

# ASEE Chemical Engineering Division Newsletter



Editor: Matthew Cooper (mecoope3@ncsu.edu), North Carolina State University

## A Message from the Chair:



**Lisa Bullard**  
North Carolina State  
University



I vividly remember the first class I ever taught by myself – Material and Energy Balances in the Fall of 2000. Having just returned to academia from nearly ten years in industry, I had never taught a course before, and the very thought of it was intimidating. Luckily I wasn't on my own – a senior colleague who had taught the course many times was teaching a parallel section on Tuesday and Thursday. I attended every one of his classes and tried in my own section to duplicate his lectures, including the use of active learning and student engagement. He also attended some of my lectures and provided helpful and encouraging feedback. Working together with him to prepare the homework assignments and tests gave me confidence that I could do it on my own the next time I taught the course. Fifteen years later, I'm the one parallel teaching Material and Energy Balances with our new faculty and providing mentoring and encouragement. In addition, I've joined my original teaching mentor, Rich Felder, as the third co-author of the upcoming 4<sup>th</sup> edition of *Elementary Principles of Chemical Processes*.

Having a mentor is powerful. A mentor can provide not only knowledge, but confidence. The relationships that we develop with mentors can model for us the potential impact that we can have on our colleagues and our students. One reason I enjoy attending ASEE meetings is that the entire event is one focused on sharing - sharing knowledge, skills, tools, experience,

successes, and failures. I always come home from the meeting with pages of new ideas to try and contact information for people I've met who offered to share their materials with me. The culture of ASEE and its emphasis on sharing and mentoring is supportive for new faculty and fulfilling for experienced faculty.

We have a great program planned for the upcoming ASEE Conference and Exposition in Seattle, Washington on June 14-17, 2015. Program Chair Kevin Dahm has arranged an outstanding lineup of presentations, posters, workshops, and panel discussions sponsored or co-sponsored by the ChE Division. It's not too late to register, and I encourage you consider bringing a graduate student or new colleague along.

It is once again time for our annual election of officers for the next term. Once again, we have an excellent slate of candidates. Please take the time to vote and have a voice in the future direction of the Division!

Finally, I would like to welcome our incoming Chemical Engineering Division Chair, Christi Luks. The golden wrench will be passed to Christi at the Annual Conference in Seattle.

Best wishes as you wrap up the spring semester, and see you in Seattle!

*Lisa Bullard, North Carolina State*

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#### Community Announcements

Page 10 – **be sure to send any announcements you'd like posted in the newsletter to [mecoope3@ncsu.edu](mailto:mecoope3@ncsu.edu)!**

- **Candidate for Division Chair-Elect:**

- *Winner will serve as chair of ChE Division for 2016-2017*



**Laura Ford**  
*University of Tulsa*

- **Candidate for Director:**

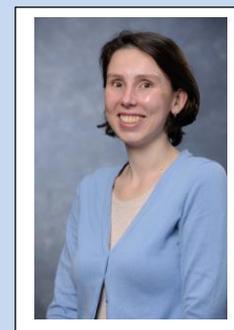
- *Winner will serve as an advisor to the executive board for a term of 2 years*



**Milo Koretsky**  
*Oregon State University*

- **Candidate for Secretary/Treasurer:**

- *Winner will serve as ChE Division Secretary/Treasurer on renewable term*



**Cheryl Bodnar**  
*University of Pittsburgh*



# Candidate for Division Chair-Elect

## Laura Ford

*Associate Professor  
Russell School of Chemical Engineering  
The University of Tulsa  
Email: [laura-ford@utulsa.edu](mailto:laura-ford@utulsa.edu)*



I am pleased to run for Chair-elect of the Chemical Engineering Division of the American Society for Engineering Education. I have been Secretary/Treasurer of the Division for six years, and I hope to continue serving. My particular interest in the Division is in building on the work that has been done to encourage new faculty to learn about engineering education and to contribute to the literature themselves. Our mentoring awards have been in place for a few years now, so it is time to review their effectiveness as we look for more ways to promote them and our Division.

I am an Associate Professor in the Russell School of Chemical Engineering at the University of Tulsa. I have been there for 16 years since getting my PhD at the University of Illinois at Urbana-Champaign. I regularly teach engineering science thermodynamics, mass transfer/separations, and senior labs. I am a co-advisor for TU's student chapter of Engineers Without Borders-USA, and I have recently advised students on TU's Hydrate Flow Assurance joint industry project. I was chosen as the Outstanding Chemical Engineering Faculty Member by TU's 2015 senior class. My recent and near-future posters and presentations at the Midwest Section Meeting of ASEE and the ASEE Annual Conferences are on team sizes, using *CEP* with sophomores, and gamification.



