

# ASEE Chemical Engineering Division Newsletter



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

## A Message from the Chair:



**David J. Dixon**

South Dakota School of Mines  
and Technology



“Aprils have never meant much to me, autumns seem that season of beginning, spring.”

– Truman Capote, *Breakfast at Tiffany's*

Dear ChED Friends:

That time of year has come when summer ends and fall begins. Many, including myself, may reflect back that summer has seemingly flown by and ended abruptly with the beginning of university classes (at most USA universities; but there are a few who might consider themselves lucky that their next quarter starts later in September, for they have a few more days of true summer). However, while I am sad to see summertime end, I've never grown tired of the time when new, fresh, and eager freshman student faces appear at our doors. And the seniors arrive and are working feverously to not only finish and graduate on time, but to find that new open door of opportunity to begin their engineering career journey. Some might be tempted to say that fall is really a disguised spring, of sorts! A time for beginning and newness. And we who have devoted our own careers to guide and educate these students have front row seats to this “secret spring”.

The ASEE annual meeting this past June was one of those summer events that have a little bit of “spring” hidden in them. A time to learn new ways to teach, to renew friendships, to make new acquaintances, and to focus on an important part of our faculty

profession. If you didn't make it this year you missed a great meeting in Atlanta, but there is still time to write next year's date in your calendar using indelible e-ink: 15 – 18 June 2014, Indianapolis, IN. I mention this because soon you will see the Chemical Engineering Division Call for Papers email cross your desk, so you'll have time now to think of sharing with us the interesting things you've discovered or developed in your teaching and education.

A huge thank you to outgoing chair, Mike Prudich and the 2013 program chair, Daniel Lepek, along with the outgoing officers from the division leadership. These are dedicated folks who have volunteered a lot of their “spare” time to help make the annual meeting and the past year a success. You also might have noticed the new newsletter editor name. Matthew Cooper from NC State has graciously stepped up to that position. We all thank Adrienne Minerick for her many years of dedicated and excellent service to ChED as the newsletter editor.

Well, I hope you all have a wonderful and productive spring, er, fall term!

Sincerely,  
David Dixon, SDSMT

### In this issue...

#### Chair's Message

Page 1

#### Award Winners

Pages 2-4

#### Call for Nominations

Pages 5-7

#### Call for Papers

Page 8

#### Community Announcements

None this issue - send announcements to mecoope3@ncsu.edu!



# 2013 Winner – Chemical Engineering Division Lectureship Award

-Sponsored by Chemstations-

## Clayton J. Radke

*Professor  
Chemical and Biomolecular Engineering Department  
and Vision Science Group  
University of California, Berkeley*



### Chemical Engineering and Dry Eye: Meet Helen

Dry eye, a burny, itchy feeling of dryness and discomfort, is a common malady that infects up to 30 % of the global population. It is especially prevalent in the elderly and women, and in arid, windy climates. During a blink, aqueous tear film is coated and trapped on the cornea, and exposed to a subsaturated air environment. Water evaporates from the tear through a 100-nm lipid-covering layer exuded from the lid meibum glands. We present a periodic-steady description of human tear dynamics that demonstrates how salts concentrate in the tear during the 5-s interblink and how that leads to ocular surface damage. Ameliorating dry eye thus requires understanding and minimizing tear evaporation through a thin duplex-oil film.

By spreading thin oil films of bovine and human meibum and model lipids over the air/water interface in a miniature Langmuir trough, we study in-vitro water-evaporation kinetics for film thicknesses ranging from 100 nm to 100  $\mu\text{m}$ . Detailed understanding of mass and heat transfer is requisite for obtaining meaningful evaporation kinetics. Contrary to current understanding of the human tear film, however, we find that 100-nm thin films of spread lipid do not slow water evaporation rates enough to prevent increased tear salinity during blinking.

