



## 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

- January 2014 Meeting (Joint with SWE)
- Judges Needed for SASEF
- Tennessee Society of Professional Engineers Banquet
- Local Section Election Results
- December Meeting Recap – High Speed Laser Scanning for 3-D Documentation, CBE Poster Presentations, and Awards
- CBE Department Student Poster Presentation at January Meeting
- Activities Calendar
- Sponsoring Opportunities
- Officers
- About Our Organization – ChEnected

## January 2014 Meeting (Joint with SWE)

Date: Thursday, January 16, 2014  
Cost: \$20  
Location: Rothchild 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 – Dr. Sharon Robinson, Oak Ridge National Laboratory, ***Opportunities in Chemical Engineering Being Created by New US Shale Gas Supplies***

**Abstract** – Recent technical breakthroughs in extraction techniques have allowed the combination of hydraulic fracturing with long horizontal wells to enable the release of unconventional hydrocarbon sources. The ability to tap into these previously unreachable shale gas resources has completely transformed the US natural gas and crude oil supply and demand outlook. These recent technology breakthroughs have resulted in natural gas production in the United States increasing by 25% over the last 5 years, largely due to shale gas production. New US natural gas supplies are playing a key role in “turbocharging” US manufacturing over the next 10 to 20 years, creating an industrial renaissance. This presentation will summarize potential opportunities in chemical engineering that could arise as a result of new shale gas production.

**Bio** – Sharon Robinson has thirty one years' experience working at Oak Ridge National Laboratory (ORNL). She has held a number of positions at ORNL ranging from research to program planning to management in technical areas of nuclear and fossil energy, energy efficiency, and environmental management. At the present she is senior staff member supporting environmental management, nuclear materials management, and nuclear fuel cycle programs for the Department of Energy. She received her B.S. in Chemical Engineering from Tennessee Technological University in 1980. She obtained her M.S. and Ph.D. degrees in Chemical Engineering at the University of Tennessee in 1985 and 1992, respectively. She has been active within AIChE throughout her career: Fellow (2009), Robert E. Wilson Award (2009), Executive Board Programming Committee (2009), Chemical Engineering Technology Operating Council (2009 – Present), Research and New Technologies Committee (Chair 2007 – 2008, Vice-Chair 2005 - 2006), National Officers Nominating Committee (2012), Ambassador Program (2007-2008 & 2008 – 2009), Spring Task Force (2007 – Present), Education Division Formation Committee (2008), Alternative Energy Committee (2008 – 2009), Separations Division (Director 2000 – 2003), Nuclear Engineering Division, Center for Waste Reduction Technologies, and Knoxville – Oak Ridge Chapter (Director 1993 – 1994, 2004 – 2006, 2009, 2011 - 2012).

**Please make your reservations by close of business, January 14, 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***

## Tennessee Society of Professional Engineers Banquet

You are invited to join the Tennessee Society of Professional Engineering (TSPE) on Tuesday, February 11, 2014 for a celebration of Science, Technology, Engineering, and Mathematics (STEM) educators and engineers, and their impact on society. In conjunction with Engineer's Week, the Knoxville Chapter of the TSPE is hosting a banquet to raise funds to support our local STEM educators. Proceeds from the banquet will be used to help fund the Grants for Engineering, Arithmetic, and Science (GEArS) Education Program. The GEArS Education Program is designed to provide small grants for schools or teachers to:

- Support the promotion of engineering in the classroom and facilitate learning in the sciences, mathematics, and natural resource education
- Encourage the creation of new/special classroom projects
- Supplement classroom curriculum
- Offer support for programs or projects for which funding is not otherwise available
- Support and reward creativity and excellence in teaching

The 2013/2014 grant recipients will be recognized and honored at the banquet.

The banquet will be held at the Knoxville Marriott on Hill Avenue. The guest speaker will be George Hawkins, General Manager of the District of Columbia Water and Sewer Authority (DC Water). DC Water has an operating and capital budget of nearly \$1 billion, operates the world's largest advanced wastewater treatment plant with a capacity of 370 mgd and a peak daily of more than a billion gallons, and has a water service area of 725 square miles. Prior to joining DC Water, Mr. Hawkins served as director of the District Department of the Environment (DDOE), a \$110 million dollar agency with 300 employees. Mr. Hawkins was also executive director of New Jersey Future and the Stony Brook-Millstone Watershed Association. Mr. Hawkins has held senior positions with the United States Environmental Protection Agency (EPA). Mr. Hawkins began his career practicing law for the Boston firm Ropes & Gray, and is a member of the Bar in Massachusetts and the District of Columbia. He graduated Summa Cum Laude from Princeton University in 1983 and Cum Laude from Harvard Law School in 1987. Since 1999, Mr. Hawkins has taught Environmental Law and Policy for the Princeton Environment Institute at Princeton University.

