



## American Institute of Chemical Engineers Knoxville-Oak Ridge Section

For additional information see our Web site at: <http://www.ornl.gov/sci/aiche/>  
Or contact: Paula George, [georgepm@ornl.gov](mailto:georgepm@ornl.gov), (865)576-0603 or  
Rita Gray, [rgray22@utk.edu](mailto:rgray22@utk.edu), (865)974-5356

### Inside this issue

Article	Pg.
• March 2015 Meeting	1
• Department of Chemical and Biomolecular Engineering and AIChE Knoxville-Oak Ridge Chapter Awards Banquet	2
• March 2015 Meeting (continued)	2
• UT Student Poster Presentation at March Meeting	3
• Editor of Knoxville News-Sentinel to Speak at the Technical Society of Knoxville Meeting on March 9, 2015	4
• Activities Calendar	5
• Sponsoring Opportunities	5
• Officers	5
• About Our Organization... AIChE Academy	6

## March 2015 Meeting

Date: Thursday, March 12, 2015

Cost: \$20

Location: Rothchild's Catering and Conference Center, 8807 Kingston Pike, Knoxville TN

Menu: Menu items

5:30 pm Executive Committee Meeting (All members welcome)

6:00 pm Dinner

7:00 pm Program – Niek Schreuder, M.Sc. DABR, Vice President and Chief Medical Physicist at Provision Center for Proton Therapy, *Proton Therapy*

**Abstract** – There is a significant difference between standard (x-ray) radiation treatment and proton therapy. If given in sufficient doses, x-ray radiation techniques will control many cancers, but healthy tissues may receive a similar dose and can be damaged. Both standard x-ray therapy and proton beams work on the principle of selective cell destruction. As a result of protons' dose-distribution characteristics, the radiation oncologist can increase the dose to a tumor while reducing the dose to surrounding normal tissues.

**Bio** – Niek Schreuder, M.Sc. DABR, Vice President and Chief Medical Physicist at Provision Center for Proton Therapy, is a board-certified medical physicist with significant experience in all aspects of proton beam radiotherapy.

Most recently, Schreuder served as chief medical physicist and senior vice president of medical physics and technology at ProCure Treatment Centers in Bloomington, Indiana. During his more than 22 years as a medical physicist, he has gained vast experience in project management, research and development and clinical training. He is considered one of the foremost medical physics pioneers in the world specializing in proton therapy.

Prior to joining ProCure, Schreuder was director of medical physics at the Midwest Proton Radiotherapy Institute (MPRI), now called the IU Health Proton Therapy Center, where he was responsible for all medical physics related matters leading to the first patient treatments. He also served as the medical physicist and project manager for the Indiana University (IU) Cyclotron Facility where he led the medical physics design effort associated with developing the MPRI facility. Niek Schreuder trained as a medical physicist in South Africa and served as a division head of the operations and development division of the Medical Radiation Group at iThemba Laboratories for Accelerator Sciences (tLabs) in South Africa prior to moving to the U.S. in February 2001. (Continued on page 2)

**Please make your reservations no later than noon on  
March 10 by contacting**

Paula George, [georgepm@ornl.gov](mailto:georgepm@ornl.gov), (865)576-0603 or  
Rita Gray, [rgray22@utk.edu](mailto:rgray22@utk.edu), (865)974-5356

**The Section will subsidize up to 15 students, including graduate students**

## Department of Chemical and Biomolecular Engineering and AIChE Knoxville-Oak Ridge Chapter Awards Banquet

You are cordially invited to join the Department of Chemical and Biomolecular Engineering and AIChE Knoxville-Oak Ridge Chapter for the annual awards banquet on Thursday, April 2, 2015. Each year the event showcases the achievements of our outstanding students as well as our student selected outstanding advisor and teacher. Mr. Paul Taylor, representing the Knoxville-Oak Ridge Chapter will present the AIChE Outstanding Student Award and AIChE Outstanding Baccalaureate Award.

