



# Biomedical Engineering Division

ASEE Paper Deadline – January 13, 2012

Fall 2012

## A Message from the Chair

Contributed by Conrad M. Zapanta

BED 2012-2013 Division Chair



Joe Tranquillo (the editor of the BME newsletter) sent me the dreaded e-mail, “Conrad, I need an article for the newsletter.” Instead of starting to write, I went for a run. Those who know me well know that I am addicted to running. One of the first things that I do after I reserve my hotel room for the ASEE annual conference is figure out where I can go for a run near the hotel. I often do my best thinking while I run. During my run on the day of Joe’s email, I realized that learning how to excel at teaching is analogous to training for a marathon.

Although I’m not an authority on either subject, I’ve learned a few things after teaching for 15 years (and running for 27 years). I’ve come to realize that becoming a better teacher has many similarities to training a marathon. I call them the “Three P’s:”

### Preparation

Preparing for a marathon involves lots of running (over 20 weeks of training for my last marathon). My training runs include shorter runs at a faster pace, 800 meter repeats at the track, and long runs of 20 miles at a slower pace. The success of my training runs depend on staying hydrated, eating before, during, and after running, and choosing what podcast to listen to on a 20 mile run. A deliberate, consistent training regimen is key to successfully completing a marathon.

Excellent teaching also requires significant preparation before you even get in the classroom. This includes developing course objectives, determining how the course fits in the overall curriculum, understanding your students’ backgrounds, selecting course materials, learning the course material, and writing lectures. All of these things are key components that must be completed effectively in order to succeed in the classroom.

### Perseverance

It typically takes about 20 weeks to properly (more about that

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## The Noblest Profession

Contributed by Arthur T. Johnson

2012 Theo C. Pilkington Outstanding Educator

As an engineer who is proud of my profession, one of my favorite quotes is from Herbert Hoover, himself educated as a civil engineer:

*It is a great profession. There is the fascination of watching a figment of the imagination emerge through the aid of science to a plan on paper. Then it moves to realization in stone or metal or energy. Then it brings jobs and homes to men. Then it elevates the standards of living and adds to the comforts of life. That is the engineer’s high privilege.*

*The great liability of the engineer compared to men of other professions is that his works are out in the open where all can see them. His acts, step by step, are in hard substance. He cannot bury his mistakes in the grave like the doctors. He cannot argue them into thin air or blame the judge like the lawyers. He cannot, like the politicians, screen his shortcomings by blaming his opponents and hope the people will forget. The engineer simply cannot deny he did it. If his works do not work, he is damned.*

*On the other hand, unlike the doctor, his is not a life among the weak. Unlike the soldier, destruction is not his purpose. Unlike the lawyer, quarrels are not his daily bread. To the engineer falls the job of clothing the bare bones of science with life, comfort, and hope. No doubt as the years go by people forget what engineer did it, even if they ever knew. Or some politician puts his name on it. Or they credit it to some promoter who used other people’s money. But the engineer himself looks back at the unending stream of goodness which flows from his successes with satisfaction that few professions may know. And the verdict of his fellow professional is all the accolade he wants.*

I have used this quote in several of my books and read it every year to my students in my Transport Process Design course. All too often we forget to express to our students the pride that comes with the positive accomplishments made by engineers, and how lucky they are to have chosen a college course of study leading to a profession associated with problem-solving, creativity, and good works. After my one lecture on ethics and professionalism, students have come to me and commented how appreciative they were that one of their professors had talked of such things. These comments reminded me of how much I was moved while myself a student at Cornell University by one of my teachers who repeatedly told his classes how privileged they all were to have a degree in engineering from that great

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## Work-In-Progress New BED Track

**Contributed by J. Aura Gimm**  
*BED 2013 Program Chair*

During the last BED business and executive board meetings we discussed a number of new and old ideas to increase overall participation and to encourage interactions between members of our Division. One idea was reviving the quarterly BED Newsletter, and another was to implement a parallel work-in-progress (WIP) track that will require an extended abstract (3 page limit) instead of a full paper. The papers in WIP track do not require complete assessments nor is the course (for example) required to have been taught before the abstract deadline. WIPs will be presented at the poster session during the annual conference that will include poster evaluation led by one or more of the executive board members of the Division. We have also created a new award for the Best Work-in-Progress Poster (see below) with a small incentive for the future submission of a full-length paper.

We hope that the new WIP track will encourage new members to participate and foster fruitful interactions between members of the BED.

Questions or comments regarding paper submissions should be directed to J. Aura Gimm (<mailto:aura.gimm@gmail.com>).