If you would like to be a sponsor for this meeting, there are three categories of sponsorship:

- Speaker Sponsors
- Event Sponsors
- Table Sponsors

Sponsorship details are described on the request form on pages 3 and 4. All sponsors will be recognized for their contribution as part of the banquet. Another option for table sponsorship is to sponsor a charitable table. If you have involvement with a local school or organization that you would like to see involved in Engineer's Week, this would be a great opportunity to introduce them to engineers. Please contact Aaron Crenshaw if you would like to sponsor a charitable table.

Please mail the sponsorship form with your contribution before February 4, 2014 to:

Mr. Aaron Crenshaw, P.E.  
Fulghum, MacIndoe, & Associates  
10330 Hardin Valley Road, Suite 201  
Knoxville, Tennessee 37932

Make checks payable to the "Tennessee Society of Professional Engineers", and list the banquet on the memo line.



(Article courtesy of notification letter by Aaron Crenshaw)

## 2014 TSPE BANQUET SPONSORSHIP INFORMATION

Send your sponsorship form and check by February 4, 2014 to:

Aaron Crenshaw  
 Fulghum, MacIndoe, & Associates  
 10330 Hardin Valley Road, Suite 201  
 Knoxville, TN 37932  
 (865) 251-5070

Sponsorship & Price	Recognition & Included Items
<p align="center"><b>Speaker Sponsor</b>  <b>\$2,000 (min.)</b></p>	<p align="center"><u>Two tickets at Speaker's Table</u>            Company Sign on Podium            Participation in Slide Show*            Recognition During the Program            Listed in Program</p>
<p align="center"><b>Platinum Event Sponsor</b>  <b>\$1,200</b></p>	<p align="center">Banquet <u>Meal for 10</u>            Participation in Slide Show*            Shown on Display Board, Listed in Program</p>
<p align="center"><b>Gold Event Sponsor</b>  <b>\$800</b></p>	<p align="center">Banquet <u>Meal for 5</u>            Participation in Slide Show*            Shown on Display Board            Listed in Program</p>
<p align="center"><b>Silver Event Sponsor</b>  <b>\$600</b></p>	<p align="center">Banquet <u>Meal for 2</u>            Shown on Display Board            Listed in Program</p>
<p align="center"><b>Table Sponsor/Additional Table</b>  <b>\$500</b></p>	<p align="center">Sponsorship of a table (10 meals), or if you need additional seating beyond the meals included in other sponsorship packages.</p>
<p align="center"><b>Charitable Table</b>  <b>\$400</b></p>	<p align="center">If you would like to sponsor a table for a group of people (teachers from a particular school, Boy/Girl Scout Troop), please contact Aaron Crenshaw. Organizations sponsoring charitable tables will be recognized during the evening.</p>
<p>* There will be a continuously running slide show during the social hour and during dinner. The slide show will highlight the represented engineering organizations and sponsors.</p>	

## 2014 TSPE BANQUET REGISTRATION FORM

**----FINAL DEADLINE FEB 4th, 2014----**

Place: Knoxville Marriott on Hill Avenue

Date: Tuesday, February 11<sup>th</sup>, 2014

Time: 6:00 p.m. Social Hour  
7:00 p.m. Program and Dinner

Speaker: George Hawkins, Esq., General Manager of DC Water

Menu: Mushroom chicken, Yukon Gold mashed potatoes, grilled vegetables, salad, rolls, dessert\*  
\*dietary restrictions can be accommodated, contact Aaron Crenshaw for details

**SIGN UP:** Name: \_\_\_\_\_ Company: \_\_\_\_\_  
Organization (ASCE, IEEE, etc.): \_\_\_\_\_ Contact No.: \_\_\_\_\_

**TICKETS & SPONSORSHIPS** – see attached for more information on sponsor options.

Reservation	_____ Individual Reservation	\$50
	_____ Student Reservation	\$25
Event Sponsors	_____ Speaker (max. of four Speaker Sponsors)	\$2,000 min.
	_____ Platinum	\$1,200
	_____ Gold	\$800
	_____ Silver	\$600
Additional Items	_____ Additional Tables	\$500
	_____ Charitable Table (See letter for details)	\$400
	Total: _____	

Names of Attendees: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

This is important so that everyone can have a nametag. Use the back of this page if necessary.

