of Major Policy and Its Effects  
Dr. Simeon Ntafos, University of Texas at Dallas  
Training and Teaching Students and IT Professionals on High-throughput Networking and Cybersecurity Using a Private Cloud  
Dr. Jorge Cricigno, University of South Carolina  
Prof. Elias Bou-Harb, University of Texas at San Antonio  
Mr. Elie Kfoury, University of South Carolina  
Mr. Jose Gomez, University of South Carolina  
Antonio Mangino, University of Texas at San Antonio  

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information.
Final Report on LEAP at UVU: An NSF S-STEM Project
Dr. Afsaneh Minaie, Utah Valley University
Dr. Reza Sanati-Mehrizy, Utah Valley University
Janis P. Raje, Utah Valley University

F332 - Study Abroad Experiences
Intl Div Tech Session 9
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: International Division
Moderators: Gloria Kim, University of Florida; Mary Dawson, Illinois Institute of Technology

This session discusses the challenges and benefits of study-abroad experiences, alternatives to the traditional study abroad, and an interesting tool to help students reflect on the emotional aspects of study abroad.

An Exploration of Faculty-led, Short-term Engineering Study Abroad Programs Offered by U.S. Institutions
Dr. Jessica D. Ventura, Endicott College

Critical Incident Assessment as a Tool to Reflect on Students’ Emotional Responses During International Experiences
Mr. Matthew Korey, Purdue University
Caitlyn M. Clarkson, Purdue University
Ms. Kali D. Frost, Purdue University
Mr. Joseph Andler, Purdue University
Congying Wang, Purdue University
Dr. Melissa S. Reeves, Tuskegee University
Carol A. Handwerker, Purdue University

International Experiences to Promote the Globalization of U.S. Engineering Students: Challenges, Benefits, and New Perspectives
Dr. Heather N. Yates, Oklahoma State University
Dr. Blake Wentz, Milwaukee School of Engineering
Ms. Sreemala Das Majumder, Oklahoma State University

Overcoming the Challenges to Launch a Successful Initiative of an Engineering Faculty-led Travel Course While Boosting Interdisciplinary Collaborations
Dr. Yanjun Yan, Western Carolina University
Dr. Nelson A. Granda Marulanda, Western Carolina University
Dr. B. David Tyler, Western Carolina University
Dr. Hugh Jack P.E., Western Carolina University
Mrs. Lauren R. Bishop, Western Carolina University

F333A - Pre-college Engineering Education Division Technical Session 15
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Martha Cyr, Worcester Polytechnic Institute

Effects of High School Dual-Credit Introduction to Engineering Course on First-year Engineering Student Self-efficacy and the Freshman Experience
Ms. J. Jill Rogers, University of Arizona
Dr. Amy Annette Rogers, Delaware State University
Prof. James C. Baygents, University of Arizona

Embedding Teacher Professional Learning into the Student-focused GEAR UP Engineering Summer Camp
Ryan Barlow, Utah State University
Dr. Max L. Longhurst, Utah State University
Prof. Kurt Henry Becker, Utah State University

Engineering Outreach: Ambassador Girls Empowering Girls in the Field
Dr. Sarah Hug, Colorado Evaluation and Research Consulting
Dr. Suzanne Eyerman, Fairhaven Research and Evaluation
Dr. Trina L. Fletcher, Florida International University
Dr. Araceli Martinez Ortiz, Texas State University
Dr. Michael A. Solty, University of Colorado, Boulder

Evaluating Student Success in a Pre-college General Engineering Program
Dr. Duncan Davis, Northeastern University
Mr. Matthew Burns, Northeastern University
Dr. John Sangster P.E., Northeastern University
Prof. Constantine Mukasa, Northeastern University
Brian Patrick O’Connell, Northeastern University
Elizabeth Quinn, Northeastern University
Ms. Alice Smith
Dr. Kathryn Schulte Grahame, Northeastern University

Evaluation of Engineering Problem-framing Professional Development for K-12 Science Teachers
Miss Meg E. West, Ohio State University
Dr. J. Blake Hylton, Ohio Northern University
Dr. Patrick James Herak, Ohio State University
Mr. Bruce Wellman, Olathe Engineering Academy at Northwest High School
F333B - Pre-College Engineering Education Division Technical Session 20
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Pre-College Engineering Education Division
Moderator: Madhurima Das, NuVu Studio

The Impact of Residential Engineering Summer Academies on Middle and High School Students
Dr. Venita M. White, NASA Marshall & Stennis Space Flight Centers/Texas State University
Dr. Debra Prince, Mississippi State University
Dr. Jamel Hill Alexander, DoD

The UMES Summer Transportation Institute - A Novel Approach to Engaging Minority Students in a U.S. Department of Transportation Summer Program for Careers in Transportation
Dr. Joseph O. Arumala PE, University of Maryland Eastern Shore
Dr. Joseph Nii Dodu Dodoo, University of Maryland Eastern Shore

Using an Embedded Researcher Approach to Explore Student Outcomes and Relationship Development during an Intensive Engineering Apprenticeship Program
Ms. Lori Caldwell, Utah State University
Dr. Angela Minichiello P.E., Utah State University

Influences for Engineering Majors: Results of a Survey from a Major Research University
Dr. Sandra B. Nite, Texas A&M University
Devyn Chae Rice
Rayan Tejani, Allen Academy

Valued Defiance - Teachers’ Views on STEM and Students
Dr. Johannes Strobel, University of Missouri
Dr. Alexander Franz Koch, University of Teacher Education, Fribourg, Switzerland
Mr. Hao He, University of Missouri-Columbia

Real-world Examples and Sociotechnical Integration: What’s the Connection?
Jacqueline Erickson, Colorado School of Mines
Dr. Stephanie Claussen, Colorado School of Mines
Dr. Jon A. Leydens, Colorado School of Mines
Dr. Kathryn Johnson, Colorado School of Mines
Dr. Janet Y. Tsai, University of Colorado, Boulder

Semiconductors and Society: A First-year Seminar
Prof. John A. Nestor, Lafayette College

WIP: A Case Study of Integrating Inclusive Engineering Skills into a Middle-years Biomedical Engineering Course via Model-based Reasoning
Dr. Maysam Nezafati, Georgia Institute of Technology
Ms. Mel Chua, Georgia Institute of Technology
Prof. Joseph M. LeDoux, Georgia Institute of Technology

F338 - Mechanical Engineering Technical Session: Mechatronics & Simulation
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanical Engineering Division
Moderator: Rungun Nathan, Pennsylvania State University, Berks Campus

This session will contain a variety of papers on mechatronics and simulation with a focus on best practices and practical application.

Adding a Simulation Module to a Primarily Experimental Mechanical Engineering Course
Dr. Reihaneh Jamshidi, University of Hartford
Dr. Ivana Milanovic, University of Hartford

Appropriate and Ethical Finite Element Analysis in Mechanical Engineering: Learning Best Practices Through Simulation
Dr. Benjamin B. Wheatley, Bucknell University

Building the Bridge Between Mechanical Curricula and Practical Application through a Mechatronic Project
Mrs. Lan He, Beihang University
Prof. Jingjun Yu, Beihang University

WIP: A Systems-level Approach for an Introductory Mechatronics Laboratory Course for Undergraduate Mechanical Engineering Students
Mr. Karnveer Gill, Greensea Systems Inc.
Nick Morales
Dr. David Quintero, San Francisco State University

F334 - Sociotechnical Integration
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Liberal Education/Engineering & Society Division
Moderators: Kathryn Neeley, University of Virginia; Juan Lucena, Colorado School of Mines

If Engineers Solve Problems, Why Are There Still So Many Problems to Solve?: Getting Beyond Technical “Solutions” in the Classroom
Dr. Cynthia Helen Carlson P.E., Merrimack College
Ms. Catherine Woodworth Wong, Merrimack College

This session will contain a variety of papers on mechatronics and simulation with a focus on best practices and practical application.