THE UNIVERSITY of  
**TULSA**



# Candidate for Director

## Milo Koretsky

*Director*

*School of Chemical, Biological and Environmental Engineering  
Center for Lifelong STEM Education Research*

*Oregon State University*

*Email: [milo.koretsky@oregonstate.edu](mailto:milo.koretsky@oregonstate.edu)*



I appreciate the opportunity to be considered for Director for the Chemical Engineering Division of ASEE. I am a Professor of Chemical Engineering at Oregon State University where I have taught since 1992. I received degrees in Chemical Engineering from UC San Diego (BS and MS) and UC Berkeley (PhD). I am actively involved in engineering education research and practice and it has become my primary area of scholarship. In general, I am interested in integrating technology into effective educational practices and in promoting the use of higher level cognitive skills in engineering problem solving. I currently direct a research group of four graduate students, three post-doctoral scholars and one undergraduate student who do work around the scholarship of chemical engineering education. Part of our efforts have been focused on developing resources faculty can use to help their students develop conceptual understanding and problem solving expertise. For example, our *Concept Warehouse Project* ([http://jimi.cbee.oregonstate.edu/concept\\_warehouse/](http://jimi.cbee.oregonstate.edu/concept_warehouse/)) has almost 700 faculty subscribers.

I have participated actively in the Chemical Engineering Division of ASEE since 1993. I am a four-time recipient of the Joseph J. Martin Award for the best paper in the Division. I also currently serve as a mentor for the Division's Mentor and Travel grant and serve as Vice Chair for the Publications Board of *Chemical Engineering Education*. I believe my experience provides good perspective to help direct the Division. If elected, I will actively interact with members to discuss and pursue ways the Division can effectively promote the education of chemical engineers. 2017 ASEE Chemical Engineering Summer School is just around the corner. Having experienced Summer School as both a young faculty member and in delivering workshops, the value of this special disciplinary activity is clear. A top priority for me would be helping contribute to the success of the 2017 Summer School. More broadly, I also see opportunities for the division to continue to leverage the effective educational materials and practices of Division members to provide teaching resources for faculty in the discipline and to continue effective delivery of professional development and mentoring opportunities. Finally, I have seen many excellent papers presented through the Division. I would like to encourage the Division to take a lead in facilitating this type of scholarship to be published in archival journals like *Chemical Engineering Education*.

Thank you for the consideration.



# Candidate for Secretary / Treasurer

## Cheryl Bodnar

*Assistant Professor (Teaching-Track)  
Department of Chemical and Petroleum Engineering  
University of Pittsburgh  
Email: bodnarca@pitt.edu*



I am flattered to be nominated as a candidate for the ASEE Chemical Engineering Division Secretary/Treasurer position. I believe that the ASEE is a great resource for all educators that are interested in improving the experience of students in the classroom and beyond. This community provides feedback not only on how to better prepare our students for the new challenges that they will face as they enter a professional engineering career but an understanding of the complexities of teaching engineering within today's society.

I obtained my PhD in Chemical Engineering with a specialization in Biomedical Engineering from the University of Calgary in 2006. Following the completion of my doctorate, I took a position as an industrial post-doctoral fellow with the Industrial BioDevelopment Laboratory in Toronto, Ontario, Canada. I have also obtained my certification as a Training and Development Professional (CTDP) from the Canadian Society for Training and Development (CSTD) in 2010, providing me with a solid background in instructional design, facilitation and evaluation.

In 2011, I joined the University of Pittsburgh first as a grants developer for the Swanson School of Engineering and then in 2012 transitioned into my non-tenure stream teaching faculty position within the Department of Chemical and Petroleum Engineering. This fall I will be moving over to Rowan University where I will be a tenure track Assistant Professor in Chemical Engineering. My research interests primarily relate to the incorporation of game-based learning as well as integration of innovation and entrepreneurship into the chemical engineering curriculum. In particular, I am interested in the impact that these tools can have on student perception of the classroom environment, motivation and learning outcomes.

I currently serve as a member of the ASEE Chemical Engineering Division Diversity Committee and look forward to the opportunity to give back to the division for all the help and support they have provided me in this new role of Secretary/Treasurer if elected.