All proceeds go to fund the Grants for Engineering, Arithmetic, and Science Program. All sponsors will be recognized at the banquet. Call Aaron Crenshaw (251-5070) for further information. Sponsor information must be received by the deadline to insure your organization is recognized during the banquet.

**REPLY TO:** Send your reservation and/or sponsorship to:

**Mr. Aaron Crenshaw, P.E.**  
**Fulghum, MacIndoe, & Associates, Inc.**  
**10330 Hardin Valley Road, Suite 201**  
**Knoxville, TN 37932**  
**(865) 251-5070**  
**(865) 690-6448 fax**  
**Email: crenshaw@fulghummacindoe.com**

Make checks payable to the "Tennessee Society of Professional Engineers", include the banquet in the memo line.

## Local Section Election Results

The ballots have been counted and the results of the Local Section election sanctioned. Of the voting members, a total of 10 ballots were cast to elect the following local section officers and directors for 2014:

Chair: Bonnie LaPierre  
(automatic succession)

Chair Elect: Kyle Mack

Secretary: David DePaoli

Treasurer: Paul Taylor

New Directors 2014-2016:

Jarrold Clark (past chair),  
Michael Aident and

Sharon Robinson  
Continuing Directors 2012-2014: Stuart Daw, and  
Chris McBride

Please congratulate our newly elected officers and directors and continue to support the local section by participating in section activities.

Every vote counts, so please don't forget to exercise your right to vote whenever the opportunity arises.



## December Meeting Recap – High Speed Laser Scanning for 3-D Documentation, CBE Poster Presentations, and Awards

At the December 12, 2013 meeting of the Knoxville-Oak Ridge Section of AIChE, Michael Hollander, Senior Vice-President of Innovative Design Inc. presented the capabilities of the Faro Focus 3D laser scanner system for use in documentation and production of highly detailed 3D images of complex environments and large scale geometries. Mr. Hollander discussed the setup and use of the system and presented several examples of its application in the design of complex parts and documentation of process systems.

In addition to the technical presentation on 3D laser scanning, several students from the Chemical and Biomolecular Engineering (CBE) Department at the University of Tennessee displayed posters on their research. Section members engaged each student in discussions of their individual research areas and career plans. The students did an outstanding job presenting their work.

At the conclusion of the meeting, awards were presented to two distinguished members of the local section (Stuart Daw and Sharon Robinson) in recognition of their contributions to the section and their election as fellows of the AIChE.

## CBE Department Student Poster Presentation at January Meeting

Amanda Jones from the Chemical and Biomolecular Engineering Department at the University of Tennessee will be displaying her award winning research poster, titled: *Comparison of Membrane Performance for Vanadium Redox Flow Batteries*, at the January 2014 meeting of the Knoxville-Oak Ridge Section of AIChE, before and after the regular meeting. You are invited to either come at 5:30 or stay after the regular meeting to talk with Amanda about her work. Amanda's poster won first place in the Fuels, Petrochemicals, and Energy category at the National AIChE Conference in San Francisco.

Abstract – The vanadium redox flow battery (VRFB) is a promising solution for large-scale energy storage. VRFBs consist of positive and negative cells operating with  $\text{VO}_2^+/\text{VO}_2$  and  $\text{V}^{2+}/\text{V}^{3+}$  redox couples. Ion diffusion across the membrane, known as crossover, is a problem that causes battery self-discharge. Electron Paramagnetic Resonance (EPR) is a sensitive technique able to detect  $\text{VO}_2^+$ . By flowing battery electrolyte through the EPR cavity, the concentration of  $\text{VO}_2^+$  can be monitored. This method is used to characterize vanadium transport in VRFB membranes. Data from such experiments is useful in guiding membrane development as well as comparing the performance of membranes. Cost, chemical stability, vanadium permeability, and ion conductivity are important factors to consider when selecting an appropriate membrane for battery operation. The Sulfonated Diels-Alder Polyphenylene (SDAPP) membrane is a possible alternative membrane for VRFB applications. Characterization of SDAPP membranes with different ion exchange capacities (IEC) allows for a better understanding of the effect of sulfonation level on the transport properties of the membrane.

