



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

For additional information about the Knoxville-Oak Ridge Section  
of AIChE see our Web site at: <http://www.ornl.gov/sci/aiche/>

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## February 2017 Meeting – Joint with ANS

Date: Tuesday, February 21, 2017  
Location: Rothchild Catering and Conference Center, 8807 Kingston Pike, Knoxville TN  
Cost: \$20 (Cash or Check at the door or to pre-pay using a credit card, see page 2 - **NOTE: There is no cost for the program or PDH Certificate**)  
5:00 pm Executive Committee Meeting (All members welcome)  
5:30 pm Social/Networking  
6:00 pm Dinner – Menu  
7:00 pm Program – Dr. Jim Roberto, Associate Laboratory Director for Science and Technology Partnerships at Oak Ridge National Laboratory, ***The Discovery of Element 117: Super-Heavy Element and the “Island of Stability”***

Abstract – The periodic table received a significant update in December 2015 with the recognition of four new chemical elements with atomic numbers 113, 115, 117, and 118. Element 117, the most recent of these discoveries, was synthesized by bombarding a  $^{249}\text{Bk}$  target produced at the High Flux Isotope Reactor and Radiochemical Engineering Center at Oak Ridge National Laboratory with an intense beam of  $^{48}\text{Ca}$  ions at the Joint Institute of Nuclear Research in Dubna, Russia. The resulting nuclei included two isotopes of element 117, with nine new heaviest isotopes of odd-Z elements 115 through 105 observed in related decay chains. These nuclei represent our closest approach to date to the “island of stability” for super-heavy elements originally proposed by Seaborg in the 1960s. The results provide the strongest evidence to date for the existence of the island, where the effects of closed shells of neutrons and protons are expected to confer exceptionally long lifetimes to super-heavy nuclei. The presentation will review recent progress in super-heavy element research with a focus on the significance of element 117, the role of actinide targets, and opportunities to produce even heavier nuclei and elements. Element 117 officially joined the periodic table in November 2016 as Tennessine (Ts), recognizing contributions of the Tennessee region, including ORNL, Vanderbilt, and the University of Tennessee to super-heavy element research.

Bio – (See Page 2)

***Please make your reservations no later than noon on  
February 20, by contacting***

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

***See page 2 for an alternate electronic registration option using EventBrite***

***Students are encouraged to attend  
and will be subsidized***

## February 2017 Meeting (continued)

Bio - Jim Roberto is Associate Laboratory Director for Science and Technology Partnerships at Oak Ridge National Laboratory. He oversees ORNL's strategic engagement with industry and universities, including technology transfer and partnership activities involving hundreds of companies, universities, joint faculty, and graduate students. He previously served as ORNL's Deputy for Science and Technology, Associate Laboratory Director for Physical Sciences, and Director of the Solid State Division. Jim joined ORNL in 1974 after receiving a Bachelor's degree in aeronautics and astronautics from the Massachusetts Institute of Technology and PhD in applied physics from Cornell University.

A former president of the Materials Research Society, Jim has authored or coauthored more than 100 publications, co-chaired numerous national and international conferences, and presented more than 200 invited talks and seminars. His research interests include condensed matter and materials physics, ion-surface interactions, materials for energy-related systems, and the synthesis and properties of super-heavy nuclei, where he participated in the recent discovery of element 117. He is a fellow of the American Association for the Advancement of Science, fellow of the Materials Research Society, and recipient of the 2004 National Materials Advancement Award from the Federation of Materials Societies.

## Alternate Registration and Payment Option for Local Section Meeting Attendees

The Knoxville-Oak Ridge Section of AIChE is providing an alternate registration and 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/the-discovery-of-element-117-super-heavy-elements-and-the-island-of-stability-tickets-31511867845>

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 Presentation at February Meeting

University of Tennessee Chemical and Biomolecular Engineering PhD candidate, Jiang Guo, will present a poster on his research, entitled: *Magnetite Polymer Nanocomposites for Giant Magnetoresistance and Electromagnetic Shielding*, at the February meeting of the Knoxville-Oak Ridge Section of AIChE. You are invited to talk with Jiang about his work at 5:00-6:00 p.m. or after the program.