### Newsletter

Please submit suggestions or submissions for the ASEE Biomedical Engineering Division newsletter via e-mail to Joe Tranquillo at <mailto:jvt002@bucknell.edu>

Thanks to everyone who contributed to this issue.

## ASEE BED Officers 2012-2013

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## **BED Award Nominations**

**Contributed by Richard Goldberg**

*BED 2013 Awards Chair*

Each year, the Biomedical Engineering Division (BED) of the ASEE grants several awards at the annual ASEE conference, including the Theo C. Pilkington Outstanding Educator Award and the Biomedical Engineering Teaching Award.

### **Theo C. Pilkington Outstanding Educator Award**

The Biomedical Engineering Division (BED) of ASEE annually awards The Theo Pilkington Outstanding Educator award. This award is conferred by the division for significant contributions to biomedical engineering education as evidenced by the development of successful undergraduate or graduate level programs, curricula, publications as well as by membership and activities in ASEE/BED and other biomedical engineering organizations. The award consists of a commemorative plaque and a check for \$350. This award recognizes the contribution of Theo C. Pilkington as a true pioneer in Biomedical Engineering who contributed significantly to the advancement of Biomedical Engineering Education.

### **Biomedical Engineering Teaching Award**

This award is conferred by the Biomedical Engineering Division (BED) to recognize contributions in the field of biomedical engineering education by new faculty members as evidenced by innovative teaching materials, curricula, textbooks and/or professional papers and by activity in ASEE/BED and/or other biomedical engineering organizations. Awardees must have a primary educational role in biomedical engineering, either through a dedicated BME/Bioengineering program or through a related engineering program. Faculty members who have no more than 5 years (by June 1 of the year in which the award is given) of teaching experience with primary course responsibility at the university/college or community college level are eligible for this award. The award consists of \$350 and a commemorative plaque.

The Awards Committee is again soliciting nominations for these two awards. For detailed nomination instructions and forms, please visit the following links:

<http://www.asee.org/member-resources/awards/full-list-of-awards/other-division-awards/pilkington-award>

<http://www.asee.org/member-resources/awards/full-list-of-awards/other-division-awards/biomedical-engineering-teaching-award>

Application process:

1. On or before **January 1, 2013**: Submit a brief email to the awards chair, declaring your "intent to nominate" a candidate.
2. On or before **February 1, 2013**: Submit a complete nomination package (more information at links above).

Both of these can be submitted to the BED awards chair at the contact information below:

Richard Goldberg, BED Awards Chair  
Department of Biomedical Engineering  
University of North Carolina at Chapel Hill  
CB 7575  
Chapel Hill NC 27599  
r.goldberg@unc.edu

## **BED Best Poster Award**

**Contributed by J. Aura Gimm**

*BED 2013 Program Chair*

The **Biomedical Engineering Division** of has created an annual Best Poster Award. The inaugural judging for this award will occur at the 2013 Annual Conference and Exposition in Atlanta, GA (June 23-26, 2013). Below is a description of the award and processes used for judging.

The Best Poster Award is presented annually and recognizes the best poster in a session of the ASEE Annual Conference & Exposition that is sponsored by the Biomedical Engineering Division. Posters are typically Work-in-Progress submissions to the Annual Conference. The award consists of a certificate of recognition. In addition, if the winner submits a full paper on this same topic to the Biomedical Engineering Division of the ASEE Annual Conference in the next two years, the winner will be reimbursed for the \$75 paper submission fee.

### **Selection process:**

The Division Chair, Program Chair and Program Chair-Elect (or alternates appointed by the Division Chair, as necessary) will form a committee that selects the best poster at the ASEE Annual Conference & Exposition. Selection will be primarily based on the quality of the poster and its relevance to Biomedical Engineering education. This includes the extent to which the poster advances knowledge or creative practice in the field of Biomedical Engineering Education; the utility of information to a wide range of Biomedical Engineering Educators; and the clarity of writing, originality, innovation, and documented results.

To be eligible, posters must be presented at a session sponsored or co-sponsored by the Biomedical Engineering Division and the corresponding paper must have been accepted for publication in the ASEE Annual Conference Proceedings.

later) train for a marathon. I often wonder why I put myself through the training when I get up before the sun rises so that I can get a 10 mile run in before my first class, feel blisters forming on my toes at the middle of a long run, start shivering when it's 85 degrees outside, or my legs cramp up on race day and refuse to move four miles before the finish line. What has kept me going during these circumstances is the feeling of accomplishment and relief that I know I am going to feel when the marathon is all over.