**Check your email listed with ASEE for your  
personal link to your online ballot.**

**Votes must be received by Sunday, May 31!**

**DIVISION CELEBRATIONS!****M505: Chemstations Lectureship Awards Presentation****Monday 2:15 – 3:45 PM**

The recipient of the Chemical Engineering Division's Lectureship Award, Dr. Ignacio Grossmann of Carnegie Mellon University, will give his presentation "Role of Process Systems Engineering in Chemical Engineering." The Lectureship award is sponsored by Chemstations.

**Special ChE Division Events!**

**Buy Your Awards  
Dinner Tickets Early  
– Save \$10!**

**M705: Chemical Engineering Awards Dinner****Monday 6:00 – 9:00 PM at the Seattle Daily Grill***Ticketed Event: \$56.00 advanced registration and \$66.00 on site.*

Come join the ChE Division in a social setting as we honor this year's award recipients.

**PANELS, WORKSHOPS AND OPEN MEETINGS****U205: Workshop: Designing Propagation Plans for NSF EDG Proposals****Sunday 9:00 AM – 4:00 PM (Leaders: Jeffrey Froyd and Debra May Gilbuena)**

This workshop details design of propagation plans addressing the broader impact criterion for NSF proposals while working in concert with development and evaluation plans.

**T205: Panel: A Virtual Community of Practice for Developing and Implementing Evidence-Based Pedagogies****Tuesday 8:45 – 10:15 AM (Moderators: Steven Krause and Stephanie Farrell)**

This panel will overview the NSF-sponsored ASEE Virtual Community of Practice project.

*Speakers: Cheryl Bodnar, Shannon Ciston, Lindsay Corneal, Richard Eitel, Amber Lynn Genau, Daniel Lepek, Nancy Ruzycski, Brittany Nelson-Cheeseman, Joseph Shih*

**W205: Panel: Diversity in Chemical Engineering Education: Status and Perspectives****Wednesday 8:45 – 10:15 AM (Moderator: Arthur Felse)**

This panel will discuss the current state of diversity within the division and relevant diversity issues.

*Speakers: Adrienne Minerick, Jennifer Cole, Jason Keith, Karen High, Cheryl Bodnar, Ann Saterbak*

**W412: Chemical Engineering Business Meeting****Wednesday 12:30 – 2:00 PM**

An open business and planning meeting for **all** existing and potential members of the Chemical Engineering Division. Feel free to stop by, meet everyone and help plan for the coming year.

**W505: Panel: Student Demographics and Outcomes in Chemical Engineering****Wednesday 2:15 – 3:45 PM (Moderator: Susan Lord)**

This panel will describe demographics and outcomes for a data set of over 100,000 ChE students.

*Speakers: Richard Layton, Matthew Ohland, Catherine Brawner, Susan Lord*



## MONDAY, JUNE 15

### **M405: Novel Student Experiences in Chemical Engineering**

*Monday 12:30 – 2:00 PM (Moderator: Matthew Cooper)*

This session overviews a broad range of pedagogical innovations designed for ChE students.

1. **Preliminary Evaluation of a Research Experience for Undergraduates (REU) Program: A Methodology for Examining Student Outcomes** Dr. Jake Follmer, Dr. Sarah E Zappe, Dr. Esther W Gomez, and Dr. Manish Kumar (The Pennsylvania State University)
2. **Comparing Pedagogical Strategies for Inquiry-Based Learning Tasks in a Flipped Classroom** Dr. Milo Koretsky, Mr. Samuel Alexander Mihelic (Oregon State University), Dr. Michael J. Prince, Dr. Margot A Vigeant, and Dr. Katharyn E. K. Nottis (Bucknell University)
3. **Interactive Mathematica Simulations for Chemical Engineering** Dr. John L. Falconer and Dr. Garret Nicodemus (University of Colorado Boulder)
4. **Preparation of Biology Review and Virtual Experiment/Training Videos to Enhance Learning in Biochemical Engineering Courses** Dr. Jacob James Elmer, Dr. Noelle K Comolli, Dr. William J Kelly, and Zuyi (Jacky) Huang (Villanova University)
5. **Making Practical Experience: Teaching Thermodynamics, Ethics and Sustainable Development with PBL at a Bioenergy Plant** Dr. Darinka del Carmen Ramirez (ITESM (Tecnológico de Monterrey)) and Dr. Pablo Moreno Ramírez (Universidad Autónoma Chapingo)

## TUESDAY, JUNE 16

### **T105: Introductory Experiences in Chemical Engineering**

*Tuesday 7:00 – 8:30 AM (Moderator: Allen Hersel)*

This session focuses on learning experiences designed for first-year students in Chemical Engineering and/or designed to introduce students to the discipline of Chemical Engineering.

