



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: Paul Taylor, taylorpa@ornl.gov, (865)574-1965 or
Amber Tipton, atipto11@utk.edu, 974-6458

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April 2016 Meeting

Date: Thursday, April 14, 2016
Cost: \$20 (Cash or Check - **NOTE:** There is no cost for the program or PDH Certificate)
Location: Rothchild Catering and Conference Center, 8807 Kingston Pike, Knoxville TN 37923

5:00 pm Executive Committee Meeting (All members welcome)
5:30 pm Social/Networking
6:00 pm Dinner
7:00 pm Program – Harold “Lee” Dobbs – University of Tennessee, **Energy Choices and Consequences**

Abstract – With the world's population approaching nine billion by the year 2040, achieving a healthy lifestyle for all people on earth will depend, in part, on the availability of affordable energy, especially electricity. This presentation addresses the various options for producing and using electricity, and the consequences associated with each option. The options include fossil, renewables, nuclear, and conservation. All energy options are needed, but some options may be better than others when compared in the following areas: economics, environmental effects, public health and safety, sustainability, and politics.

Bio – Dr. H. L. (Lee) Dodds is IBM Professor of Engineering and Department Head, Emeritus, in the University of Tennessee Nuclear Engineering (UTNE) Department. He joined UTNE in 1976 after working for the DuPont Company at the Savannah River Laboratory for six years. He began serving as UTNE Department Head in early 1997 and retired in December 2011. He also previously worked at the Oak Ridge National Laboratory and the National Aeronautics and Space Administration. Dr. Dodds earned B.S., M.S., and Ph.D. degrees in nuclear engineering at UT. He has served as a consultant for the U.S. Department of Energy and several American, Canadian, and Dutch research institutes and companies. He currently serves on the External Advisory Boards for the nuclear engineering programs at The Ohio State University and Virginia Commonwealth University. He is also a past member of the Accreditation Board of the National Academy for Nuclear Training, which is part of the Institute of Nuclear Power Operations, a current member of the National Board of Directors of the American Nuclear Society (ANS), and a past member of the National Board of Directors of the Nuclear Energy Institute (NEI). Dr. Dodds has received many awards including the ANS Arthur Holly Compton National Teaching Award. He is a Licensed Professional Engineer in Tennessee and a Fellow of ANS.

**Please make your reservations no later than noon on
April 12 by contacting**

Paul Taylor, taylorpa@ornl.gov, (865)574-1965 or
Amber Tipton, atipto11@utk.edu, 974-6458

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

Volunteer Opportunities

If you would like to support your local section of AIChE, there are several opportunities for service. The section is currently seeking volunteers to chair and participate in the following activities:

Social Media Committee –

The local section desires to establish a presence on various social media outlets, such as: Facebook™, Twitter™, LinkedIn™, and YouTube™. The Knoxville-Oak Ridge Section is seeking volunteers to chair and participate on the Social Media Committee. The committee chair will serve as the point of contact and work with the committee to establish and maintain a presence for the local section in various social media outlets. The Chair of this committee would be responsible for recruiting committee members, setting up social media outlets, establishing and managing content, and implementation of all social media activities for the section.

Young Professionals

Committee – The local section desires to establish a Young Professional's Group to increase participation and interactions with young chemical engineers within the East Tennessee region. The Knoxville-Oak Ridge Section is seeking volunteers to chair and participate on the Young Professionals Committee. The committee will establish a Young Professional's Group within the local section. The Chair of this committee would be responsible for recruiting committee members, coordinating activities for the group, developing a budget for the committee, working with the Social Media Committee to publicize group activities,

planning of activities, and coordination with the local section.

Webmaster – A volunteer is needed to assume the responsibility for the maintenance and updating of the Knoxville-Oak Ridge Section website. The site is presently hosted by Oak Ridge National Laboratory. However, the National AIChE has offered to host local section websites and transfer currently stored content. A volunteer is needed to lead this effort and subsequently to maintain site.

Junior Achievement - If you've ever had a hankering to teach, here's your chance. Junior Achievement, a non-profit organization that educates and inspires young people to achieve their potential in school and in the future, is seeking volunteers to teach K-12 students in schools throughout the area about financial literacy, business and economic fundamentals, career exploration, and workplace competencies.