### **Magnetite Polymer Nanocomposites for Giant Magnetoresistance and Electromagnetic Shielding**

Jiang Guo and Zhanhu Guo



***Integrated Composites Lab, Department of Chemical & Biomolecular Engineering,  
University of Tennessee, Knoxville, TN 37996, USA***

Due to the incomparable advantages such as light weight, optical, magnetic, and enhanced mechanical properties, polymer nanocomposites have been widely studied by researchers for different applications such as environmental remediation, energy (or information) storage, and sensing. Giant Magnetoresistance (GMR) phenomenon can be designed for information storage – our previous work shows that polymer nanocomposites show unique GMR behavior, indicating great potential applications for information storage. Meanwhile, as in the development of electrical devices, electromagnetic wave radiation is a potential threat for human health. Thus, the materials with electromagnetic wave absorption properties are urgently needed. In this project, we found the negative GMR in the magnetite polypyrrole nanocomposites (PNCs) synthesized by the surface initiated polymerization method. The temperature dependent resistance of the magnetite nanocomposites indicates a 3-D variable range hopping (VRH) electrical conduction mechanism. The positive GMR is observed in the synthesized pure polypyrrole at room temperature and analyzed by the wave function shrinkage model. The negative GMR is obtained in the synthesized magnetic PNCs at room temperature and analyzed by the orbital magnetoconductivity theory. Meanwhile, enhanced electromagnetic wave shielding is observed in its epoxy nanocomposites, which is due to the increased interface area, eddy current loss, and increased anisotropic energy. Moreover, significantly reduced flammability is observed and analyzed as well.

**Bio** - Mr. Jiang Guo is currently a PhD candidate in the Department of Chemical and Biomolecular Engineering at the University of Tennessee, Knoxville. He obtained his M.S. (2014) from the Dan F. Smith Department of Chemical Engineering at Lamar University, Beaumont, TX, USA. He received B.E. (2012) from the School of Chemical and Biological Engineering at Taiyuan University of Science and Technology, China. His research interests include Multifunctional Polymer Nanocomposites and Carbon Nanocomposites, Environmental Remediation Polymers, Conductive Polymers, Giant Magnetoresistance Sensors and Electromagnetic Interference Shielding/Microwave Absorption Composites.

## Notes from AIChE Discussion Group

On January 30, 2017 at 5:44 PM Joseph Cramer posted the following in the on-line AIChE discussion group:

Just a quick note about the recently posted Chemical Engineering Handbook that can now be downloaded from the NCEES (National Council of Examiners for Engineering and Surveying) website. This 600-page Handbook will have many uses and will soon be the only reference supplied for those who take the Ch.E. PE Exam, which will be given beginning in January 2018 only in computer based testing format. Right now, there will be an opportunity through April 30<sup>th</sup> of this year for interested ChEs (both with or without a PE) to submit helpful suggestions or comments. A good way to better understand the Handbook and gain access to comment is to go through the following AIChE web page: <http://www.aiche.org/resources/careers/professional-engineering-licensure/pe-handbook-provide-input>.


(Courtesy of Paul Taylor)



