



American Institute of Chemical Engineers Knoxville-Oak Ridge Section

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

November 2014 Meeting – Joint with SWE

Date: Thursday, November 20, 2014
Cost: \$20
Location: Rothchild Catering and Conference Center, 8807 Kingston Pike, Knoxville TN
5:30 pm Executive Committee Meeting (All members welcome)
6:00 pm Dinner – Menu
7:00 pm Program – Dr. Robert Hatcher, University of Tennessee, ***Progress in Understanding Seismic Hazard in the East Tennessee Seismic Zone***

Abstract – The East Tennessee seismic zone has had little detailed investigation of its pre-European settlement history despite being the second most active seismic zone in the eastern U.S. Current seismic activity extends from northeast Alabama and northwestern Georgia through Tennessee and possibly into southeastern Kentucky. Our Nuclear Regulatory Commission-Supported work since 2008 has proved that large seismic events have occurred throughout the seismic zone at least during the last 15,000 years. We have discovered paleoseismic features in young river sediments, including faults with displacements up to 2 m (some involving bedrock), zones of intense fracturing, and paleoliquefaction features, e.g., sand dikes. Faults have been observed in the East Tennessee seismic zone over a distance of 90 km from near Vonore, Tennessee, ~60 km south of Knoxville to Dandridge, Tennessee, ~40 km east of Knoxville. These faults may be isolated features or may be connected as a larger fault system.

The collective data that currently exist indicate there have been prehistoric earthquakes of at least a magnitude of 6.5. Based on these data, we recommend revision of zoning ordinances for the East Tennessee seismic zone region to standards consistent with our new data.

Bio – Dr. Robert Hatcher received a B. A. in 1961 and M. S. in 1962 from Vanderbilt University, Nashville, Tennessee before receiving his Ph.D. in 1965 from the University of Tennessee, Knoxville, Tennessee.
(Continued on page 2)

Please make your reservations by noon, November 18, by contacting
Paula George, georgepm@ornl.gov, (865)576-0603 or
Rita Gray, rgray22@utk.edu, (865)974-5356

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

Bio (continued)

Professional Employment: Geologist, Humble Oil and Refining Company (1965–66), Clemson University (1966-78, Assistant Professor to Full Professor), Florida State University (1978-80, Full Professor), University of South Carolina (1980-86, Full Professor), and University of Tennessee-Knoxville and Oak Ridge National Laboratory Distinguished Scientist (1986–2000), UT Distinguished Scientist and Professor (2000-present).

Research Interests: Primary research goal is to gain a better understanding of the evolution of continental crust, mostly through the study of mountain chains and mature crust. Most of my research has been concentrated in the southern and central Appalachians, but large amounts of time have been spent visiting and studying other mountain chains, and Precambrian continental crust. My primary interest is in the mechanics and kinematics of large faults, which formed a natural transition into a related long-term interest in the geologic controls of petroleum occurrence in the Appalachians, radioactive waste management, the causes of intraplate seismicity and geologic evidence for determination of recurrence intervals for intraplate earthquakes. While I am a structural geologist, most of my research is interdisciplinary, integrating stratigraphic, geochronologic, geochemical, and geophysical data into structural studies. I am primarily a field geologist, however, and field data form the basis for all other supporting studies. I have been involved for many years with geophysicists and geologists in other academic institutions and the USGS in the geologic interpretation of seismic reflection and potential field (aeromagnetic and gravity) data. From 1981 through 1983 (part of the Bechtel team), I participated in the Electric Power Research Institute-sponsored study of eastern seismicity, and during the late 1970s and early 1980s participated in the TVA-sponsored Southern Appalachian Tectonic Study (with S. S. Alexander and W. J. Hinze, 1979-1980). Current research support includes a Nuclear Regulatory Commission grant for study of the East Tennessee seismic zone (through 2015), a USGS EDMAP grant (detailed geologic mapping of stream terraces around Douglas Lake), and a National Park Service grant (detailed geologic mapping, Obed W & SR region).

Research Support: Received over \$5M in grants and contracts from the National Science Foundation, Nuclear Regulatory Commission, U.S. Department of Energy, U.S. Department of the Interior, state geological surveys, and private industry.

Professional Service (Abbreviated): Editor (with W. A. Thomas) Geological Society of America Bulletin (1982-88); President, Geological Society of America (1993); President, American Geological Institute (1996); Trustee, GSA Foundation (1999–2007), Chair of the GSA Foundation Board (2005–07); National Academy of Sciences/National Research Council Board on Radioactive Waste Management (1990-96); Federal Advisory Committee on Nuclear Reactor Safety Research (Nuclear Regulatory Commission, 1993-96); Federal Advisory Committee for the National Cooperative Geologic Mapping Program (Department of the Interior, 1996-2006); Federal Advisory Committee Oak Ridge Site Specific Advisory Board (2009-2015; have also served on numerous committees of GSA, AAPG, AGU, and other organizations. Fellow: AAAS, Geological Society of America, Geological Association of Canada.