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WIP: A Systems-level Approach for an Introductory Mechatronics Laboratory Course for Undergraduate Mechanical Engineering Students
Mr. Karnveer Gill, Greensea Systems Inc.
Nick Morales
Dr. David Quintero, San Francisco State University
F339 - Teaching Statics: What and How?
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Mechanics Division
Moderators: Amie Baisley, University of Florida; Brian Self, California Polytechnic State University, San Luis Obispo

Does Physics Really Need to be a Prerequisite to Statics?
Dr. Amir H. Danesh-Yazdi, Rose-Hulman Institute of Technology
Dr. Aimee Monique Cloutier, Rose-Hulman Institute of Technology
Dr. Phillip Cornwell, Rose-Hulman Institute of Technology

WIP Statics Abroad: Lessons in Pedagogy from a Short-term Study Abroad Mechanics Course
David Allen Evenhouse, Purdue University at West Lafayette
Prof. Charles Morton Krousgrill, Purdue University, West Lafayette
Prof. Jeffrey F. Rhoads, Purdue University, West Lafayette
Dr. Edward J. Berger, Purdue University, West Lafayette
Prof. Jennifer DeBoer, Purdue University, West Lafayette

Who Needs the Method of Sections and the Method of Joints? Just Pick a Strategy and Define Your System!
Dr. Phillip Cornwell, Rose-Hulman Institute of Technology
Dr. Amir Hossein Danesh Yazdi, Rose-Hulman Institute of Technology
Dr. Aimee Monique Cloutier, Rose-Hulman Institute of Technology

Impact of a Sketch-based Tutoring System at Multiple Universities
Dr. Vimal Kumar Viswanathan, San Jose State University
Josh Taylor Hurt
Dr. Tracy Anne Hammond, Texas A&M University
Dr. Benjamin W. Caldwell, LeTourneau University
Dr. Kimberly Grau Talley P.E., Texas State University
Dr. Julie S. Linsey, Georgia Institute of Technology

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

Analysis of the State of Tenure-line Black Engineering Faculty in Research-intensive (R1) Institutions
Dr. Girum Urgessa P.E., George Mason University

Toward the Development of a Scale Linking Underrepresented Engineering Faculty’s Workplace Experiences and Career Outcomes
Dr. Jeremi S. London, Virginia Polytechnic Institute and State University
Dr. Stephanie G. Adams, University of Texas at Dallas
Julia Machele Brisbane, Virginia Polytechnic Institute and State University
Miss Crystal M. Pee, Virginia Polytechnic Institute and State University

F340A - Multidisciplinary Learning Experiences
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Multidisciplinary Engineering Division
Moderators: Anderson Prewitt, University of South Florida; Fan Xiong; Cynthia Barnicki, Milwaukee School of Engineering

Innovation-based Learning: Enhancing Innovative Problem Solving and Higher-order Thinking in Education Through Multidisciplinary Collaboration
Ms. Ellen M. Swartz, North Dakota State University
Mary Pearson, North Dakota State University
Ms. Lauren Singelmann, North Dakota State University
Ryan Striker P.E., North Dakota State University
Mr. Enrique Alvarez Vazquez, North Dakota State University

First-year Engineering Program Evaluation: Understanding Senior Students’ Perceptions About Their First-year Experience
Dr. Homero Murzi, Virginia Polytechnic Institute and State University
Jazmin Jurkiewicz, Virginia Polytechnic Institute and State University
Dr. Kenneth Reid, Virginia Polytechnic Institute and State University

F341A - Multidisciplinary Learning Experiences
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Multidisciplinary Engineering Division
Moderators: Anderson Prewitt, University of South Florida; Fan Xiong; Cynthia Barnicki, Milwaukee School of Engineering

Innovation-based Learning: Enhancing Innovative Problem Solving and Higher-order Thinking in Education Through Multidisciplinary Collaboration
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Dr. Homero Murzi, Virginia Polytechnic Institute and State University
Jazmin Jurkiewicz, Virginia Polytechnic Institute and State University
Dr. Kenneth Reid, Virginia Polytechnic Institute and State University
### F341B - Innovations for Multidisciplinary Programs

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Multidisciplinary Engineering Division

**Moderators:** Elise Barrella, Wake Forest University; Jack Bringardner, New York University Tandon School of Engineering

This session highlights innovations from 10 programs that have adopted the vertically integrated project model to increase collaborative and multidisciplinary engineering education. Discussion between the authors and the session attendees is expected and encouraged.

**Breaking Down the Silos: Innovations for Multidisciplinary Programs**

- Dr. Michaela E. Amoo, Howard University
- Dr. Jack Bringardner, New York University
- Prof. Jen-Yeu Chen, National Dong Hwa University
- Prof. Edward J. Coyle, Georgia Institute of Technology
- Ms. Jillana Finnegan, Boise State University
- Prof. Charles J. Kim, Howard University
- Dr. Patricia D. Koman, University of Michigan
- Ms. Magdalini Z. Lagoudas, Texas A&M University
- Dr. Donna C. Llewellyn, Boise State University
- Dr. Louise Logan, University of Strathclyde
- Julie Sonnenberg-Klein, Georgia Institute of Technology
- Dr. Nadia Millis Trent, University of Pretoria
- Dr. Scott Munro Strachan, University of Strathclyde
- Dr. Bennett C. Ward, Virginia Commonwealth University

### F342 - New Engineering Educators 3 - Grading: Grate or Great

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** New Engineering Educators Division

**Moderators:** Rebecca Reck, Kettering University; Vimal Viswanathan, San Jose State University

**A Chegg® Era Model for HW**

- Dr. Kurt M. DeGoede, Elizabethtown College
- Closing the Homework Feedback Loop Using Dual-Submission-with-Reflection Homework Methodology
  - Dr. Timothy Aaron Wood, The Citadel
  - Dr. Dan D. Nale, The Citadel
  - Dr. Ryan Kent Giles P.E., The Citadel
- Fantastic Cheats: Where and How to Find Them? How to Tackle Them?
  - Dr. Ashish D. Borgaonkar, New Jersey Institute of Technology
  - Dr. Christina Marie Zambrano-Varghese, Rutgers University-Newark
  - Dr. Jaskirat Sodhi, New Jersey Institute of Technology
  - Dr. Swapnil Moon, New Jersey Institute of Technology
- Grading by Competency and Specifications: Giving Better Feedback and Saving Time
  - Dr. Jennifer Pascal, University of Connecticut
  - Dr. Troy J. Vogel, University of Notre Dame
  - Dr. Kristina Wagstrom, University of Connecticut
- Scalable Implementation of Metacognitive Homework: Comparing Experiences at Large and Small Institutions
  - Dr. Derek Breid, Saint Vincent College
  - Ms. Tara Gupte Wilson, Ohio State University
  - Dr. Ann D. Christy P.E., Ohio State University

### F345 - Engineering Physics and Physics Division Technical Session 3

11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE

**Sponsor:** Engineering Physics and Physics Division

**Moderators:** Todd Zimmerman, ; Robert Ross, University of Detroit Mercy

**Socioeconomic and Gender Differences in Students’ Perceptions of Physics in Mexican Schools**

- Prof. Genaro Zavala, Tecnologico de Monterrey and Universidad Andres Bello
F351A - Women in Engineering Division Technical Session 5
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Women in Engineering Division
Moderators: Chrysanthe Demetry, Worcester Polytechnic Institute; Janet Callahan, Michigan Technological University

How Students View the Role of Faculty Advisors in the SWE Organization
Dr. Diane L. Peters P.E., Kettering University
Dr. Maryam Darbeheshti, University of Colorado Denver
Dr. Gloria Guohua Ma, Wentworth Institute of Technology
Dr. Karinna M. Vernaza, Gannon University
Dr. Alexa N. Rihana Abdallah, University of Detroit Mercy
Dr. Christina Remucal, University of Wisconsin-Madison
Prof. Stephanie G. Wettstein, Montana State University; MEERC

Nascent Professional Identity Development in Freshman Architecture, Engineering, and Construction Women
Dr. Andrea Nana Ofori-Boadu, North Carolina A&T State University
Mr. Victor Ofori-Boadu, Penuel Consult Inc.
Mr. Jacob Randall Vanderpool, North Carolina Agricultural and Technical State University
Dongyang Deng, North Carolina Agricultural and Technical State University

STEM Program for Female High School Students
Dr. Jiahui Song, Wentworth Institute of Technology
Dr. Douglas Eric Dow, Wentworth Institute of Technology
Dr. Gloria Guohua Ma, Wentworth Institute of Technology
Dr. Weihui Li, Biomedical Engineering, Wentworth Institute of Technology
Dr. Lili Ma, New York City College of Technology

Work in Progress: Studying the Factors Affecting Women Recruitment and Retention in Engineering
Dr. Anu Osta, Rowan University

F351B - Women in Engineering Division Technical Session 6
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Women in Engineering Division
Moderators: Jinny Rhee, San Jose State University; Kristi Shryock, Texas A&M University

Does Adding “Helping Disciplines” to Engineering Schools Contribute to Gender Parity?
Dr. Agnes Germaine d'Entremont P.Eng., University of British Columbia, Vancouver
Dr. Kerry Greer, University of British Columbia
Dr. Katherine A. Lyon, University of British Columbia, Vancouver

Women in Engineering: Promoting Identity Exploration and Professional Development
Dr. Maureen C. Smith, San Jose State University
Dr. Jinny Rhee, San Jose State University
Dr. Belle Wei, San Jose State University

A Phenomenological Exploration of Women's Lived Experiences and Factors that Influence their Choice and Persistence in Engineering
Dr. Shawn Fagan, Temple University

Developing a Meta-Model of Critical Factors for Females in STEM with Application to a Minority-serving Institution
Dr. Lourdes A. Medina, University of Puerto Rico-Mayaguez
Dr. Saylisse Davila, University of Puerto Rico-Mayaguez
Miss Olga Beatriz Rivera, Amgen Manufacturing Limited
Nolgie Oquendo-Colon, University of Puerto Rico-Mayaguez
Dr. Maria Angelica Velazquez, Montana State University

Exploring the Educational Experiences of Women Who Persisted in Engineering: A Qualitative Case Study
Courtney Green P.E.
F352 - Community Engagement Division Technical Session 4
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Community Engagement Division
Moderator: Arthur Kney, Lafayette College