1. **Results & Lessons Learned from a Chemical Engineering Freshman Design Laboratory** Prof. Anthony Edward Butterfield and Kyle Joe Branch (University of Utah)
2. **Cocoa for ChemE: Using Bulk Chocolate Manufacture as an Introduction to Chemical Engineering** Dr. Noelle K Comolli (Villanova University)
3. **Green Chocolate? - Investigating the Sustainable Development of Chocolate Manufacturing in a Laboratory-Based Undergraduate Engineering Course** Prof. Alexander Vincent Struck Jannini, Dr. Mary Staehle, Prof. Joseph Francis Stanzione III, and Mr. Christian Michael Wisniewski (Rowan University)
4. **Using Degrees of Freedom as a Pervasive Strategy for Improving Problem Solving** Dr. Joseph J. Biernacki (Tennessee Technological University)

# ChE Division Technical Sessions



## TUESDAY, JUNE 16 (cont'd)

### **T205: Chemical Engineering Division Poster Session**

*Tuesday 12:30 – 2:00 PM (Moderator: Kevin Dahm)*

1. **Analysis of a Small Gamification Addition to Labs** Dr. Christi L Patton Luks (Missouri University of Science & Technology) and Dr. Laura P Ford (University of Tulsa)
  2. **Pyrolysis of Biomass to Bio-oil in the Classroom: The fabrication and optimization of a miniaturized Biomass Conversion Module** Amber DeAnn Graviet, Jacqueline K Burgher, Prof. Bernard J. Van Wie, and Dr. Paul B Golter (Washington State University)
  3. **Hands-on Tabletop Units for Addressing Persistent Conceptual Difficulties in Continuity & Bioengineering** Ms. Xuesong Li P.E. and Prof. Bernard J. Van Wie (Washington State University)
  4. **Assessing Studio-based Learning in Material/Energy Balance Classes** Dr. Richard L. Zollars, Dr. Christopher Hundhausen (Washington State University), Dr. Derrick Wayne Smith (University of Alabama in Huntsville), and Mr. Adam Scott Carter (Washington State University)
  5. **Why Not Ask Students to Explain Themselves? Enhancing Conceptual Testing with Technical Writing** Dr. Matthew Cooper (North Carolina State University)
  6. **Variability in Instruction of Introductory Chemical Engineering Course: Does it affect our students?** Elif Miskioglu (The Ohio State University)
  7. **Promoting Metacognition through Writing Exercises in Chemical Engineering** Dr. Mariajose Castellanos and Dr. Joshua A Enszer (University of Maryland, Baltimore County)
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### **T505: Broad Perspectives on the Chemical Engineering Curriculum**

*Tuesday 2:15 – 3:45 PM (Moderator: Christi Patton-Luks)*

This session examines topics and issues with cross-cutting importance throughout the ChE curriculum.

1. **What Should Every Graduating Chemical Engineer Know About Process Safety and How Can We Make Sure That They Do?** Dr. W. David Harding (University of New Haven), Mr. Brian Harding (Texas A&M University), and Mr. Peter C Montagna (University of New Haven)
2. **Are Your Students Getting the Most out of the Process Simulator?** Dr. Joseph A. Shaeiwitz (Auburn University) and Dr. Richard Turton P.E. (West Virginia University)
3. **Integrating Multi-scale Approaches and Innovation into Product and Process Design in Chemical Engineering Curricula** Prof. Watson L. Vargas, Prof. Oscar Alvarez, and Prof. Jorge Mario Gomez (Universidad de los Andes)
4. **How We Teach: Transport Phenomena and Related Courses** Dr. Daniel Lepek (The Cooper Union), Dr. Margot A Vigeant (Bucknell University), Dr. David L. Silverstein (University of Kentucky), and Dr. Jason M. Keith (Mississippi State University)
5. **An Approach to Strengthening Compliance with ABET Safety Criteria** Dr. Troy J. Vogel (University of Illinois, Urbana-Champaign) and Dr. David L. Tomasko (Ohio State University)

# ChE Division Technical Sessions



## TUESDAY, JUNE 16 (cont'd)

### **T605: Laboratory Experiences in Chemical Engineering**

*Tuesday 4:00 – 5:30 PM (Moderator: Richard Zollars)*

This session will focus on labs, experiments and experiential learning activities for ChE students.