Bio – Amanda Jones is a senior in Chemical and Biomolecular Engineering at the University of Tennessee, Knoxville (UTK). She is involved in undergraduate research with the Zawodzinski Group, which focuses on electrochemical energy storage. This year, Amanda served as Vice President of the student chapter of AIChE at UTK, and was previously involved with the Chem-E-Car Team, serving as Co-Captain. She had the honor of representing both the Zawodzinski Group and the Chem-E-Car Team at the National AIChE Conference in San Francisco. Her research poster won first place in the Fuels, Petrochemicals, and Energy category, and UTK's Chem-E-Car team won an award for inherent safety in design.

(Information courtesy of Amanda Jones)

## Activities Calendar

Date	Time	Topic	Speaker	Location
Jan 16	6:00 PM	Opportunities in Chemical Engineering Being Created by New US Shale Gas Supplies – Joint with SWE	Sharon Robinson - ORNL	Rothchild's, Knoxville TN
Feb 21	6:00 PM	Joint Meeting with ANS	TBD	Calhouns on the River, Knoxville TN
Mar 13	6:00 PM	ClimateMaster Trilogy 40 Q-Mode Geothermal Heat Pump – Joint with ASM	Moonis Ally	Rothchild's, Knoxville TN
Apr 10	6:30 PM	UT Department of Chemical & Biomolecular Engineering 2014 Awards Banquet	Welcome by Dr. Khomami Student Presentations	Calhouns on the River – upstairs banquet room, Knoxville TN
Apr 17	6:00 PM	Dandelion Roots to Rubber Pilot Plant for Ohio State University	David Pitts – Process Engineering Associates	Rothchild's, Knoxville TN
May 15	6:00 PM	Gunpowder Production and Nitrate Extraction from Caves	Stuart Daw	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!



(ORNL – Lightweight, high-strength hands and fingers for robotic applications - Source: DOE Digital photo archive at: <http://www.flickr.com/photos/oakridgelab/>)

## Officers

<b>Chair:</b>	Bonnie LaPierre	241-6521	<a href="mailto:lapierrebl@y12.doe.gov">lapierrebl@y12.doe.gov</a>
<b>Chair-Elect:</b>	Kyle Mack	(423)747-7947	<a href="mailto:kylematthewmack@gmail.com">kylematthewmack@gmail.com</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>	Jarrold Clark	259-6552	<a href="mailto:jarrod.clark@merrick.com">jarrod.clark@merrick.com</a>
<b>Term 2013-2014</b>	Stuart Daw	946-1341	<a href="mailto:dawcs@ornl.gov">dawcs@ornl.gov</a>
<b>Term 2013-2014</b>	Chris McBride	692-8662	<a href="mailto:cemcbride@focusenv.com">cemcbride@focusenv.com</a>
<b>Term 2014-2015</b>	Michael Aident	694-7333	<a href="mailto:Michael.Aident@CBIFederalServices.Com">Michael.Aident@CBIFederalServices.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>

““The road to success is always under construction.”

**Author Unknown**

Knoxville - Oak Ridge  
Section

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

Phone: 574-1965  
Fax: 574-6872

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



We're on the Web!

See us at:

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

Editor: B. Lewis

*About Our Organization – ChEnected*

As a member of AICHe you have access to a number of resources for sharing information and connecting with fellow professionals. One of these resources is ChEnected, which is a unique online community created for and by young professional chemical engineers. ChEnected is where chemical engineers can read, view, contribute, and engage with everything Chem-E. Learn new skills, solve challenges, find mentors, engage with other chemical engineers, and gain more exposure to hiring companies.

• **ChEnected is Reactive.**

The Reactor blog is the [epicenter of ChEnected](#), featuring content that covers the spectrum of the Chemical Engineering profession – from hot developments and opinions in the areas of alternative energy to career and legal advice.

**By virtue of its name, The Reactor blog is meant to be the driver of discussions** about all

things ChemE. Those discussions will help mold its future, its content, and the entire ChEnected portal. So please, **be an active participant by commenting on posts, providing feedback, or becoming a guest contributor.**

- **ChEnected is Interactive**, featuring [polls](#), reviews, jokes, challenges, and contests.
- **ChEnected is Connected**. Join fellow professionals on [Twitter](#), [Facebook](#), [LinkedIn](#), Flickr, [Slideshare](#) and more.
- **ChEnected is Multimedia**. Look for our [ChEtube](#) video content, which can also be accessed on the AICHe [YouTube channel](#) and [ChemE On Demand](#).
- **ChEnected is You**. Every month features an

article on a new [Young Professional of the Month](#).

Don't hesitate to make use of this valuable resource and valuable benefit of membership in AICHe.

(Source: AICHe web site: <http://chenected.aiche.org/about/>)

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