Aspirations: Overcoming Barriers to Success through Pre- and Post-secondary School Partnerships
Chelsea Cefalu, Lafayette College
Dr. Arthur D. Kney, Lafayette College

Engagement in Practice: A Second Year Project-based Learning Sequence
Dr. Melissa Morris, Embry-Riddle Aeronautical University - Worldwide

Deepening Engineering Skills through Community Engaged Learning in a Sustainable Energy Systems Course
Dr. Maija A Benitz, Roger Williams University
Dr. Li-Ling Yang, Roger Williams University

Lessons Learned from a Summer Bridge Research Partnership Between a Community College and a University
Dr. Peter Golding, University of Texas at El Paso
Mrs. Helen Elizabeth Geller, University of Texas at El Paso and El Paso Community College
Dr. Diane Elisa Golding, University of Texas at El Paso
Ms. Ana Karen Jimenez Enciso, University of Texas at El Paso
Dr. Kwame Opuni, University of Houston-Downtown (Retired)
Mr. Anand Raj, University of Texas at El Paso
Mr. Mike Thomas Pitcher, University of Texas at El Paso
Ms. Carla Ann Judith Navar, University of Texas at El Paso
Prof. Paul E. Hotchkin, El Paso Community College

Professional Ethics LIVE! – A Community Partnership in Continuing Education
William D. Lawson P.E., Ph.D., Texas Tech University
Ms. Heather R. Keister PE, Freese and Nichols

F360 - FOCUS ON EXHIBITS: Virtual Showcase
12:00 P.M. - 1:00 P.M.
Sponsor: ASEE Headquarters
Live interaction with sponsors and exhibitors.

F371A - NSF Grantees: S-STEM 3
10:40 A.M. - 11:00 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees
Moderators: Amber Genau, University of Alabama at Birmingham; Valerie Carr, San Jose State University

Presentations from groups with current NSF S-STEM grants (Scholarships in Science, Technology, Engineering, and Math).

Closing the STEM Labor Gap through a Path to Graduation for Low Income, Rural Students
Dr. Paul D. Adams, University of Arkansas
Xochitl Delgado Solorzano, University of Arkansas
Dr. Wenjuo Lo, University of Arkansas
Dr. Carol S. Gattis, University of Arkansas
Jennie S. Popp Ph.D., University of Arkansas Honors College

A Summer Calculus Experience to Encourage Development of Community and Self-efficacy Building of Civil Engineering Students
Dr. Mary Katherine Watson, The Citadel
Dr. Simon Thomas Ghanat P.E., The Citadel
Dr. Timothy Aaron Wood, The Citadel
Dr. William J. Davis P.E., The Citadel
Dr. Kevin C. Bower, The Citadel
Dr. Tara Hornor , The Citadel
Dr. Ronald W. Welch P.E., The Citadel

Improving Student Success in STEM with a Student Success Coach and Intrusive Advising
Dr. Thomas G. Carter, College of DuPage
Dr. Richard H. Jarman, College of DuPage
Susan Fenwick, College of DuPage
Mr. Thomas Olai Schrader, College of DuPage
Dr. Cory Michael DiCarlo, College of DuPage

Understanding Student Retention in Engineering
Dr. Robin A.M Hensel, West Virginia University
Mr. Joseph Dygert, West Virginia University
Dr. Melissa Lynn Morris, University of Nevada - Las Vegas

A Study of the Effects of Peer Tutoring in Relation to Student GPA
Dr. Scott Steinbrink, Gannon University
Mr. Adam Finn Nogaj
Dr. Karinna M. Vernaza, Gannon University
Dr. Lin Zhao, Gannon University
Dr. Saeed Tiari, Gannon University
ASEE'S VIRTUAL CONFERENCE
FRIDAY, JUNE 26 SESSIONS #ASEEVC

F371B - NSF Grantees: REU 2
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees
Moderators: Amber Genau, University of Alabama at Birmingham; Katie Evans, Louisiana Tech University

Presentations from groups with current NSF REU (Research Experiences for Undergraduates) programs.

Outcomes and Assessment of Three Years of an REU Site in Multiscale Systems Bioengineering
Dr. Timothy E. Allen, University of Virginia

The Differences Between Individual Project and Team Project Settings in an Interdisciplinary REU Site
Dr. Hua Li, Texas A&M University, Kingsville
Prof. Kai Jin, Texas A&M University, Kingsville

An NSF REU Site with Integrated Academia-Industry Research Experience – Development, Implementation, and Lessons Learned
Dr. Zhaoshuo Jiang P.E., San Francisco State University
Dr. Juan M. Caicedo, University of South Carolina
Dr. Robert Petrulis, EPRE Consulting LLC

Expanding Summer Research Programs at an NSF ERC: Innovation, Assessment, and Adaptation
Maev Drummond Oakes, Purdue University
Kristin Everett, Western Michigan University
Dr. Michael T. Harris, Purdue University at West Lafayette
Dr. Maryanne Sydlik, Western Michigan University
Dr. Allison Godwin, Purdue University at West Lafayette

F371C - NSF Grantees: S-STEM 4
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees
Moderator: Ronald Bucinell, Union College

Presentations from groups with current NSF S-STEM grants (Scholarships in Science, Technology, Engineering, and Math).

Opportunities in Manufacturing of Advanced Materials for Second Career-Seeking Students
Dr. Oleksandr Kravechenko, Old Dominion University
Dr. Konstantin Cigularov, Old Dominion University
Tancy J. Vandecar-Burdin, Old Dominion University

Developing a Culturally Adaptive Pathway to Success: Implementation Progress and Project Findings
Dr. Eun-Young Kang, California State University, Los Angeles
Dr. Jianyu "Jane" Dong, California State University, Los Angeles
Matthew Jackson Ph.D., California State University, Los Angeles

Dr. Emily L. Allen, California State University, Los Angeles
Dr. Daniel Galvan, California State University, Los Angeles

NSF S-STEM Project Update: A Pathway to Completion for Pursuing Engineering and Engineering Technology Degrees
Dr. Kim Bullington, Old Dominion University
Dr. Cynthia Tomovic, Old Dominion University
Dr. Vukica M. Jovanovic, Old Dominion University
Dr. Anthony W. Dean, Old Dominion University
Dr. Rafael Landaeta, Old Dominion University

S-STEM Lessons Learned: Supporting Community College Transfer Pathways and Access to High-Impact Practices during Transfer Transition
Dr. Rebekah Dupont, Augsburg University
Dr. Nancy A. Rodenborg, Augsburg University

The S-STEM Program in Mathematics and Its Impact on Student Success
Prof. Tuncay Aktosun, University of Texas at Arlington
Dr. Yolanda Parker, Tarrant County College
Prof. Jianzhong Su, University of Texas at Arlington

F371D - NSF Grantees: REU 1
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: NSF Grantees Session
Moderators: Amber Genau, University of Alabama at Birmingham; Elizabeth Gross, Sam Houston State University

Presentations from groups with current NSF REU (Research Experiences for Undergraduates) programs.

Delivering Contextual Knowledge and Critical Skills of Disruptive Technologies through Problem-based Learning in a Research Experiences for Undergraduates Setting
Gurcan Comert, Benedict College
Dr. Charles E. Pierce, University of South Carolina
Dr. Zulfikar Berk, University of South Carolina
Dr. Nathan N. Huynh, University of South Carolina
Dr. Robert Petrulis, EPRE Consulting LLC
Dr. Majbah Uddin, Oak Ridge National Laboratory

Assessing the Impact of an REU Program on Students’ Intellectual Growth and Interest in Graduate School in Cybermanufacturing
Mr. Pavan Kumar Moturu, Texas A&M University
Dr. Bimal P. Nepal, Texas A&M University
Prof. Prabhakar Reddy Pagilla, Texas A&M University
Prof. Satish Bukkapatnam, Texas A&M University

REU Site on UAV Technologies: Effectiveness of the Program on Student Success
ASEE’S VIRTUAL CONFERENCE
FRIDAY, JUNE 26 SESSIONS

#ASEEVC

Dr. Subodh Bhandari, California State Polytechnic University, Pomona
Dr. Fang Tang, California State Polytechnic University, Pomona
Dr. Zekeriya Aliyazicioglu, California State Polytechnic University, Pomona
Dr. Amar Raheja, California State Polytechnic University, Pomona
Dr. Erika DeJonghe, California State Polytechnic University, Pomona

Outcomes and Lessons Learned from a NSF-REU Site on Metrology and Nondestructive Inspection
Dr. Mathew Kuttolamadom, Texas A&M University
Dr. Jyhwen Wang, Texas A&M University

F399A - SPONSOR TECHNICAL SESSION: Multi-Level Curriculum Assessment using Gradescope - Presented By: University of Illinois Urbana Champaign with Gradescope by Turnitin
11:00 A.M. - 11:20 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions

F399B - SPONSOR TECHNICAL SESSION: Quick Wins to Bring Entrepreneurial Mindset into your Courses Presented by Engineering Unleashed
11:20 A.M. - 11:40 A.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Sponsored Sessions

F413 - DEED Panel
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Design in Engineering Education Division
Moderators: Zahed Siddique, University of Oklahoma; Jessica Kuczenski, Santa Clara University

DEED Panel

F414 - FIE Steering Committee: Executive Session
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division

F415 - ECE Division Business Meeting
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Electrical and Computer Division
Annual business meeting for the ECE Division.