Professional Registrations: Georgia (#290), Tennessee (#1211).

Medals and Awards: Geological Society of America Distinguished Service Award (1988, the first ever awarded), I. C. White Award (1997), honorary citizen of West Virginia (by the Governor, 1998), John T. Galey Award by the Eastern Section of the American Association of Petroleum Geologists (2001), American Geological Institute Ian Campbell Medal (2006), Geological Society of America Penrose Medal (2006), and American Geological Institute Marcus Milling Legendary Geoscientist Medal (2014). The latter three medals constitute the highest levels of career recognition possible in my profession.

Publications: Author or co-author of >200 scientific publications, including 9 books.

Graduate Students: 47 M. S. theses and 17 Ph. D. dissertations completed since began working in graduate departments in 1978. 3 M. S. and 1 Ph. D. student are currently in progress.

Election of Local Section Officers

In accordance with the Knoxville-Oak Ridge Section of the AIChE By-Laws (<http://web.ornl.gov/sci/aiche/bylaws.html>), officers and directors are to be elected every year. Officers serve a 1 year term whereas the directors serve for 2 years.

The local section is looking for members in good standing that may be interested in volunteering for any of the following officer/director positions.

- Chair Elect (the previous Chair Elect automatically assumes the Chair position).
- Secretary
- Treasurer
- Directors (2)

We encourage anyone who would like to become more active in the local Section to run for an office. If you have questions about the level of commitment, job duties, or would like to include your name as a candidate

for an office, please contact Bonnie LaPierre at lapierrebl@y12.doe.gov. If you cannot reach Bonnie, feel free to contact any of the other Section officers at the email addresses and/or phone numbers posted on page 5.

Once engaged in the Section meetings we are sure that you will agree that we have a great group of people who all work together to provide the Section with informative programs and opportunities. If you are unsure as to whether you can make all the meetings or cannot commit to being on the Board, we encourage you to still attend the Board meetings (typically beginning at 5:30, just before the scheduled Section meeting) and meet other members and share your ideas. Board meetings are open to all members. Attending a board meeting is a good way to get a feel for the workings of the Section and to see firsthand the level of commitment and involvement required (actually

very little) of the Section Officers. We routinely have several members participate in the board meetings although not an elected officer or director. If for no other reason, attending local Section meetings is a good way to network with other Chemical Engineers in the area.

(Excerpt from, Michael Aident, *Election of Local Section Officers*, American Institute of Chemical Engineers, Knoxville-Oak Ridge Section, October 2013, Vol. 66, Issue 7)

UT Student Poster Presentation at November Meeting

University of Tennessee Chemical and Biomolecular Engineering student, Mauricio Valverde, will present a poster on his research on the study of the mechanism of viral fusion protein activity for transport of drugs or genes across cell membranes at the November meeting of the Knoxville-Oak Ridge Section of AIChE. You are invited to either come at 5:30 pm or stay after the regular meeting to talk with Mauricio about his work.

Abstract – Fusion proteins facilitate the combining of two membranes in processes such as viral infection, secretion, and phagocytosis. Hemagglutinin (HA) is a viral fusion protein that undergoes an irreversible conformational change upon acidification to catalyze the fusion of endosomal and viral membranes during influenza infection. This rearrangement, which is essential for fusion activity, exposes a 20 amino acid sequence, the fusion peptide, which is previously buried within the protein's core. The conformational change of HA to the fusion active state has been associated with a cell-wide autocatalytic activation. Other viral fusion proteins go through similar rearrangements in order to deliver viral DNA to the host cell. Understanding and engineering the mechanism of viral fusion protein activity will lend insight toward the design of efficient delivery systems for transport of drugs or genes across cell membranes. Here, we characterize hemagglutinin mutants engineered for altered activation pH triggering the conformational change, and we probe the kinetics of autocatalytic activation and aggregation.

Bio – Mauricio Valverde received his B.S. in Chemical Engineering from the University of Florida in 2008. He enrolled in the Chemical and Biomolecular Engineering department at the University of Tennessee in August 2011 and began working in the laboratory of Eric T. Boder.



Preview of December Meeting

The December meeting of the Knoxville-Oak Ridge Section of AIChE will feature a presentation by David Moon of Moon Capital Investments. David's presentation, titled: "A quick look at interest rates - 5000 BC to present," will compare today's interest rates and lending practices with historical methods. Please join us for this entertaining and informative look at the art of borrowing and lending money.

Abstract - If you are over the age of 50, you probably remember the 1980s when CD and mortgage rates were in the mid-to-high teens. If so, today's interest rates seem unsustainably low, especially in historical context. That is, if your sense of history correlates anywhere close to your personal experience.