Quantifying the role of the in-vivo lipid layer in controlling tear evaporation in human subjects is extremely challenging, partly because the lipid layer cannot be eliminated or controlled. We design a hand-held in-vivo evaporimeter in which the evaporation rate scales linearly with ambient relative humidity and with air velocity to a power index less than unity. Most importantly, we calibrate the new in-vivo evaporimeter using a life-size, anatomically correct mannequin, known as Helen. Preliminary results for selected human subjects (i.e., students) are shown and discussed.

Progress in understanding the behavior of the human anterior eye and how to control dry eye and other diseases critically depends on applying classical chemical-engineering principles from thermodynamics to kinetics and transport. Such principles are not well known in the optometry and medical communities.



# 2013 Winner – Chemical Engineering Division Lectureship Award

-Sponsored by Chemstations-

## Clayton J. Radke Biographical Sketch

**Dr. CLAYTON (CLAY) J. RADKE** received his B.S. degree in chemical engineering at the University of Washington in 1966 and his Ph.D. in 1971 at the University of California under the mentorship of J. M. Prausnitz. He spent 18 months as an NSF Postdoctoral Fellow at the University of Bristol studying colloid chemistry under Professors Douglas Everett and Ron Ottewill. In 1973, he joined the chemical-engineering faculty at the Pennsylvania State University returning to the faculty at the University of California in 1976. He rose to full Professor in 1984 and was appointed Professor of Vision Science in 2003. Dr. Radke has held a number of visiting professorships including the Universite de Poitiers, University of Minnesota, Massachusetts Institute of Technology, and Stanford University, and was Benjamin Maeker Distinguished Professor at the University of Bristol in 2007. He won the Proctor & Gamble Colloid Chemistry Award of the American Chemistry Society in 2003 and the John Franklin Carl Award of the Society of Petroleum Engineering in 2011. Dr. Radke has lectured at well over 100 university and industrial laboratories. His lectures are appreciated for clear presentation of new technical advances sparked by humor and illustrative anecdotes. He currently serves on the editorial boards of 4 technical journals, several company technical boards, and is President of the Board of Trustees of New College in the Graduate Theological Union at Berkeley.

Dr. Radke's research focuses on interfacial and colloidal technologies where phenomena at phase boundaries influence overall behavior. His research is rigorous and quantitative blending fundamental theory with experiment. He tackles important problems that have large impact on practical application in industry. Professor Radke is known for constructing innovative apparatus to elucidate physical phenomena including a continuous-flow tensiometer, an internal reflection fluorescence oil/water interfacial spectrometer, an insitu streaming-potential optical reflectometer, a single-lens polarographic oxygen permeameter, and most recently, a handheld in-vivo evaporimeter for the human eye. He has published over 260 research monographs, one book, and one patent, and delivered over 700 technical papers.

Dr. Radke is devoted to teaching. He served as department vice chair for undergraduate education over almost two decades. For many years, he taught, and continues to teach, the introductory course for undergraduate chemical-engineering students. In addition, Dr. Radke teaches undergraduate courses in transport, fluid mechanics, kinetics, and interfacial phenomena, as well as graduate courses in applied mathematics, transport, and colloid science. He won the physical sciences Donald Sterling Noyce Prize for Excellence in Teaching in 1993, the campus Distinguished Teaching Award in 1994, and the department teaching award 9 times. In addition, Dr. Radke is a much-beloved mentor and advisor including over 60 PhD students and enumerable undergraduate research assistants.

*The Chemical Engineering Division of ASEE gratefully acknowledges the support provided by Chemstations by their sponsorship of this award.*



# 2013 ASEE Chemical Engineering Division Award Recipients

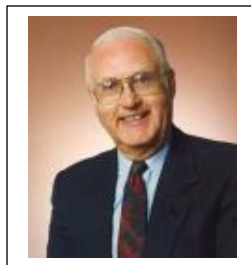


## William H. Corcoran Award

for the best paper published in the previous calendar year in  
Chemical Engineering Education:

*Sponsored by Eastman Chemical Corporation*

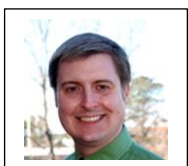
**Dr. Donald R. Woods** (McMaster University) is recognized posthumously for his paper entitled "PBL: An Evaluation of the Effectiveness of Authentic Problem-Based Learning (aPBL)."