F416 - The Latest Research and Pedagogy in Energy Conversion and Conservation
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Energy Conversion and Conservation Division
Moderators: Seyed Mousavinezhad, Idaho State University; Chengying Xu, North Carolina State University at Raleigh; Siamak Farhad, The University of Akron
Speakers: Charles K. Alexander, Cleveland State University; Dr. Aaron St. Leger, United States Military Academy; Dr. Howard B. Rockman, The University of Illinois at Chicago; Dr. Barry D. Ganapoli, The University of Arizona; Dr. Herbert L. Hess P.E., University of Idaho; Dr. Dagmar Niebur, Drexel University

Panel members from academia, industry, and government will discuss the latest research and pedagogy in energy conversion and conservation. Smart energy systems, renewable systems, and new forms of energy conversion will be discussed, as well as teaching innovations to keep students engaged in these important engineering subject areas. This session is for those interested in academia-industry connections and in broadening participation in engineering and engineering technology.

F418 - Maker Spaces: Developing and Broadening our Knowledge, Skills, and Implications in their Value
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Design Graphics Division
Moderators: Sheryl Sorby, University of Cincinnati; Matthew Wettergreen, Rice University

Maker space’s top three benefits include:
(1) developing creativity skills;
(2) developing critical thinking and problem-solving skills; and
(3) applying knowledge to practical problems (Nagel, 2018).

Those involved in maker-space activities have also been found to collaborate more with others and to have gained confidence in their abilities. This participatory panel session focuses on recognizing, sharing, and developing our knowledge, skills, and implications associated with

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information.
the value of maker spaces. While not inclusive, this session also examines maker-space ideas, definitions, purpose, materials, activities, locations, furniture, and all that make maker spaces and their impact.

**F422 - Faculty Advancement Panel**

1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsors: Engineering Management Division; Faculty Development Division

Moderator: Jena Asgarpoor, University of Nebraska - Lincoln

Speakers: Prof. Edward A. Pohl, University of Arkansas; Dr. Adrienne Minerick, Michigan Technological University; Dr. Elizabeth G. Jones, University of Nebraska - Lincoln; Dr. Matthew W. Ohland, Purdue University at West Lafayette

Description:

Academic leaders at the program director level and higher from various institutions will share their perspectives, insights, and advice to inform and assist individuals interested in learning about the general processes and procedures for academic promotion, achieving tenure, and building a research portfolio in support of academic advancement.

Goals:

To capture advice and insights from seasoned academic professionals on the subject of tenure, and professional-track faculty advancement and success.

Questions such as the following will be entertained:

- Advice for junior faculty as they start their academic career
- What does a successful first year look like?
- Major mistakes made by junior faculty
- Advice for professional-track faculty
- Balance between work (research, teaching, service) and life

**F433 - Pre-College Engineering Education Division Session II**

1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Pre-College Engineering Education Division

Moderators: Andrea Burrows, University of Wyoming; Bradley Bowen, Virginia Polytechnic Institute and State University

F436 - Activities with Impact

2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Materials Division

Moderators: Lessa Grunenfelder, University of Southern California; Alison Polasik, Ohio State University

Members of the Materials Division will share in-class or online activities/demos used to teach topics in materials science. Participants will describe or show an activity/demo and discuss facilitation and student feedback. Presentations will be approximately 5-10 minutes each, followed by group discussion.

**F440A - MIND Business Meeting**

2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Minorities in Engineering Division

Annual business meeting for the Minorities in Engineering Division. Election results to be shared.

**F450 - TYCD Business Meeting**

2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Two-Year College Division

Two-Year College Division annual business meeting

**F452 - Community Engagement Division Business Meeting**

2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: Community Engagement Division

Business meeting to discuss the yearly activities of the division and the PIC. Topics include the division financials, activities at the Annual Conference, election of division officers, and any new business.
F457 - Effective Design of Faculty Development Workshop for Equity-mindset and Inclusion
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Faculty Development Division
Moderators: Daniel Galvan, California State University, Los Angeles; Stephanie Cutler, Pennsylvania State University; Jianyu Dong, California State University, Los Angeles
Speakers: Dr. Daniel Galvan, California State University, Los Angeles; Jane Dong; Dr. Lizabeth T. Schlemer P.E., California Polytechnic State University, San Luis Obispo

Background:
The Teaching and Learning Academy (TLA) has been offered at California State University, Los Angeles through the College of Engineering, Computer Science, and Technology for five years. This university is a predominately Latinx state university in a large metropolitan area. Many engineering students come from under-served high schools and the faculty often express a frustration with the level of their academic preparation. As part of an effort to help our faculty meet the students where they are, TLA provided a summer workshop focusing on equity and asset-based mindsets, as well as strategies to enhance student learning by leveraging their strengths. TLA also includes monthly gatherings throughout the academic year with the participants in order to build a community and a culture of innovation in Engineering Education. The TLA workshop received overwhelmingly positive feedback from the faculty participants because of the following elements: 1) inclusive design of the workshop for Math, Science and Engineering faculty and professional advisors who can offer broad and diverse perspectives of students’ learning characteristics; 2) reflective and interactive activities that resonate with the participants’ own educational experiences; and 3) demonstration of teaching strategies using Yosso’s Cultural Wealth Model.

Purpose:
Our proposed special session will show how the workshop was designed and conducted in a “demonstration.” Participants will gain direct experience with an engaging workshop that helps faculty rethink their own models of instruction through deep reflection and begin to shift from a deficit orientation of students to one of assets. At the end of the special session, the participants will achieve the following learning goals:

1) Develop a good understanding of effective strategies in designing a faculty development workshop on a topic that could be controversial
2) Gain knowledge about Yosso’s Community Cultural Wealth Model and experience activities that help to bridge the cultural gap between faculty and Latinx students
3) Gain insights/ideas of reflective and interactive activities that can be implemented in the participants’ own institution.

F460A - Accreditation Activities Committee
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters
Accreditation Activities Committee

F460B - Joint ASEE EDC Diversity and Data Committee Meeting
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters
Joint meeting of the EDC Diversity and EDC Data Committees to discuss collaborations.

F460C - External Session Please See Description - ASEE 2021 Program Chair Orientation
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters
This meeting will take place separately from the ASEE Virtual Conference. New and current program chairs will be contacted directly with meeting details.

F466 - INDUSTRY DAY: Preparing Students for Transformative Technology
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Corporate Member Council
Moderators: David Pistrui, University of Detroit Mercy; PJ Boardman, MathWorks
Mega-trends like Artificial Intelligence, Internet of Things, and 5G will change profoundly the way future engineers apply theory to applications like Industry 4.0, autonomous vehicles and health care. How will educators adapt engineering curricula to prepare students for areas that were science fiction but a decade ago?
Join a panel of educators, policymakers and industrial leaders to see how they recommend enhancing engineering curricula to address the needs of future innovators.
F477 - Expanding Resources that Connect Diversity, Equity, Access, and Inclusion with Ethics Education
2:00 P.M. - 3:00 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsors: ASEE Commission on Diversity, Equity & Inclusion; Engineering Ethics Division; Liberal Education/Engineering & Society Division; Engineering Technology Council; Minorities in Engineering Division

Moderators: Elizabeth Cady, National Academy of Engineering; Jean Sanders, North Carolina State University at Raleigh

Speakers: Dr. Rosalyn W. Berne, National Academy of Engineering; Prof. Rebecca A Bates, Minnesota State University, Mankato; Dr. Michael C. Loui, University of Illinois at Urbana-Champaign

Formally connecting ethics to issues of diversity, equity, and inclusion has value, particularly in supporting how engineering programs consider assessment of new ABET Student Outcomes 4 and 5. Outcome 5 includes the phrase, “create a collaborative and inclusive environment.” Without the ability to do this, it is very difficult to achieve ethical design outcomes because diverse perspectives and voices may be excluded.

The goal of this session is to collaboratively consider the intersection of engineering ethical responsibility and the values of diversity, equity, access, and inclusion. The Online Ethics Center (OEC), a digital library maintained by the National Academy of Engineering’s Center for Engineering Ethics and Society and funded by the National Science Foundation, contains resources that support ethics education and assessment across STEM fields. Unfortunately, most engineering cases on the OEC address “traditional” ethical issues about product failure and conflicts of interest. This session will provide a framework to develop materials that broadly support engineering education practitioners in teaching and practicing ethics from a diversity, equity, access, and inclusion perspective.

OEC’s challenge is how to engage diverse audiences in use of the site; something formative evaluation shows has not yet been done sufficiently. The most recently NSF funded OEC project Transforming Ethics Education: Connecting STEM Faculty, Research Administrators, and Ethics Education Resources through the Online Ethics Center, aims to engage two new audiences for the site: RCR (responsible conduct of research) administrators and STEM faculty new to teaching ethics. Specific program goals include reaching diverse audiences within those two groups, in addition to the general and ongoing use of the site by students and faculty. Other goals include drawing in an international audience and expanding resources that are relevant to these audiences.