But what if we look at interest rates over an even longer period—say 7,000 years or so? How do today's rates compare in that context? David Moon will discuss historic interest rate trends, including changes in lending and collateralization practices over the past seven millennia.

Bio - David Moon is President of Moon Capital Management. His editorial writing has been featured in the Wall Street Journal, Barron's and Corporate Board Member magazine. He currently pens a weekly commentary for newspaper publisher Scripps. Prior to Maria Bartiromo's departure from CNBC, David was a regular guest on her "After the Bell" segment.

David is also the author of Thoughts Are Things®, a collection of daily devotionals for elementary and middle school-aged students and their families. The book received the top award for best Juvenile Inspiration book of 2013 by the Beverly Hill-based National Indie Excellence Awards.

David earned bachelor's and MBA degrees (both cum laude) from the University of Tennessee, where he was named a member of the Academic All-Southeastern Conference football team his senior year. He was an adjunct professor in the finance department of his alma mater from 1995 to 2002 and earned the Chartered Financial Analyst designation in 1995.

Along with his wife of 29 years and their 14-year-old twins, David lives on an east Knox County farm where his life regularly resembles old episodes of "Green Acres."



Volunteer Opportunity

From time to time the Local Section is contacted by parents of prospective University of Tennessee chemical engineering students, seeking information on the duties of practicing chemical engineers and career development opportunities. Information such as this is of great value to students trying to decide on a career path. If you are interested in sharing your career experiences with prospective chemical engineering students, please contact a member of the Local Section board for additional information (see the Officers section on page 5 for contact information). We recently received an inquiry such as this from a parent, whose son will be visiting the UT campus on Monday, November 24, 2014 for a full day of tours and meetings. The student and parents are available on Tuesday, November 25, 2014 around 9:00 or 9:30 and would appreciate your input on a career in chemical engineering.

National Election News

Knoxville-Oak Ridge Section member and Director Sharon Robinson has been elected to serve on the National AIChE Board of Directors. Please join us in congratulating Sharon on this achievement. Also, thank you for casting your vote and enabling Sharon to serve as a National Director of AIChE.



Dr. Sharon M. Robinson,
newly elected to the National
AIChE Board of Directors

Activities Calendar

Date	Time	Topic	Speaker	Location
Nov 16-21		2014 AIChE Annual Meeting		Atlanta Marriott Marquis Hilton, Atlanta GA
Nov 20	6:00 PM	Progress in Understanding Seismic Hazard in the East Tennessee Seismic Zone – Joint with SWE	Robert Hatcher, UTK	Rothchild's, Knoxville TN
Dec 18	6:00 PM	A quick look at interest rates - 5000 BC to present	David Moon, Moon Capital Investments	Rothchild's, Knoxville TN
Jan 15	6:00 PM	What is everything made of? The quest for the ultimate building blocks of the physical universe – Joint with ASM	Soren Sorenson, UT Physics Department	Sun Sphere Restaurant, Knoxville TN
Feb 19	6:00 PM	Pu-238 Production – Joint with ANS	Bob Wham, ORNL	Rothchild's, Knoxville TN
Mar 12	6:00 PM	Proton Therapy	TBD	Rothchild's, Knoxville TN
Apr 16	6:00 PM	3D Modeling and Engineering	Jack Kissell, Modern Tech	TBD
Apr XX		UT Department of Chemical & Biomolecular Engineering Awards Banquet		TBD
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!



(392 MW Ivanpah Solar Power Facility, Mojave Desert - Courtesy of DOE Digital Photo Archive, <https://www.flickr.com/photos/brightsourceenergy/8720323711/in/faves-departmentofenergy/>)

"Everything should be made as simple as possible, but not simpler."

Officers

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Chair-Elect:	Kyle Mack	(423)747-7947	kylematthewmack@gmail.com
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Albert Einstein
Theoretical physicist and philosopher
1879-1955

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We're on the Web!

See us at:

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

Editor: B. Lewis

About Our Organization...Online Donation

Did you know that you could donate online to AIChE's Annual Fund or select from a number of other specific programs to donate? There are several ways of donating to the AIChE by either sending a check, dues renewal gifts, planned gifts, tribute gifts, stock gifts, matching gifts, make a pledge, or endowment gifts.

AIChE makes it easy to donate to:

- AIChE Annual Fund
- Minority Affairs Committee (MAC) – MAC Futures Fund
- Andreas Acrivos Award for Professional Progress in Chemical Engineering
- D.I.C Wang Award for Excellence in Biochemical

- Engineering
- AIChE Leadership Challenge: Volunteer Leaders for the Future
- Society for Biological Engineering BioCatalyst Fund
- AIChE Water Initiative
- Center for Energy Initiatives
- Minority Programs
- Women's Initiatives

Refer to the National AIChE web-site for additional information on making a donation.

(Source: <http://www.aiche.org/community/giving/donate>)

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