Becoming an excellent teacher takes a lot of work. One hour of class time can easily lead to six or more hours outside of the class. Besides the preparation before you get to the classroom, you may have to grade homework, review term papers, correct lab reports and notebooks, fix lab equipment, and hold office hours. I have often (and still do) questioned why I was going through all of this effort. Will the students really learn anything? Will they appreciate my effort? Will this lab work? Does my department head know (or care) how much I am doing? For me, the reward for all of this effort is the "I get it!" look from a student during lecture, an e-mail from a student that says that says he learned a lot in my class, or an alumnus coming back at Homecoming saying my class helped her in her job at a medical device company. When you find yourself wondering if it is all worth it, remember that you may never know the impact you have had on your students, but good teachers will always make a positive impact.

#### **Pick Yourself Up**

For my first marathon, I didn't run a training run over 13 miles. Since a marathon is 26.2 miles, one could say I was grossly undertrained. I also didn't drink much water or eat anything during that first marathon. The result was "blacking out" while running miles 20 to 25. (I still don't remember anything about those five miles.) Somehow I finished and survived. For my next marathon, I changed my training program to allow me to gradually build up to 20 miles, and I learned to drink water and eat before and during my long runs. The result was a time that was 30 minutes faster than my first marathon, and I actually remembered what happened during the entire race.

The process of becoming an excellent teacher is full of bumps along the way. I remember the first time that I completely failed during a lecture in a thermodynamics class. I planned to review three problems that were similar to the homework problems. I decided that I didn't need to solve the problems before class. It didn't go well, as I didn't make it through the third problem before I had to give up. Since then, I have always made sure that I prepared before class (and that I have gone through each example problem carefully before class). I could list many other instances: a lab that didn't work, an exam problem that was too hard (or easy), or an entire course that went badly. In each case, I figured out what I did wrong, and designed a plan so it didn't happen again. It took me six years to develop a lab course from scratch, and I'm still evaluating and improving it after each semester. When you mess up, learn from the your mistakes and use them to continue to improve. I hope this brief essay inspires you to continue to strive to be an excellent teacher. Let me know if you want to go for a run at ASEE in Atlanta (after I find a safe route to run!). And now that I've finally written this, I can go for a run....

university.

But, as proud I am of engineering, I am more proud of being a teacher. Teaching, I am convinced, is the noblest profession. Teachers of all kinds and at all levels impart knowledge and ability to their students. A great teacher influences her or his students in innumerable ways, all positive. That same teacher can be one of the most influential people in a student's life, and that influence can last a lifetime. There is not much in a negative way that can be said about teaching; even the worst of teachers can have good outcomes; there is hardly anyone who can't learn something that a teacher tries to teach.

The result of teaching is that the student is better able to be a valuable and productive citizen. The student learns how to channel energy and creativity in acceptable ways. The student learns how to become an individual who can make her or his way in this world, not becoming a burden on others, but contributing in some measure to the needs of society.

Who else but a teacher has the nearly unfettered opportunity to urge young people to accomplish great things with their lives? To make a difference because they were here? To change history for the better? To become the best that they can possibly be? Teachers are in a position to influence entire generations of great scientists, engineers, humanitarians, poets, lawyers, politicians, artists, parents, and even the next generation of teachers. Teachers can urge and inspire, enable and encourage, and stimulate creative and imaginative endeavors. What could be a better lot in life than this?

We have all had teachers who we remember fondly for the positive influences that they had on our lives. We remember the teachers who were tough, but fair. We remember the teachers who knew their materials amazingly well. We remember the teachers who were interested in us as individuals, despite the fact that we acted so immature at times. Good teachers are like that: they are competent at teaching, they like their students and get to know them as individuals; they are less interested in showing off how much they know than in seeing to it that we learn what we are supposed to; they are interesting to listen to, both in and out of class; they are open to learn, as well, from their students; they earn respect rather than obsess about popularity; they treat everyone fairly and equally; and they challenge each and every student to perform at the highest level to which they are capable. Good teachers are gems, and not to be taken for granted.

Many of us in college teaching also engage in research activities. We must write proposals, manage money and lab activities, publish papers, and, perhaps, even find important breakthrough results that can change the course of technology. The most influence most of us will have in our careers, the greatest accomplishments that we will ever see, is in the students who have learned valuable lessons from us and, in turn, will pass these on to others. As teachers, our high privilege is not the things we produce, but the people who are better because of our efforts, and the investments we have made in their futures.