Many of the OEC’s goals align with the vision of the Commission on Diversity, Equity, and Inclusion. However, these goals have been challenging to achieve with limited resources. Searches for the following key words or phrases among the engineering resources on the OEC site returned only two relevant resources: Diversity (one bibliography resource); equity, inclusion, access (multiple hits for access to data, but none related to accessibility in design or access to education); and social impact, disability (one case study on addressing a learning disability in a lab).

Along with the goals that can support the professional development of session participants in connecting diversity issues with ethics, this session aims to have a space where underrepresented groups and people with expertise in DEI are explicitly invited to support the ethical development of engineers by creating awareness of the need for additional resources and familiarity with the processes for contributing resources. This is one way to expand the community of practice related to ethics training within engineering and to further the Commission’s long-term goals of creating a more equitable field and more equitable academic experiences for all prospective engineers.

The format of the session will be a combination of interactive workshop and roundtable discussion, with the bulk of idea generation in the form of small group discussions based on participants’ interests and experiences.

Potential working groups include:

• Positive cases where diverse perspectives are included
• Negative cases where diverse perspectives are excluded
• User-centered design
• Social justice actions by engineers
• Social impact of engineering designs
• Climate and culture within engineering education
• Climate and culture within engineering industry
• Hiring practices within engineering education and/or industry
• Recruitment of diverse perspectives for engineering design

Note that participants are likely to translate these suggestions into topics that resonate with them and will find innovative ways of moving forward in this space.

F479 - ABET SESSION: ABET Conducts Remote Program Accreditation Reviews in 2020 - 2021
1:00 P.M. - 1:30 P.M., ONLINE, A VIRTUAL CONFERENCE

Sponsor: ABET Sponsored Sessions

Moderator: Tom Walker,

Speakers: Dr. Joseph L. Sussman, ABET; Ms. Jane Emmet, ABET

This session will summarize how best to address ABET accreditation within the context of academic program response to the novel coronavirus COVID-19 pandemic.

ABET’s Chief Accreditation Officer, Dr. Joe Sussman, and Senior Director of Accreditation Operations, Jane Emmet, will discuss modifications to ABET operations and how these modifications will affect program reviews, acknowledging the current delivery changes to academic programs that have affected teaching and learning.

In addition, Dr. Sussman and Ms. Emmet will answer questions regarding how best to prepare for ABET accreditation given the current status of
academic program offerings at institutions around the globe.

This session will summarize recent updates, and we especially encourage participation from programs with ABET visits planned for Fall 2020. Please bring your ABET leaders to this session.

F501 - ASEE Aerospace Division Business Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Aerospace Division

ASEE Aerospace Division Business Meeting

F508 - Computer-based Testing Facility (CBTF)
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Computers in Education Division
Moderators: Afrin Naz, West Virginia University Institute of Technology; Walter Schilling, Milwaukee School of Engineering

The Computer-based Testing Facility (CBTF) has been operating at Illinois for over five years and was highlighted by our recent ABET visit as a novel facility that other (large) engineering colleges should know about. It is a pair of computer labs that we proctor 12 hours each day, seven days a week. Students make reservations within a three-day period to take sophisticated, randomized computer-based exams. This fall semester, we’re projecting that we’ll run 75,000 exams to 8,600 unique students serving 35 of the largest courses in Engineering and Computer Science.

We would present: (1) An overview of the facility and its philosophy; (2) salient details related to question/exam construction, security, testing accommodations, and cost; (3) findings from pseudo-experimental research studies that demonstrate improved student course performance; and (4) faculty experiences using the CBTF. The session will summarize and synthesize the findings from a series of previous conference and journal publications.

F514 - FIE Planning Committee Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Educational Research and Methods Division

F516 - ECCD Business Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Energy Conversion and Conservation Division

This meeting is to discuss ECCD matters with the officers and members.

F541 - Multidisciplinary Engineering Division Business Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE, TBA
Sponsor: Multidisciplinary Engineering Division

Get involved in the MULTI Division. The business meeting is open to all interested ASEE members.

F545 - Executive Business Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Physics and Physics Division

Meeting of Engineering Physics and Physics Division officers to discuss ongoing matters of interest.

F560A - Equity, Culture & Social Justice in Education Constituent Committee
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters

F560B - ASEE Projects Board Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters

F560C - ASEE New Division & Section Officers Orientation - External Session
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters

This meeting will take place separately from the ASEE Virtual conference. New Division officers will be contacted directly with meeting details.

F569 - ERC Board Meeting
3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: Engineering Research Council

Board Meeting of the Engineering Research Council.
### ASEE’s Virtual Conference
#### Friday, June 26 Sessions

**F577 - Equity and Inclusion Advocacy: Diversity, Equity, and Inclusion 300**

*3:00 P.M. - 4:00 P.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** ASEE Commission on Diversity, Equity & Inclusion

**Moderators:** Bruce Neville, Texas A&M University; Elizabeth Litzler, University of Washington; Lynn Albers, Hofstra University; Andrea Haverkamp, Oregon State University

**Speakers:** Prof. Bruce Neville, Texas A&M University; Dr. Meagan C. Pollock, Engineer Inclusion

This participant-focused session is for individuals who have already begun significant self and organizational work to grapple with concepts like diversity, equity, inclusion, and privilege, and perhaps have begun to interrogate how dominant systems operate within our culture (engineering and larger) to maintain power structures. To be DEI advocates, we must also form a community with the ability to talk about DEI issues. To empower and equip those who wish to take a more active role in advocating DEI within their spheres of influence, the focus of this session will be for participants to engage in deeper conversations based on their own needs and experiences.

**F605 - Open Mic Session**

*4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** Chemical Engineering Division

**Moderator:** Matthew Cooper, North Carolina State University at Raleigh

**F614 - FIE Steering Committee: Open Session**

*4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** Educational Research and Methods Division

**F622 - EMD Business Meeting**

*4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** Engineering Management Division

Business meeting of the Engineering Management Division

**F623 - Journal of Engineering Technology Board Meeting**

*4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** Engineering Technology Division

Summer meeting of the JET publications board.

**F639 - Mechanics Division Business Meeting**

*4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** Mechanics Division

**F642 - New Engineering Educators Division Business Meeting**

*4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** New Engineering Educators Division

Please join us as we decide on the future and direction of our New Engineering Educators Division.

**F645 - Business meeting**

*4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** Engineering Physics and Physics Division

Engineering Physics and Physics general business meeting.

**F646 - Software Engineering Division Business Meeting**

*4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** Software Engineering Division

This business meeting is open to all ASEE members interested in software engineering. We will elect officers for any vacancies, obtain feedback about the conference, and plan next year’s conference.

**F660A - JEE Editorial Board Meeting**

*4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE*

**Sponsor:** ASEE Headquarters
F660B - Advances in Engineering Education Editorial Board Meeting
4:00 P.M. - 5:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Headquarters

W758 - PRESIDENT’S FAREWELL RECEPTION and Passing of the Gavel
5:00 P.M. - 6:00 P.M., ONLINE, A VIRTUAL CONFERENCE
Sponsor: ASEE Board of Directors

Join us as we say goodbye to ASEE President Stephanie Adams and welcome President-Elect Sheryl Sorby.
# ASEE's Virtual Conference

## Sponsor Groups

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W206B Integrating Sustainability and Resilience Concepts into Courses
W306A Making it Sticky: Ways to Reinforce Prerequisite Knowledge
W306B Flipped, Blended, Online, Oh My
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R507  CIPD Business Meeting

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W752  Celebration of Engagement: Community Engagement Division Social

### Computers in Education Division

M208  Computers in Education Division Technical Session 1: Topics Related to Engineering
M308  Computers in Education Division Technical Session 2: Teaching and Learning
T208  Computers in Education Division Technical Session 9: Pedagogical Tools
T308  Computers in Education Division Technical Session 3: Digital Learning Part I
T508  CoED Division Business Meeting
W208  Computers in Education Division Technical
Session 4: Digital Learning Part II

W308A  Computers in Education Division Technical Session 5: Online Teaching and Learning

W308B  Computers in Education Division Technical Session 6: Computer Science Freshman Courses

R308A  Computers in Education Division Technical Session 10: STEM Outreach

R308B  Computers in Education Division Technical Session 7: Advanced CS courses

R308C  Computers in Education Division Technical Session 11

F208  Computers in Education Division Technical Session 8: Modulus Topics

F508  Computer-based Testing Facility (CBTF)

### Computing and Information Technology Division

M330A  Computing and Information Technology Division Technical Session 1

M330B  Computing and Information Technology Division Technical Session 2

T330A  Computing and Information Technology Division Technical Session 9

T330B  Computing and Information Technology Division Technical Session 3

W330  Computing and Information Technology Division Technical Session 4

W448  The Many Facets of Cyber- and Systems-security Engineering Education

R230  Computing and Information Technology Division Technical Session 5

R330A  Computing and Information Technology Division Technical Session 6

R330B  Computing and Information Technology Division Technical Session 7

R430  Computing and Information Technology Business Meeting

F330  Computing and Information Technology Division Technical Session 8

### Construction Engineering Division

M202  Architectural Engineering Division Technical Session 1

M302  Architectural Engineering Division Technical Session 2

T202  Architectural Engineering Division Technical Session 3

W209  Construction Engineering Division Technical Session 2

W709  Construction Division Social - canceled

R309A  Construction Engineering Division Technical Session 4

R309B  Construction Engineering Division Technical Session 5

R409  Construction Engineering Division Business Meeting

R509  Round Table 1 - COVID in the Spring

R609  Round Table 2 - COVID-19 in the Fall

### Continuing Professional Development Division

W510  CPDD Executive Board Meeting

R310A  CPDD Session 1 - Generating Intellectual Excitement for Professional Learners

R310B  CPDD Session 2 - Professional Development - Where Are We Going?