The event will be held at Calhoun's on the River's upstairs banquet hall on Neyland Drive. A cash bar in the banquet area will open at 6:00 p.m. The program will begin at 6:30 p.m. The dinner menu includes grilled chicken teriyaki served over rice, hickory smoked pulled pork with BBQ sauce, sautéed mixed vegetables, spinach Maria, stuffed baked potatoes, and decadent desserts (double chocolate cake and Italian cream cake). The cost for Knoxville-Oak Ridge Chapter members is \$20 at the door. However, pre-registration is due before March 26, 2015. Please e-mail Rita Gray at [rgray22@utk.edu](mailto:rgray22@utk.edu), if you plan to attend or need additional information.



Paul Taylor presents Amanda Jones the 2014 AIChE Outstanding Baccalaureate Award

(Article courtesy of Rita Gray)

## March 2015 Meeting (continued)

Schreuder has more than 40 published articles in peer-reviewed journals on various aspects of proton beam therapy, has authored and co-authored nearly 100 presentations at international conferences and has taught many courses on proton therapy. As Vice President and Chief Medical Physicist at Provision Center for Proton Therapy, Schreuder will be responsible for key aspects of the center's technical and clinical operations. This includes the commissioning and acceptance testing of all proton therapy and imaging equipment. He will also be responsible for the training of the facility's staff of physicists, therapists and dosimetrists. Additionally, Schreuder will develop and implement safety programs and quality control measures at the center.

Schreuder earned a BS in radiation physics, a Diploma in Datametrics, and an MS in physical sciences in medical sciences from the University of Stellenbosch in South Africa. He has been honored two times with the South African Bureau of Standards (SABS) prize for most outstanding research in the field of radiation dosimetry and received the Meditech prize for the most innovative use of computers. Schreuder is a board-certified medical physicist and is a member of the American Association of Physicists in Medicine (AAPM) and the American Society for Therapeutic Radiation Oncology (ASTRO).

## UT Student Poster Presentation at March Meeting

University of Tennessee Chemical and Biomolecular Engineering PhD candidate, Samantha Bedsole, will present a poster on her research, titled: *Liposome solubilization and stability for insertion of Synechosystis PCC 6803 Photosystem I*, Samantha Clark<sup>1</sup>, Andy Sarles<sup>2</sup>, and Paul Frymier<sup>1</sup>, at the March meeting of the Knoxville-Oak Ridge Section of AIChE. You are invited to either stop by at 5:30 p.m. or stay until after the regular meeting to talk with Samantha about her work.



**Abstract** – Cell structure is maintained through complex interactions of lipids and proteins to form cell membranes. The membranes act as protective barriers against toxins and give functionality and stability to proteins embedded in the lipid bilayer. In cyanobacteria and green plants, photosynthetic complexes are among the proteins in the thylakoid membrane. These complexes are responsible for converting photons into usable energy. Photosystem I (PSI), part of this pathway, transfers electrons across the thylakoid membrane to form NADPH. In vitro, PSI must be isolated from the membrane using detergents, amphiphilic molecules containing a single hydrophobic fatty acid chain. Unlike lipids, they form a toroidal belt around the hydrophobic region of the protein, which affects PSI's stability and activity. In order to recreate an environment more suited for PSI, synthetic lipid vesicles have been created. To successfully reconstitute PSI into a liposome, stable vesicles must be formed in conjunction with detergent solubilization, which promotes protein insertion into the vesicle as detergent is removed from the system. In the current study, we are interested in the effect of different detergents, namely n-Dodecyl  $\beta$ -D-maltoside (DDM) and Octyl-beta-Thioglucopyranoside (OTG), on the liposome stability of different lipid liposomes.

**Bio** – Samantha Bedsole is a graduate student in Chemical and Biomolecular Engineering at the University of Tennessee, Knoxville. She is a fellow of the GAANN Ph.D. program at the University of Tennessee, which focuses on energy and biomolecular engineering. Bedsole received her Bachelors of Science from Auburn University in 2010 in Nutrition and Food Science. After working in the food industry, she returned to school pursuing undergraduate studies in Chemical Engineering at the University of South Alabama, and was accepted to the graduate program at UTK in 2012. Her studies and research at UTK are under advisement by Dr. Paul Frymier. Dr. Frymier specializes in electron transport in redox and photoactive proteins.