Volunteers present programs to expose students to a "real-world" perspective and serve as positive role models and mentors. JA will provide you with a step-by-step guidebook of lesson plans and all the student activity materials you need to lead the students through fun, hands-on activities centered on one of JA's many free enterprise-themed programs. Teachers are present in the classroom and help reinforce your JA message.

Depending on the program and the grade level, teachers make one visit per week for a five to seven-week period.

Teaching visits last 30-45 minutes depending on the program. For additional information visit the East Tennessee Junior Achievement web-site at: <http://www.jaeasttennessee.org/>.

If you have an interest in any of these volunteer opportunities, please contact either one of the local section officers to express your interest or the indicated point of contacts above.

2016 Tennessee Science Bowl

The Knoxville-Oak Ridge Section of AIChE received several thank you notes from student participants (below) for our donation of \$150 to the Tennessee Science Bowl, as well as a Certificate of Appreciation for being a Bronze Sponsor from the DOE ORNL Site Office Manager. A total of 59 teams from 55 schools across Tennessee participated this year's Science Bowl. This year's winners were: 1st place – Cedar Springs Homeschool (Knoxville), 2nd place – Lausanne Collegiate School (Memphis), 3rd place – Oak Ridge High School, and 4th place – Brentwood High School.

Dear Paul Taylor,
 Thank you for your contribution to the Tennessee Science Bowl!
 Nico Tsujis
 From Blackman High School.
 Madison Fabber
 Morgan Fabber
 Aaron Eason

Yulise Gulghun Joshua Doyle
 Wesley Wright Tara C. Turaski
 Lily Turaski
 Dudee Turaski
 Dear American Institute of Chemical Engineers,
 Thank you for sponsoring the TN State Science Bowl. We had a great time at the banquet on Friday & at the competition on Saturday. We answered lots of questions including lots of chemistry questions. Yay!! You would have been so proud of us! 😊 And guess what... we won!! So we are very excited that we will be representing TN in the National Science Bowl. Thank you for your support! 😊
 — Cedar Springs Homeschool



**2016 Tennessee
 SCIENCE
 BOWL**

Certificate of Appreciation
American Institute of Chemical Engineers, Knoxville-Oak Ridge

BRONZE SPONSOR

In recognition of your dedication to students in their pursuit of outstanding achievement in mathematics and science and to educational excellence in the 2016 Tennessee Science Bowl.


 Johnny O. Moore
 DOE ORNL Site Office Manager

February 27, 2016






Department of Chemical & Biomolecular Engineering Awards Banquet



THE UNIVERSITY OF
TENNESSEE
KNOXVILLE

DEPARTMENT OF CHEMICAL &
BIOMOLECULAR ENGINEERING

invites you to the
2016 CBE Honors Awards Banquet

Wednesday, April 20

6:00 -6:45 p.m.
Social

6:45 p.m.
Welcome

7:00 p.m.
Dinner

Southern Depot
318 West Depot Avenue
Knoxville, TN 37917

AICHE Members: \$20 at the Door

RSVP by April 15 Business Casual
Rita Gray at rgray22@utk.edu

New Payment Option Available for Local Section Meeting Attendees

The Knoxville-Oak Ridge Section of AIChE is providing a new payment option to cover the costs of meals, speakers, and student attendees at our monthly meeting. Attendees now have the option to pay by credit card using an online payment system at the following web-address:

https://www.eventbrite.com/e/aiche-knoxville-oakridge-april-meeting-tickets-24410037078?ref=enivtefor001&utm_source=eb_email&utm_medium=email&utm_campaign=inviteformalv2&utm_term=eventpage.

If you use this service, the cost for the meeting will be \$22.09. If you do not want to use this web-based payment option, you may continue to pay \$20 at the door by cash or check.

UT Student Poster Presentations at April Meeting

University of Tennessee Chemical and Biomolecular Engineering PhD candidate, Nelly Cantillo, will present a poster on her research at the April meeting of the Knoxville-Oak Ridge Section of AIChE. You are invited to talk with Nelly about her work at 5:00-6:00 p.m. or after the program.