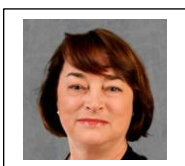
## Joseph J. Martin Award

for the best paper in the ChE Division at the previous  
ASEE meeting:

**Drs. Matthew Cooper, Lisa Bullard, David Ollis and Steven Peretti** (North Carolina State University) are recognized for their paper, "Application of Plagiarism Screening Software in the Chemical Engineering Curriculum."



Cooper



Bullard



Ollis



Peretti

## Ray W. Fahien Award

for teaching effectiveness and educational scholarship in  
the first ten years as a faculty member

**Dr. Matthew Liberatore** (Colorado School of Mines)

Matthew Liberatore is a leader in developing and delivering pedagogical methods in large engineering courses. He has developed web-based tools such as You Tube Fridays and examined the utility of personalized online homework that resonate with this generation's students. These methods have been published in four full length articles in *Chemical Engineering Education* and *Advances in Engineering Education* and two teaching tips in *Chemical Engineering Education*. He has won numerous university wide and department level teaching awards. Outside the classroom, he has mentored 32 undergraduate students and 12 graduate students in his rheology and complex fluids lab.



## CACHE Award

for contributions to computing in chemical engineering:

*Sponsored by the CACHE Computing Corporation*

**Dr. Edward M. Rosen** (Monsanto Company, retired)

Dr. Edward M Rosen has been selected as the 2013 recipient of the ASEE / CACHE Award For Excellence in Computing In Chemical Engineering Education. With E. J. Henley he is the coauthor of the text *Material and Energy Balance Computations* by John Wiley (1969). Dr. Rosen was a CACHE trustee from 1977 – 2004 (Secretary in 1985) and served as the Chairman of the CAST division of AIChE in 1984. He has served as an ABET Program evaluator from 1987 to 2009, has published over sixty papers in various journals and has been a frequent contributor to CACHE News. He retired from Monsanto Co. in 1994 and has been a principal in EMR Technology Group since that time. He is a Fellow of the AIChE.



## Lifetime Achievement Award

for sustained career of pedagogical scholarship:

**Dr. Ronald W. Rousseau** (Georgia Institute of Technology)

In his 43-year career as teacher, scholar, and head of one of the top academic programs in the field, Ronald Rousseau has made many significant contributions to chemical engineering education. He co-created the groundbreaking and widely acclaimed textbook *Elementary Principles of Chemical Processes* that has introduced three generations of chemical engineering students to their chosen profession; taught and mentored countless faculty members, practicing engineers, and students; and provided wise counsel to many chemical engineering programs and the editorial staff of *Chemical Engineering Education*.



## Mentoring and Travel Grant

**Dr. Matthew Cooper**

(North Carolina State University)



# Announcing 2014 ASEE ChE Division Awards!

Send one file to: Valerie Young, ASEE ChE Division Awards Chair, [youngv@ohio.edu](mailto:youngv@ohio.edu)



## **The Chemstations Lectureship Award**

This award, sponsored by Chemstations, is presented to a distinguished engineering educator to recognize and to encourage outstanding achievement in an important field of fundamental chemical engineering theory or practice. The individual shall demonstrate achievement through the formulation of fundamental theory or principles, improvements of lasting influence to chemical engineering education with books and/or articles, and the demonstration of success as a teacher. In addition, evidence of the ability to conduct original, sound, and productive research, and an interest in the progression of chemical engineering through participation in professional and educational societies shall be demonstrated. The recipient presents a lecture at the ASEE summer school. The award consists of a \$3,000 honorarium, \$500 travel allowance, and a commemorative plaque presented at the Chemical Engineering Division Banquet of the ASEE Annual Conference.