1. **A Unit Operations Laboratory Experiment Combined with a Computer Simulation to Teach PID Controller Tuning** Dr. William M. Clark (Worcester Polytechnic Institute)
2. **Assessments of Ultra-Low-Cost Venturi Nozzle in Undergraduate Engineering Classes** Mr. Arshan Nazempour, Dr. Paul B Golter, Prof. Cecilia Dianne Richards, Prof. Robert F. Richards , and Prof. Bernard J. Van Wie (Washington State University)
3. **Impact of Narrative, Character Creation, and Game Mechanics on Student Engagement in a Game-Based Chemical Engineering Laboratory Course** Mr. Daniel D. Anastasio, Dr. Aravind Suresh, and Prof. Daniel D. Burkey (University of Connecticut)
4. **Mixing in the Chemical Engineering Curriculum** Dr. Richard K Grenville (Philadelphia Mixing Solutions Ltd.)
5. **The Effectiveness of In-Class, Hands-On Learning vs. Lecture for Teaching About Shell and Tube Heat Exchangers** Dr. Paul B Golter, Prof. Bernard J. Van Wie and Mr. Arshan Nazempour (Washington State University)

## WEDNESDAY, JUNE 17

### **W105: Introductory Experiences in Chemical Engineering**

*Wednesday 7:00 – 8:30 AM (Moderator: Cheryl Bodnar)*

This session will explore the development of communication skills in Chemical Engineering students and applications of communication skills within Chemical Engineering courses.

1. **Improving Student Technical Communication via Self Reflection** Mr. Kenneth P Mineart (North Carolina State University) and Dr. Matthew Cooper (North Carolina State University)
2. **Technical and Professional Communication for Chemical Engineers** Elif Miskioglu (The Ohio State University)
3. **Student Led Example Problems in a Graduate-Level Advanced Transport Phenomena Course** Dr. Adrienne Minerick (Michigan Technological University)
4. **Using an Article in a Sophomore Engineering Science Class to Boost Life-long Learning Confidence** Dr. Laura P Ford (University of Tulsa)

**Check out**

**<http://www.asee-ched.org>**

**for additional details!**

# Community Announcements

## 2015 AIChE-CCPS-SACHE Faculty Workshop

The 2015 AIChE-CCPS-SACHE Faculty Workshop will be held August 9 - 12, 2015 at the Chevron Energy Technology Company, 100 Chevron Way, Richmond, CA 94802. The purpose of this SACHE faculty workshop is to show faculty how the theory of process safety is put into industrial practice. It is intended to provide chemical engineering faculty opportunities to gain expertise in safety issues, to participate in industry-related safety case studies, and to visit manufacturing sites where these solutions are implemented, so that these can be shared in educational environments. The theme for this workshop is process safety management (PSM) in a large industrial complex. Sponsors for this workshop include Chevron and the AIChE's Center for Chemical Process Safety (CCPS). Attendee housing and meal expenses will be covered during the period of the workshop; however, attendees must cover their transportation costs to and from Richmond, CA. Faculty can register via a registration form that is available at the home page of the SACHE web site: [www.sache.org](http://www.sache.org) or contacting the workshop faculty organizer: Ronald J. Willey, Northeastern University, Boston, [r.willey@neu.edu](mailto:r.willey@neu.edu), or calling 781-492-4956 (cell).

## FYI: Proposed Amendment to ChE Division

### By-Laws Regarding Diversity Passed

The results of early Spring voting are in, and the proposed amendment to the ChE Division's by-laws which includes language explicitly addressing diversity has passed.

## Collection of Articles for New (and not-so-new) Faculty Posted

CEE has posted a "Start-Up Collection for New Faculty" article series which includes helpful discussion on topics of interest for new faculty members. The collection can be accessed through the left-hand column menu at <http://www.che.ufl.edu/cee>

## Thermodynamics MOOC Available

Carnegie Mellon University's College of Engineering launched the MOOC *Statistical Thermodynamics: Molecules to Machines* by Venkat Viswanathan via Coursera on April 20. It is an advanced undergraduate course which combines theoretical models with practical examples and applications. The course is scheduled to run for 6 weeks.



**Can't wait to see everyone in Seattle!**



**Check out**

**<http://www.asee-ched.org>**

**for additional details!**