Microstructure Characterization of a PEMFC Catalyst Layer: Effect on Performance

Nelly M. Cantillo,^a Luyue Li,^a Christopher Neal,^a Gabriel Goenaga,^a
Karren More^b and Thomas Zawodzinski^{a,b}

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In this study, a set of experimental techniques have been adopted to characterize the fundamental properties of machine prepared catalyst layers (CLs) formed by different Pt:C ratios, highly graphitized carbon and 3M ionomer (825EW). Single cell performance with these CLs was evaluated in order to analyze the relationship with the structure properties.

Scanning electron microscopy (SEM), transmission electron microscopy (TEM) and Brunauer-Emmett-Teller (BET) nitrogen adsorption have been conducted in a series of CLs with Pt:C ratio variations at a fixed Pt loading and ionomer:carbon (IC) ratio, in order to investigate the microstructure including materials dispersion and porosity. This analysis was performed to both the CL in fresh (as-prepared) condition and after subjected to a PEMFC standard protocol.

TEM images along with Pt size distributions of the 50:50 Pt:C fresh and post-operation samples are shown in Fig. 1 as an example. A significant widening of the Pt size distribution and a tendency towards a multimodal form is observed after FC operation. This behavior can be explained by a combination of Pt particles coalescence and dissolution/re-precipitation processes within the solid ionomer, as has been suggested in previous studies.

In order to assess the ionomer behavior in the machine prepared CLs, proton conductivity measurements and estimation of the proton conduction tortuosity was performed as a function of relative humidity (RH) in the single cell. Water uptake isotherms of the as-prepared CLs have also been acquired under well-controlled RH levels. In contrast to typical Nafion® fuel cells, the 3M fuel cells reached its optimal performance at 60%-70% RH and suffered dramatic mass transfer losses at saturated humidity level. Therefore, the 3M fuel cells are able to function fully under drier conditions than the Nafion units. However, the high sensitivity on the cells' water content requires efficient water management during operation, especially at higher current densities.

Bio - Nelly Cantillo is a PhD student in the Chemical and Biomolecular Engineering Department at UTK. She received her Bachelor's and Master's degree in Chemical Engineering from National University of Colombia in 2008 and 2012, respectively. Her research interests include the synthesis and characterization of electrocatalysts and its applications in Proton Exchange Membrane Fuel Cells. More specifically, her current work examines the microstructure and physical properties of platinum-based electrodes and its effect on fuel cell performance.

Activities Calendar

Date	Time	Topic	Speaker	Location
Apr 14	5:30 PM	Energy Choices and Consequences	Harold "Lee" Dobbs, UT	Rothchild's, Knoxville TN
Apr 20		UT Department of Chemical & Biomolecular Engineering Awards Banquet		Southern Depot, 318 West Depot Avenue, Knoxville TN
May 19	5:30 PM	Fossils of Crocodilia	Stephanie Drumheller-Horton	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!



(Glenn Seaborg and Alvin Weinberg at restart of the Molten Salt Reactor Experiment at ORNL in 1968: DOE Photo Archive:

<https://www.flickr.com/photos/oakridgelab/22204695971/in/photostream/>

"No matter what accomplishments you achieve, somebody helped you."

Officers

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Althea Gibson
*American-tennis player and pro-golfer
 1927-2003*

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We're on the Web!

See us at:

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

Editor: B. Lewis

About Our Organization – AIChE Engage

If you haven't already checked out the new AIChE Engage site, I encourage you to so. AIChE Engage is a new, mobile-friendly platform that connects AIChE members with each other and their chemical engineering communities. To get started you will need to log in, add or update your profile, and begin participating in discussions. From the AIChE Engage site (<http://engage.aiche.org/home>) you can:

Manage Your Profile -

Your profile is how other members can get to know your professional and academic background, and what makes you stand out.

Share Knowledge -

Curate content of interest to you and your communities

Find and Connect with Your Peers -

A dynamic community directory allows you to maintain connections through AIChE's exclusive ChemE networking platform. Search members, companies, and specific communities. Use advanced search to filter by industry classification, job function, and more.

Join Discuss Central -

Participate in discussion groups to communicate with leaders in the ChemE community.

Volunteer with AIChE –

Coming soon, you will be able to post and find volunteer opportunities suited for your interests and needs.

(Source: AIChE website
<http://engage.aiche.org/home>)

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