<sup>1</sup>Department of Chemical and Biomolecular Engineering; University of Tennessee – Knoxville, 419 Dougherty Engineering Building, Knoxville, TN 37996; [sclark40@utk.edu](mailto:sclark40@utk.edu), [pdf@utk.edu](mailto:pdf@utk.edu)

<sup>2</sup>Department of Mechanical, Aerospace, and Biomedical Engineering; University of Tennessee – Knoxville, 414 Dougherty Engineering Building, Knoxville, TN 37996; [ssarles@utk.edu](mailto:ssarles@utk.edu)

## 2015 Southern Appalachian Science and Engineering Fair

The 2015 Southern Appalachian Science and Engineering Fair (SASEF) will be held March 30 – April 2 at Thompson Boling Arena. The entry deadline has been extended to March 14, 2015. Paul Taylor and Mark Swintoniewski have volunteered to serve as judges for the AIChE special awards. If you would like to help with judging for the special awards or for the general awards, please use the following link to register: <http://sasef.com/>. Select "Judges" and then "Register Online", or contact Tim Prater at [prather@tennessee.edu](mailto:prather@tennessee.edu).

## Editor of Knoxville News-Sentinel to Speak at the Technical Society of Knoxville Meeting on March 9, 2015

The March 9, 2014 meeting of the Technical Society of Knoxville will host Jack McElroy, Editor of the Knoxville News Sentinel, as the guest speaker. The title of Mr. McElroy's presentation is "How Scientists and Engineers Can Contribute More to Public Dialog in the Knoxville Area". The historic role of the Technical Society of Knoxville has been very much geared to Mr. McElroy's topic and the society is presently addressing its role for the future.

The News Sentinel provides a valuable service by announcing the Technical Society's meetings in each Sunday's business section.

Technical Society meetings take place at the Crowne Plaza on Summit Hill Drive in downtown Knoxville. Complimentary self-parking is available in the hotel garage. Meeting attendees receive a token for exiting the garage without charge after the meeting. Members and guests begin arriving around 11:30 a.m. and go through the buffet line. The cost is \$13 per person. The meetings start at 11:55 a.m. and end at 1:00 p.m. Visitors are welcome.

For additional information contact Bob Scott, secretary, at 690-0705 or [TechnicalSocietyofKnoxville@gmail.com](mailto:TechnicalSocietyofKnoxville@gmail.com) or go to the Technical Society website at [TechnicalSociety.net](http://TechnicalSociety.net).

The Technical Society of Knoxville is a group of persons interested in technology and science, and their effects on society, and in particular, on the community. The Society was founded in 1921 by Charles E. Ferris, the first dean of the UT College of Engineering, and a group of leading members of the community. It has been an important civic organization for the technical and scientific people in the greater Knoxville area for over 93 years.

The Technical Society has voted to become an umbrella organization if other technical organizations are willing to participate. All Technical Society members are urged to encourage people who could contribute to join the Society. Members of other technical organizations are urged to use their influence to have other organizations participate.



(Article adapted from March 5, 2015 email from Joe Carson, Interim President of Technical Society of Knoxville)



## Activities Calendar

Date	Time	Topic	Speaker	Location
Mar 12	6:00 PM	Proton Therapy	Niek Schreuder, Provision Center for Proton Therapy	Rothchild's, Knoxville TN
Apr 2	6:00 PM	UT Department of Chemical & Biomolecular Engineering Awards Banquet		Calhoun's on the River
Apr 16	6:00 PM	3D Modeling and Engineering	Jack Kissell, ModernTech	ModernTech, 1626 Downtown West, Knoxville
Apr 26-30		2015 Spring Meeting		Austin Convention Center
May 14	6:00 PM	TBD	TBD	McClung Museum

## Sponsoring Opportunities

We continue to accept advertising in the newsletter in order to provide funds to support student participation in the meetings.

Rates per newsletter are:

**\$80** full-page advertisement

**\$45** half-page advertisement

**\$25** quarter-page advertisement

The section will also continue to accept individual or corporate sponsors to provide student meals at section meetings. The sponsor will be recognized at the meeting and in the Newsletter.

The cost to sponsor one meeting is **\$200**. It's a great way to encourage students to attend the local meetings and become future members in the Institute!