## **CACHE Award for Excellence in Computing in Chemical Engineering Education**

This award, sponsored by the CACHE Corporation, is presented for significant contributions in the development of computer aids for chemical engineering education. The award consists of a \$1,000 honorarium and a commemorative plaque presented at the Chemical Engineering Division Banquet of the ASEE Annual Conference.

## **Ray W. Fahien Award**

This award is given in honor of Ray Fahien, who was editor of Chemical Engineering Education from 1967-1995, and who was effectively the founding father of the journal, establishing it as a premier publication vehicle in the field of chemical engineering education. Professor Fahien selflessly gave his time and talents to advance pedagogical scholarship, particularly in the careers of young educators, through his dedication to the journal and the profession. The award is given annually to an educator who has shown evidence of vision and contribution to chemical engineering education, consists of a \$1,500 honorarium and a commemorative plaque presented at the Chemical Engineering Division Banquet of the ASEE Annual Conference. See the Division web site for more details on the award criteria. Educators who have been faculty members for not more than ten years as of July 1st in the year of the award are eligible.

## **Donald R. Woods Lifetime Achievement**

### **Award in Chemical Engineering Pedagogy**

This award is given in honor of Donald R. Woods, a renowned engineering educator and long-time faculty member at McMaster University. This award will normally be given for lifetime achievement, recognizing a sustained career of contributions to pedagogical practice, scholarship, and/or mentoring that not only caused innovative and substantial changes, but also inspired other educators to new behaviors that benefit students in Chemical Engineering. The award will be presented on an as merited basis, not necessarily annually. Acceptance of the award implies the obligation to attend the Chemical Engineering Division Awards Banquet at the ASEE Annual Conference.

*The following awards do not require a formal nomination packet:*

## **William H. Corcoran Award**

This award, sponsored by Eastman Chemical Corporation, is presented each year to the author of the most outstanding article published in Chemical Engineering Education. Nominations are not accepted. All published papers in a calendar year are automatically considered. The award consists of a \$1500 honorarium (per paper) and a commemorative plaque presented at the Chemical Engineering Division Banquet of the ASEE Annual Conference.

## **Best Poster Award**

The Best Poster Award is presented for the most outstanding Chemical Engineering Division poster presentation at the ASEE Annual Conference. Nominations are not accepted. Papers must be presented at the chemical engineering division poster session to be considered. The award consists of a commemorative plaque presented at the Chemical Engineering Division Banquet of the ASEE Annual Conference.

## **Joseph J. Martin Award**

The Joseph J. Martin Award is presented for the most outstanding Chemical Engineering Division paper presented at the ASEE Annual Conference. Nominations are not accepted. All papers presented that also appear in the conference proceedings are automatically considered. The award consists of a commemorative plaque presented at the Chemical Engineering Division Banquet of the ASEE Annual Conference.

# Call for Nominations

The Chemical Engineering Division of ASEE presents awards to outstanding chemical engineering educators at the Division Banquet during the annual ASEE meeting. Nominations of candidates for awards to be presented at the 2014 meeting in Indianapolis, IN are due by January 15, 2014, with the winners notified in March 2014.

Please consider nominating one of your faculty or a colleague at another school for an ASEE Chemical Engineering Division Award!

*Award packets should be sent (as a single file) to:*

**Valerie Young**  
**ASEE ChE Division Awards Chair**  
**[youngv@ohio.edu](mailto:youngv@ohio.edu)**



## **Instructions for Assembling Nomination Packets**

Please assemble the nomination package in the following order. These instructions parallel those available at [www.asee.org](http://www.asee.org). Nominating a faculty member for an award implies that the nominee has been informed and consents to the nomination and conditions of the award.