R510  CPDD Executive Board Meeting
## Cooperative and Experiential Education Division

- **M211** Cooperative and Experiential Education Division Technical Session 4 - Innovating Engineering Education through Industry and Community Partnerships, Maker Spaces, Competitions, Research Initiatives, and Experiential Education
- **M311** Cooperative and Experiential Education Division Technical Session 2 - Development, Assessment, and Impact of Experiential Education
- **M411** Joint Panel: Innovating Engineering Education to Transform the Future
- **M417** The Engineer of 2020: Realizing the Vision?
- **T411A** Joint Panel: Moving Engineering Forward with Micro-Mobility
- **T411B** Joint Panel: Developing a Talent Pipeline through Cooperative/Experiential Education in Applied Research
- **W311** Cooperative and Experiential Education Division Technical Session 1 - Skill and Competency Development through the Co-op Experience
- **W411A** Joint Panel: Leveraging Experiential Education to Become an International Engineering Education Leader
- **W411B** DISTINGUISHED LECTURE: Continued Conversation - Social Disruption of Emerging Technologies and Implications for Engineering Education
- **R411** Joint Panel: Leveraging Experiential Education to Become an Engineering Education Leader
- **R711** ASEE-CEED Social
- **F211** Cooperative and Experiential Education Division Technical Session 3 - Co-op Recruitment and Factors Affecting Success

## Corporate Member Council

- **W766** INDUSTRY DAY: CMC and CIPD Virtual Kick-off
- **R466A** INDUSTRY DAY: Hearing from Diverse Voices from the Classroom
- **R466B** Corporate Member Council - Board Meeting
- **F466** INDUSTRY DAY: Preparing Students for Transformative Technology

## Council of Sections

- **T567A** PNW Section Mixer
- **T567B** Zone I Business Meeting
- **T567C** Zone II Business Meeting
- **T567D** Zone III Business Meeting
- **T567E** Zone IV Business Meeting
- **T567F** Council of Sections Meeting
- **W567** Best Zone Paper

## Design in Engineering Education Division

- **M213A** Capstone Design Practices
- **M213B** Design Methodologies 1
- **M313A** Capstone Pedagogy
- **M313B** Design Methodologies 2
- **T213A** Maker Spaces in Design Education
- **T213B** Design Mental Frameworks
- **T313A** Best In DEED
- **T513** DEED Business Meeting
- **W213A** Design Across Curriculum 1
- **W213B** Empathy and Human-Centered Design 1
- **W313A** Design Across the Curriculum 2
- **W313B** Design Teams 1
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**F314A** K-12 and Bridge Experiences in Engineering Education
**F314B** Cognitive Skills Development
**F314C** Approaches to Encouraging Student Engagement

**F414** FIE Steering Committee: Executive Session
**F514** FIE Planning Committee Meeting
**F614** FIE Steering Committee: Open Session

## Electrical and Computer Division

**M215A** Curricular Advancements in ECE
**M315B** Insights for Teaching ECE Courses
**M315** Assessment of Learning in ECE Courses
**M415** PANEL: Research from NSF RED ECE Departments
**M451** Managing Dual Careers

**T215** Capstone, Undergraduate Research, and Projects in ECE
**T315** Embedded Systems and Cybersecurity in ECE

**W215** Improvements in ECE Circuit Analysis
**W315** Course Transformation in ECE
**W448** The Many Facets of Cyber- and Systems-security Engineering Education
**W715** ECE Division Networking Social

**R315A** New Developments in ECE
**R315B** Active and Cooperative Learning in ECE
**F215** New ECE Laboratories

**F415** ECE Division Business Meeting

## Energy Conversion and Conservation Division

**M216** ECCD - Technical Session 1 - Energy & Electrical Engineering
**M416** Innovations in Energy, Environment, and Engineering Education

**T216** ECCD - Technical Session 2 - Solar Energy
**T316** ECCD Technical Session 3: Energy and Multidisciplinary

**T335** Green Energy Manufacturing and Sustainable Energy Management
**T416** ECC and Manufacturing Divisions - NSF Guest Speaker Session

**W216** ECCD Technical Session 4: Energy and Analysis
**W316** ECCD Technical Session 5: Energy and Wind and Design

**W416** DISTINGUISHED LECTURE: Smart Energy: Opportunities and Challenges

**W716** Virtual Tour - Energy Facilities
**R716** Social: Energy Conversion & Conservation Division and Manufacturing Division

**F216** ECCD - Technical Session 6 - Energy & Thermodynamics
**F416** The Latest Research and Pedagogy in Energy Conversion and Conservation

**F516** ECCD Business Meeting

## Engineering Deans Council

**W568A** EDC Public Policy Committee Meeting
**W568B** EDC Executive Board Meeting
**R668** EDC Business Meeting

## Engineering Design Graphics Division

**M218** Engineering Design Graphics Division Technical Session 4
**M417** The Engineer of 2020: Realizing the Vision?

**T318** Engineering Design Graphics Division Technical Session 1
**T518** EDGD Executive Committee Meeting
**W318** Engineering Design Graphics Division Technical Session 2

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
W518  Engineering Design Graphics Division Business Meeting
R318  Engineering Design Graphics Division Technical Session 3
F218  Engineering Design Graphics Division Technical Session 5
F418  Maker Spaces: Developing and Broadening our Knowledge, Skills, and Implications in their Value

### Engineering Economy Division

T519  Engineering Economy Division Business Meeting
R319  Engineering Economy Division Technical Session 1
R729  Joint Divisions Social Event

### Engineering Ethics Division

M320  New Media for Ethics Education
T220  Research on Engineering Ethics Education and Practice
T320  Assessing Ethics Learning
W220  Ethical Reasoning and Decision Making
W320A  Innovating Ethics Curriculum and Instruction
W320B  Ethical Design
W477B  DISTINGUISHED LECTURE: Indigeneering Engineering Education: Welcoming Indigenous Knowledge and Wisdom with Integrity
W520  Engineering Ethics Division Business Meeting
R320  New Areas of Ethical Inquiry
F320  Reimagining Engineering Ethics
F477  Expanding Resources that Connect Diversity, Equity, Access, and Inclusion with Ethics Education

### Engineering Leadership Development Division

T355  Engineering Leadership Skills Development Across the Undergraduate-to-Workforce Transition
T455  We The North: Engineering Leadership Programs in Canada
W555  LEAD Division Business Meeting
W755  LEAD Division Social
R255  Designing and Implementing Leadership Development Experiences for Engineering Students

### Engineering Libraries Division

M221  Information Literacy in First-year Courses and Co-curricular Experiences
M321  Improving and Understanding Engineering Collections and Publication
M421  ELD Lightning Talks 1
T221  Engineering Librarian Collaborations in the Library, On Campus, and Beyond
T421  Metrics and Measuring Research Impact: What Engineering Librarians Really Need to Know
T521  ELD Round Table Discussions
W221  Professional Issues and Opportunities for Engineering Librarians
W321  Assessing, Expanding, and Innovating Information Literacy
W421  ELD Lightning Talks 2
W521  Engineering Libraries Division Annual Business Meeting
R321  Opening Up: Data, Open Access, and Open Educational Resources
R621  ELD Extended Executive Committee Meeting
### ASEE’s Virtual Conference

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**Engineering Management Division**
- W222 Engineering Management Division 1: The Practice of EMD
- W322 EMD 2: Issues in Engineering Management Education
- R319 Engineering Economy Division Technical Session 1
- R322 Engineering Management Division 3: Teaching and Learning in Engineering Management
- R622 CEMAL Meeting
- R729 Joint Divisions Social Event
- F222 Engineering Management Division 4: Teaching and Learning in Engineering Management
- F422 Faculty Advancement Panel
- F622 EMD Business Meeting

**Engineering Research Council**
- M417 The Engineer of 2020: Realizing the Vision?
- R469 Building a Research Scholarship Program
- F569 ERC Board Meeting

**Engineering Technology Council**
- W477B DISTINGUISHED LECTURE: Indigeneering Engineering Education: Welcoming Indigenous Knowledge and Wisdom with Integrity
- W523C Engineering Technology National Forum
- R423 Engineering Technology Council
- R523A Engineering Technology Leadership Institute
- F477 Expanding Resources that Connect Diversity, Equity, Access, and Inclusion with Ethics Education