(Scanning Probe Microscope – Oak Ridge National Laboratory – Source: DOE Digital photo archive at: <https://www.flickr.com/photos/oakridgelab/12507590134/in/photostream/>)

*“Live neither in the past nor in the future, but let each day's work absorb your entire energies, and satisfy your widest ambition.”*

## Officers

<b>Chair:</b>	Kyle Mack	(423)747-7947	<a href="mailto:kylematthewmack@gmail.com">kylematthewmack@gmail.com</a>
<b>Chair-Elect:</b>	Mark Swientoniewski	574-1150	<a href="mailto:swientoniem1@y12.doe.gov">swientoniem1@y12.doe.gov</a>
<b>Secretary:</b>	David DePaoli	574-6817	<a href="mailto:depaolidw@ornl.gov">depaolidw@ornl.gov</a>
<b>Treasurer:</b>	Paul Taylor	574-1965	<a href="mailto:taylorpa@ornl.gov">taylorpa@ornl.gov</a>
<b>Directors:</b>	Bonnie LaPierre	241-6521	<a href="mailto:lapierrebl@y12.doe.gov">lapierrebl@y12.doe.gov</a>
<b>Term 2015-2016</b>	Stuart Daw	946-1341	<a href="mailto:dawcs@ornl.gov">dawcs@ornl.gov</a>
<b>Term 2015-2016</b>	Bamin Khomami	974-2421	<a href="mailto:bkhomami@utk.edu">bkhomami@utk.edu</a>
<b>Term 2014-2015</b>	Michael Aident	441-5354	<a href="mailto:michael.aident@idi-tn.com">michael.aident@idi-tn.com</a>
<b>Term 2014-2015</b>	Sharon Robinson	574-6779	<a href="mailto:robinsonsm@ornl.gov">robinsonsm@ornl.gov</a>
<b>Membership:</b>	Paul Taylor	574-1965	<a href="mailto:taylorpa@ornl.gov">taylorpa@ornl.gov</a>
<b>Newsletter:</b>	Paula George	576-0603	<a href="mailto:georgepm@ornl.gov">georgepm@ornl.gov</a>
<b>Editor/Webmaster:</b>	Ben Lewis	574-4091	<a href="mailto:lewisbejr@ornl.gov">lewisbejr@ornl.gov</a>
<b>E-mail:</b>			<a href="mailto:aiche-chat@chem.engr.utk.edu">aiche-chat@chem.engr.utk.edu</a>
<b>Website</b>			<a href="http://www.ornl.gov/aiche">http://www.ornl.gov/aiche</a>

### **William Osler**

Canadian physician and one of the four founding professors of Johns Hopkins Hospital  
1849-1919

## Knoxville - Oak Ridge Section

P.O. Box 2008  
Bldg. 4500N, Room B12  
Oak Ridge, TN 37830-6243

Phone: 574-1065  
Fax: 574-6872

E-Mail: [aiche-  
chat@chem.engr.utk.edu](mailto:aiche-chat@chem.engr.utk.edu)



We're on the Web!

Visit us at:

<http://www.ornl.gov/sci/aiche/>

Editor: B. Lewis

### About Our Organization – AIChE Academy

AIChE Academy brings a full array of education and training resources to chemical engineers and the companies they work for. You'll find courses, webinars, conference presentations and more from AIChE, CCPS (Center for Chemical Process Safety), SBE (Society for Biological Engineering), IfS (Institute for Sustainability), and ISWS (International Society for Water Solutions). You can search by topic, availability of CEUs (Continuing Education Unites) and PDHs (Professional Development Hours), delivery method, skill level—even location.

Top Picks in Chemical Engineering Practice include:

- Spreadsheet Problem-Solving for Chemical Engineers

- Heat Exchanger Design and Operations
- Characterization of Glycerol-Diesel Emulsions Fuels
- Strategies for the Design and Production of Particulate Materials

Top picks in energy include:

- Revealing a Stimulatory Effect of Lignin in Enzymatic Hydrolysis of Lignocellulose
- Thirst for Power: The Global Nexus of Energy and Water
- Process Safety Management for Bioethanol
- Distillation in Practice

Top Picks in Chemicals & Materials include:

- Flow of Solids/Pneumatic Conveying Combo Course
- Intro to Maintenance and Reliability
- Crystallization Operations
- Particle Technology

(Source: AIChE website  
<http://www.aiche.org/academy>)

P.O. BOX 2008  
BLDG. 4500N, ROOM B12  
OAK RIDGE, TN 37830-6243