*Do not submit to ASEE headquarters or through their web page.*

Submit nominations electronically following the procedure described below to the ASEE ChE Division Awards Chair, Valerie Young, at [youngv@ohio.edu](mailto:youngv@ohio.edu) by January 15, 2014.

### **Paper submissions will not be accepted.**

Nominations should be sent as ONE Word or PDF file. The document should have sections for nominee information, citation, rationale, curriculum vitae, additional information as required for that award, and letters of support. It is the nominator's responsibility to assemble all of the pertinent information into ONE electronic document that committee members can easily read.

1. Nominee Information – list the information found on the general ASEE awards form that may be found at [http://www.asee.org/members/awards/nomForm\\_paper.cfm](http://www.asee.org/members/awards/nomForm_paper.cfm)
2. Include a 100-word maximum Citation, which will be used if the nominee wins the award.
3. Include a 700-word maximum description of the Rationale for the Nomination.

4. Include a Curriculum Vitae containing the following information: Degrees earned (university and granting dates); other postgraduate study; record of positions held; publications, including all books, published papers and articles; ASEE activities and offices held; awards, honors and inventions, etc.
5. Include Other Supporting Information as required for that particular award. Please see the Chemical Engineering Division web site for details on particular award criteria.
6. Include a maximum of 8 Letters of Support for the nomination. These letters may be from peers, students, and/or former students as appropriate to the award.

Any nominee for an award may be re-nominated using the original nomination package for one additional year only by sending an email to the Awards Chair along with the electronic award nomination. However, reference letters should be updated for the year of the renewed application. After the re-nomination a complete new nomination is required.

Submit the entire nomination as ONE electronic file to [youngv@ohio.edu](mailto:youngv@ohio.edu) by January 15, 2014. General, procedural or other questions about the awards should be directed to Valerie Young at [youngv@ohio.edu](mailto:youngv@ohio.edu) or 740-593-1496.

*Contact the Awards Committee Chair, Valerie Young ([youngv@ohio.edu](mailto:youngv@ohio.edu)) or consult the Division website (<http://www.asee-ched.org>) for more information.*





# Inviting Mentoring Grant Applications for 2014!

Send one file to: Valerie Young, ASEE ChE Division Awards Chair,  
[youngv@ohio.edu](mailto:youngv@ohio.edu)

## ChE Division Mentoring and Travel Grant for New Attendees

All chemical engineering or chemistry faculty who have not attended an ASEE Annual Conference are eligible. There will be at most two grants per year. A faculty member may apply for this grant by the end of October to attend the following year's conference. The faculty member must have submitted an abstract for that conference. The application consists of a curriculum vitae, a maximum one-page statement of interests in educational scholarship and a copy of any submitted abstracts. The faculty member may or may not be collaborating with other faculty who are active in ASEE.

Applications will be reviewed by a committee consisting of the awards chairs and directors. If there is a conflict of interest, the directors will identify another member of the committee. The amount of the grant is \$400 and will include a ticket to the ChE Division Banquet. A condition of the grant is that the grant winner attends the meeting and present their paper. The grant will be presented at the ChE Division Banquet. The grant winner(s) will be provided with a ChE Division mentor (an individual determined by the ASEE CHED executive committee) who will meet with the grant winner for both formal and informal interactions during the meeting.

## ChE Division "Engineering Education" Mentoring Grant

All chemical engineering or chemistry faculty who have not attended an ASEE Annual Conference in the past five years are eligible for this grant. More than one grant may be given annually. A faculty member may apply for this grant by the last day of February. The application consists of a curriculum vitae and a maximum one-page statement of interests in educational scholarship.

Applications will be reviewed by a committee consisting of the awards chairs and directors. If there is a conflict of interest, the directors will identify another member of the committee. The grant will be a ticket to the ChE Division Banquet. The grant winner(s) will be provided with a ChE Division mentor (an individual determined by the ASEE CHED executive committee) who will meet with the grant winner for both formal and informal interactions during the meeting.