**Engineering Technology Division**
- M223A ET Pedagogy I
- M323A New Directions for ET
- M323B Capstone/ET Projects I: Electrical and Computer Focus
- M417 The Engineer of 2020: Realizing the Vision?
- T323A Capstone/ET Projects III - Mechanical and Manufacturing Focus
- T323B Capstone/ET Projects II - General
- T523B ECET Dept Heads Meeting
- T523C ETD Executive Board
- W323 STEM Issues in ET
- W523A MET Department Heads
- W523C Engineering Technology National Forum
- W523B Tau Alpha Pi Meeting

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Schedule subject to change. Please go to [www.asee20.pathable.co](http://www.asee20.pathable.co) for up-to-date information.
## Entrepreneurship & Engineering Innovation Division

- **M24** ENT Division Technical Session: EM Across the Curriculum I
- **M324** ENT Division Technical Session: First-year Experiences
- **M417** The Engineer of 2020: Realizing the Vision?
- **T324** ENT Division Technical Session: Creativity and Innovation
- **W324** ENT Division Technical Session: Entrepreneurship and IP
- **R224** ENT Division Technical Session: Assessment Tools and Practices
- **R324** ENT Division Technical Session: Competitions, Challenges, and Teams
- **R424** ENT Business Meeting
- **R724** ENT Reception and Award Ceremony
- **F224** ENT Division Technical Session: EM Across the Curriculum II
- **F324** ENT Division Technical Session: Making and Maker Spaces

## Engineering and Public Policy Division

- **M417** The Engineer of 2020: Realizing the Vision?
- **T717** Engineering and Public Policy Social
- **W217** Engineering and Public Policy Division Technical Session 1
- **W411B** DISTINGUISHED LECTURE: Continued Conversation - Social Disruption of Emerging Technologies and Implications for Engineering Education
- **R517** Engineering and Public Policy Division Business Meeting
- **F417** Expanding Resources that Connect Diversity, Equity, Access, and Inclusion with Ethics Education

## Environmental Engineering Division

- **M225** Emphasizing Communication and the Humanities in Environmental Engineering
- **M417** The Engineer of 2020: Realizing the Vision?
- **M425** Innovative Development for Various Faculty Lines
- **T325** A Focus on Sustainability
- **T506** Best in 5 Minutes: Demonstrating Interactive Teaching Activities
- **W225** Inventive Opportunities for Research and Exposure
- **R225** Innovative Approaches to Improving Student Learning
Experimentation and Laboratory-oriented Studies Division

R625 Environmental Engineering Division Business Meeting
R725 Environmental Engineering Division Social Experimentation and Laboratory-oriented Studies Division Technical Session 1
M326 Experimentation and Laboratory-oriented Studies Division Technical Session 6
T326 Experimentation and Laboratory-oriented Studies Division Technical Session 2
W226 Experimentation and Laboratory-oriented Studies Division Technical Session 3
W326 Experimentation and Laboratory-oriented Studies Division Technical Session 4
R226 Experimentation and Laboratory-oriented Studies Division Technical Session 5
R526 Experimentation and Laboratory-Oriented Studies Division Business Meeting
W357B Lessons Learned about Faculty Development!
W557A Ways that Teaching and Learning Centers Work: Sharing Lessons Learned
W557B The Changing Tide of Post-tenure Review in Colleges of Engineering
R257 Faculty Development Evidence-based Practices!
R357 Learnin’ Lessons about Faculty Development
R657 Faculty Development Division Business Meeting
F422 Faculty Advancement Panel
F457 Effective Design of Faculty Development Workshop for Equity-mindset and Inclusion

First-Year Programs Division

M227 First-Year Programs: Maker Spaces in the First Year
M324 ENT Division Technical Session: First-year Experiences
T327A First-year Programs: Retention and Bridge Programs #1
T327B First-year Programs: Student Perceptions and Perspectives
T327C First-Year Programs: Retention & Bridge Programs #2
T527 FYEE Steering Committee Meeting
T577B Safe Zone Level 1
W227 The Best of First-Year Programs Division
W327 First-year Programs: Professional Development and Skills
W527 First-Year Programs Officers Meeting
W577C Equity and Inclusion Advocacy: Diversity, Equity, and Inclusion 100
W577B Safe Zone Level 2
R227A First-year Programs: Focus on Students
R227B First-Year Programs: Assessment in the First Year

Faculty Development Division

M357 Faculty Development Medley!
M425 Innovative Development for Various Faculty Lines
M451 Managing Dual Careers
T257A Evidence-based Practices in Faculty Development
T257B Faculty Development Research
T357A Research! Research! Research! in Faculty Development
T357B Research in Faculty Development
T357C WIP-ing Up Faculty Development!
T657 VIRTUAL WORKSHOP: Transforming Inclusive Teaching, Mentoring, and Academic Advising in Engineering: A Core Competencies and Skills Framework
W357A WIP It! Faculty Development Style!
W557B The Changing Tide of Post-tenure Review in Colleges of Engineering
R257 Faculty Development Evidence-based Practices!
R357 Learnin’ Lessons about Faculty Development
R657 Faculty Development Division Business Meeting
F422 Faculty Advancement Panel
F457 Effective Design of Faculty Development Workshop for Equity-mindset and Inclusion

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
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<tr>
<td>M417</td>
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<td>Mathematics Division Technical Session 5: From Functions to Big Data–A Hands-on Challenge</td>
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<td>Mathematics Division Technical Session 1: Best Practices in Engineering Math Education</td>
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W237 Mathematics Division Technical Session 2: Poster Presentations
W337 Mathematics Division Technical Session 3: Diversity in Mathematics Education
R637 Mathematics Division Business Meeting

**Mechanical Engineering Division**

M338A Mechanical Engineering Technical Session: Fluid Mechanics
M338B Mechanical Engineering Technical Session: Assessment and Accreditation: Making the Grade!
T238A Mechanical Engineering Technical Session: Outreach and Retention
T238B Mechanical Engineering Technical Session: Labs & Projects - New Opportunities
T338A Mechanical Engineering Technical Session: The Art of Education
T338B Mechanical Engineering Technical Session: Team/Project-based Pedagogy and Approaches
T338C Mechanical Engineering Technical Session: Dynamics I
T338D Mechanical Engineering Technical Session: Potpourri
T638 VIRTUAL WORKSHOP: Advancing Mechanical Engineering Education Through Mobile Learning Micro-Workshop Training
T738 ME Division Convivium
W338A Mechanical Engineering Technical Session: Pedagogy I - Best Teaching Practices
W338B Mechanical Engineering Technical Session: Dynamics II - Feel the Vibe
W338C Mechanical Engineering Technical Session: Capstone and Design
W416 DISTINGUISHED LECTURE: Smart Energy: Opportunities and Challenges
R238 Mechanical Engineering Technical Session: Pedagogy II - Best Teaching Practices
R338A Mechanical Engineering Technical Session: The Remote World
R338B Mechanical Engineering Technical Session: Curriculum and Education
R338C Mechanical Engineering Technical Session: Feeling the Heat - Thermodynamics and Heat Transfer
R538 ME Division Business Meeting
F338 Mechanical Engineering Technical Session: Mechatronics & Simulation

**Mechanics Division**

M339 Making Mechanics Courses Fun and More Effective
M339B Assessment Strategies in Mechanics
T239 Concept Inventories in Mechanics
T339 Grading and Feedback Models in Mechanics
W339A Alternative Methods of Teaching and Learning Mechanics
W339B Hybrid and Online Teaching of Mechanics
W539 Hands-on Mechanics
R239 Improving Student Outcomes in Mechanics
R339 Learning Mechanics Through Experimentation
R739 Mechanics Division Virtual Awards Banquet
F339 Teaching Statics: What and How?
F639 Mechanics Division Business Meeting

**Military and Veterans Division**

T456 Military and Veterans Division Panel Session
W356A Military and Veterans Division Technical Session 1
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<td>T340B</td>
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<td>T577C</td>
<td>Do You See Me?: Hypervisible Invisibility #EngineeringWhileBlack</td>
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<tr>
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<td>F477</td>
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<td>T741</td>
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T271B  NSF Grantees: Diversity 2
T371A  NSF Grantees: Diversity 3
T371B  NSF Grantees: Identity
T371C  NSF Grantees: Student Development
T371D  NSF Grantees: Student Thought
W271B  NSF Grantees: Learning Tools (Virtual)
W271   NSF Grantees: Learning Tools (Hands On)
W371A  NSF Grantees: Design
W371B  NSF Grantees: Student Learning 1
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R271   NSF Grantees: Workforce Development
R271B  NSF Grantees: Workforce Development (ATE)
R371D  NSF Grantees: First Year Programming (1)
R371A  NSF Grantees: First Year Programming (2)
R371B  NSF Grantees: Sustainability
R371C  NSF Grantees: Entrepreneurship
F271B  NSF Grantees: S-STEM 1
F271   NSF Grantees: S-STEM 2
F371A  NSF Grantees: S-STEM 3
F371D  NSF Grantees: REU 1
F371B  NSF Grantees: REU 2
F371C  NSF Grantees: S-STEM 4
R342   New Engineering Educators 2: Success In and Out of the Classroom
R542   Jump-start Your Grant Search: Help in Identifying and Applying for NSF Sponsored Grants
R642B  Pathways into Engineering Education Research: Where Do I Get Started?
R642A  Rx for Active Learning Success
R742   NEE Division Networking Social
F342   New Engineering Educators 3 - Grading: Grate or Great
F642   New Engineering Educators Division Business Meeting

Ocean and Marine Division

M417   The Engineer of 2020: Realizing the Vision?
T344   Ocean and Marine Engineering Division: Best Paper Technical Session
W416   DISTINGUISHED LECTURE: Smart Energy: Opportunities and Challenges
W544   Ocean and Marine Engineering Division Business Meeting
W716   Virtual Tour - Energy Facilities

Pre-College Engineering Education Division

M333A  Pre-college Engineering Education Division Technical Session 1
M333B  Pre-college Engineering Education Division Technical Session 2
M333C  Pre-college Engineering Education Division Technical Session 19
M333D  Pre-college Engineering Education Division Technical Session 3
M333E  Pre-college Engineering Education Division Technical Session 4
T333A  Pre-college Engineering Education Division Technical Session 16

New Engineering Educators Division

M342   New Engineering Educators 4: Tips and Tools
W342   New Engineering Educators 1: Learning Aids
W542   How Should I Teach? Perspectives and Discussions on What Works for Your Peers in an Engineering Classroom
T333B  Pre-college Engineering Education Division Technical Session 17
T333C  Pre-college Engineering Education Division Technical Session 18
T533  Pre-College Engineering Education Division Business Meeting
W333A  Pre-college Engineering Education Division Technical Session 5
W333B  Pre-college Engineering Education Division Technical Session 6
W401  K-12 Experience in Aerospace Engineering
R233A  Pre-college Engineering Education Division Technical Session 7
R233B  Pre-college Engineering Education Division Technical Session 8
R333A  Pre-college Engineering Education Division Technical Session 9
R333B  Pre-college Engineering Education Division Technical Session 10
R333C  Pre-college Engineering Education Division Technical Session 11
R333D  Pre-college Engineering Education Division Technical Session 12
R451  Computing -- Increasing Participation of Women and Underrepresented Minorities
R740  PCEE/MIND/WIED Mixer
F233A  Pre-college Engineering Education Division Technical Session 13
F233B  Pre-college Engineering Education Division Technical Session 14
F333A  Pre-college Engineering Education Division Technical Session 15
F333B  Pre-College Engineering Education Division Technical Session 20

Professional Interest Council
S173  PIC Chair I - V Business Meeting
T573F  PIC I Business Meeting
T573G  PIC II Business Meeting
T573H  PIC III Business Meeting
T573I  PIC IV Business Meeting
T573J  PIC V Business Meeting

Software Engineering Division
M346  Software Engineering Division Technical Session 2
T346  Software Engineering Division Technical Session 1
W448  The Many Facets of Cyber- and Systems-security Engineering Education
W411B  DISTINGUISHED LECTURE: Continued Conversation - Social Disruption of Emerging Technologies and Implications for Engineering Education
F646  Software Engineering Division Business Meeting

Sponsored Sessions
T299A  SPONSOR TECHNICAL SESSION: Enabling Virtual Classroom Without Giving Up Hands-on Labs (Or, Save the Disinfectant for the Bathroom, not the Lab) Presented by Analog Devices
T399F  SPONSOR TECHNICAL SESSION: Assessments in the Online Engineering Classroom - Presented by Wiley
T399A  SPONSOR TECHNICAL SESSION:
SPONSOR GROUPS

Presented by the University of Maryland

T399B SPONSOR TECHNICAL SESSION: Presented by Liaison
T399D SPONSOR TECHNICAL SESSION: Get Your Simple-to-Use TI-RSLK MAX Robot Fully Built, Tested, and Ready for Learning in Under 20 Minutes - Presented by Texas Instruments
T399E SPONSOR TECHNICAL SESSION: Online Learning with MATLAB and Simulink - Presented by Mathworks
T499 Round Table Discussion Presented by University of Maryland

T699A VIRTUAL WORKSHOP: Mastery-based Learning: From Exposure to Expertise
T699B VIRTUAL WORKSHOP: Leading Change During Times of Transition with Trust and Transparency
T699C VIRTUAL WORKSHOP: Interpreting and Acting on Peer Evaluations
T699D VIRTUAL WORKSHOP: Redshirting in Engineering: A Model for Supporting Student Success in Engineering
T699E VIRTUAL WORKSHOP: Partnering with the Engineering for Us All (E4USA) Advanced High School Course: Next Steps for All Stakeholders
T699F VIRTUAL WORKSHOP: How to Identify Appropriate NSF Funding Programs and Prepare Competitive NSF Engineering Education Research Proposals

W299A SPONSOR TECHNICAL SESSION: Integrating Coordinate Metrology into Engineering Programs - Presented by ZEISS Industrial Quality Solutions
W299B SPONSOR TECHNICAL SESSION: Presented by MSC Software
W399B SPONSOR TECHNICAL SESSION: Innovation in Engineering Education – Fusing Electromagnetic Simulations with Theory and Experiments in Antenna and Wireless Communication Courses - Presented by Altair

W399C SPONSOR TECHNICAL SESSION: Hands-on, Project-based Learning with Digital Twins for Mechatronics in Engineering Education and Research - Presented by Altair
W399A SPONSOR TECHNICAL SESSION: How to Implement Online Hands-on Classes During the Time of COVID-19 - Presented by STMicroelectronics
W699A VIRTUAL WORKSHOP: Mixed Reality in Engineering Education: How Does it Affect User Experience, Motivation, and Student Performance?
W699B VIRTUAL WORKSHOP: Art to STEM: Using Comics to Improve Student Learning in Engineering
W699C VIRTUAL WORKSHOP: Teaching K-12 STEM with Robotics: Engaging Students with STEM Content in an Authentic Manner
W699D VIRTUAL WORKSHOP: A Phasor Toolbox for AC Circuit Analysis using MATLAB
W699F VIRTUAL WORKSHOP: Integrated E-Learning Modules for Developing an Entrepreneurial Mindset in Students
W699G VIRTUAL WORKSHOP: Doing Empathy in Engineering - An Interactive Workshop
W699H VIRTUAL WORKSHOP: Returning Graduate Students: Mentoring, Advising, and Teaching Graduate Students with Industry Experience
W699I VIRTUAL WORKSHOP: Recent Developments of Remote Laboratories
W699J VIRTUAL WORKSHOP: How to Integrate Equity and Inclusion into the Engineering Classroom through Student-authored Children’s Books
W699K VIRTUAL WORKSHOP: Introducing STEM Concepts at Freshman Level via a New Design-driven Robotics Class
ASEE’S VIRTUAL CONFERENCE
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W699L VIRTUAL WORKSHOP: P-12 Engineering Outreach - Amplifying Impact and Building Community
W699M VIRTUAL WORKSHOP: Applying for an NSF CAREER Award? Research-based Workshop to Support Early Career Faculty
W699N VIRTUAL WORKSHOP: Curriculum and Course Design for Mechatronics and Robotics Engineering Education
W699O VIRTUAL WORKSHOP: Reverse-engineering YouTube Videos to Develop Course Content
W699P VIRTUAL WORKSHOP: Technology Enhanced Active Learning - for Busy Skeptics and True Believers
W699Q VIRTUAL WORKSHOP: Reframing and Reimagining the Experiences of Doctoral Women of Color in Engineering
W699T VIRTUAL WORKSHOP: Massification of Open-ended, Project-based Design Teaching for Any Class Size
R399 SPONSOR TECHNICAL SESSION: Presented by the University of Maryland
R399B SPONSOR TECHNICAL SESSION: Presented by IEEE
R399A SPONSOR TECHNICAL SESSION - Presented by STMicroelectronics
F399A SPONSOR TECHNICAL SESSION: Presented by Gradescope by Turnitin
F399B SPONSOR TECHNICAL SESSION: Presented by EngineeringUnleashed

T547 ERM Community Welcome Session
T747 Student Division Social
W447 How to be a Graduate Student - Before We Forget
W547 Student Division Business Meeting
F247 Student Division Technical Session 3

Systems Engineering Division

M348 Systems Engineering Division Technical Session 1
T248 Systems Engineering Division Technical Session 2
W448 The Many Facets of Cyber- and Systems-security Engineering Education
W548 SED Business Meeting
R319 Engineering Economy Division Technical Session 1
R729 Joint Divisions Social Event

Technological and Engineering Literacy/Philosophy of Engineering Division

M349 Developing Technological Literacy in Students
M417 The Engineer of 2020: Realizing the Vision?
T249 Exploration of Broad Issues and Promotion of Engineering and Technological Literacy
W349 Curriculum Development in Technological Literacy
W549 TELPhE Division Business Meeting

Student Division

M347 Student Division Technical Session 1
T247 Student Division Technical Session 2
T347A Student Division Technical Session 4
T347B Student Division Technical Session 5

Schedule subject to change. Please go to www.asee20.pathable.co for up-to-date information
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<td>W350A</td>
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