## ChE Division Graduate Student "Future Faculty" Grant

All current graduate students in a chemical engineering or related program are eligible, and they must be nominated by a faculty member who is a member of ASEE. There will be at most one grant per year to subsidize travel to the ASEE Annual Conference. This grant is intended to build upon the existing ASEE "Bring-A-Student" program. Preference will be given to first-time attendees who have coauthored a paper and will be giving an oral or poster presentation at the ASEE Annual Conference. The nomination consists of the student's resume, a one page letter of support from the faculty member, and the abstract of any ASEE talks with the student as coauthor. Nominations are due by October 31st.

Applications will be reviewed by a committee consisting of the awards chairs and directors. If there is a conflict of interest, the directors will identify another member of the committee. Grants will be announced about two weeks after the paper acceptance deadline. The amount of the grant is \$500 and will include a ticket to the ChE Division Banquet. A condition of the grant is that the grant winner attends the meeting and present their paper. The grant will be presented at the ChE Division Banquet. The grant winner will be provided with a ChE Division mentor (an individual determined by the ASEE CHED executive committee) other than their nominating faculty mentor who will meet with the grant winner for both formal and informal interactions during the meeting.

**Application Deadline for Mentoring Grants is October 31, 2013!**

- A condition of receiving most awards and mentoring grants is attendance at the Chemical Engineering Division banquet at the 2013 ASEE Annual Meeting in Indianapolis, IN June 15 – 18 2014.
- For more information on national and other awards, visit the ASEE awards page at <http://www.asee.org/member-resources/award>

# CALL for PAPERS!

2014 ASEE Annual Meeting

June 15 – 18, 2014 Indianapolis, IN



The Chemical Engineering Division of the ASEE, which is dedicated to the promotion and improvement of Chemical Engineering Education, invites papers on all topics relating to the education of chemical engineers. This includes topics relating to K-12, undergraduate and graduate courses and activities, as well as relevant faculty development and community outreach activities. In addition, suggestions for workshops and sessions are welcome. Current topics of interest include, but are not limited to:

- Effective use of technology and simulation in the ChE courses
- ABET – addressing safety and contemporary issues
- Unit Ops Lab Bazaar Poster Session
- Learning outcomes and assessment
- Teaching communication, ethics, and professional skills to ChE students
- Outreach activities: from K-12 to community colleges to graduate school
- Strategies and goals for advisors
- Incorporating research topics into ChE classes
- Elective courses in ChE
- Sustainability (co-sponsored with Civil Engineering)
- All other topics related to Chemical Engineering Education are WELCOME!

Due to popular demand we will once again have an “Open Mic” session, with the topic(s) to be announced at a later date.

Abstracts should be up to one (1) page in length and should clearly address an aspect of Chemical Engineering Education. Since abstracts are reviewed using a double-blind process, please do not include the names of authors or institutions anywhere in the abstract or draft paper. At the end of your abstract, please state if you would particularly like your paper to be in a regular session or a poster session. Abstracts will be reviewed, and if accepted, authors are then invited to complete full papers for further review. Please note that papers describing ongoing work (“works-in-progress”) are particularly welcome and will be targeted for a poster session.

The Chemical Engineering Division is a “publish-to-present” division: to present at the conference, you must have your paper accepted for publication and have at least one author participate in the peer review. Abstract submission will open on September 9, 2013 and will close on October 20, 2013. Author kits will be published shortly.

For more information, please contact 2014 ASEE ChED Program Chair Michael Elsass (University of Dayton) at [melsass1@udayton.edu](mailto:melsass1@udayton.edu)

Link to Monolith: [https://www.asee.org/public/person\\_sessions/new](https://www.asee.org/public/person_sessions/new)

**Abstract submission window opens September 9, 2013  
and closes October 20, 2013!**