## VOLUNTEER'S CORNER

*Engineers making a difference in our community*

<i>Date</i>	<i>Event</i>
Anytime	<b>Junior Achievement</b> <ul style="list-style-type: none"> <li>Interested in teaching Math or Science to a Middle/High Schooler? Check out the Junior Achievement site at: <a href="http://www.jaeasttennessee.org">www.jaeasttennessee.org</a>.</li> </ul>
Anytime	<b>AIChE Young Professionals Committee</b> We sponsor a competition for our collegiate student chapters, the <a href="#">Global Undergraduate Student Video Competition</a> . This competition requires chapters to create a video about a relevant chemical engineering subject that will be shown to high school students to teach them about that topic, and ultimately encourage them to study chemical engineering.
Anytime	<b>AIChE Academy</b> AIChE Academy can deliver chemical engineering educational resources to help Chemical Engineering professionals connect, learn, and solve pressing challenges. Visit <a href="http://www.aiche.org/academy">www.aiche.org/academy</a> and see what AIChE Academy has to offer. <div data-bbox="899 976 1240 1064" data-label="Image"> </div>
Anytime	<b>AIChE K-OR section needs help</b> with: <ul style="list-style-type: none"> <li>Social Media Committee – The local section desires to establish a presence on various social media outlets, such as: Facebook™, Twitter™, LinkedIn™, and YouTube™.</li> <li>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.</li> <li>Monthly Newsletter - Submit an Article, Editor-At-Large</li> <li>AIChE K-OR Webmaster</li> </ul>
Anytime	<b>Engineer's Without Borders</b> – <a href="http://www.ewb-usa.org">http://www.ewb-usa.org</a>
Anytime	<div data-bbox="878 1472 1213 1656" data-label="Image"> </div> <p><b>Why did you choose to be a TN Achieves mentor?</b>            I truly believe the Tennessee Promise is a game changer for our state. Working with students who until now did not believe college was a possibility for them is amazing. This program is changing lives and improving our state. I am proud to be a small part of that effort.</p>

	<p>If you have not yet registered to mentor with the Class of 2017 and would like to do so please visit <a href="https://tnachieves.org/mentors/apply/">https://tnachieves.org/mentors/apply/</a> to do so today!</p>
Anytime	<p><b>National Council of Examiners for Engineering and Surveying needs reviewers for PE Chemical Handbook</b></p> <p>The NCEES (National Council of Examiners for Engineering and Surveying) has requested that practicing engineers assist in reviewing the PE Chemical Handbook for possible errors and omissions. In January 2017, <a href="#">NCEES</a> published a draft of the PE Chemical Handbook to provide reference information for engineers taking the <a href="#">Chemical Principles and Practice of Engineering (PE) Exam</a>. NCEES is the organization that develops and administers the examinations for Professional Engineering licensure. When the professional license exam is converted to a computer-based test in the near future, the handbook will be the only reference available to the examinees and will be loaded online. The handbook may be downloaded by both practicing engineers to use as a reference and by prospective examinees as a study guide.</p> <p>To enroll in the review process and obtain a copy of the draft handbook, you may connect to the following AIChE website: <a href="http://www.aiche.org/resources/careers/professional-engineering-licensure/pe-handbook-provide-input">http://www.aiche.org/resources/careers/professional-engineering-licensure/pe-handbook-provide-input</a>. The AIChE website will provide directions for connecting to the NCEES site.</p> <p>If you have any questions, please contact Joe Cramer: <a href="mailto:josec@aiche.org">josec@aiche.org</a>.</p>
January	
February 17-18, 2017	<p><b>Tennessee Science Bowl</b></p> <p>See <a href="http://www.orau.gov/sciencebowl/volunteers/index.html">http://www.orau.gov/sciencebowl/volunteers/index.html</a> for details.</p> 
February 18, 2017	<p><b>Boy Scouts Merit Badge College</b></p> <p>Roane State Community College - <a href="#">Merit Badge College</a></p> <ul style="list-style-type: none"> <li>• Help teach the chemistry merit badge</li> <li>• <b>Contact Paul Taylor or Mark Swientoniewski if you can help</b></li> </ul>
February 19-25, 2017	<p><b>Engineer's Week – <a href="#">DiscoverE.org</a></b></p> <p>As part of Engineer's Week, Consolidated Nuclear Security, LLC, (Y-12) is soliciting volunteers to conduct visits to local schools in the February 20-24 and beyond timeframe. For more information on this service opportunity contact:</p> <p><b>Kristin Waldschlager</b>  Community and Education Outreach  Communications &amp; Public Affairs  <a href="mailto:waldschlagk@y12.doe.gov">waldschlagk@y12.doe.gov</a>  (865) 574-8934 <b>Office</b>  (865) 363-0633 <b>Cell</b></p>

<b>February 25</b>	<b>MATHCOUNTS Competition</b> Judges are needed for the MATHCOUNTS Competition at the John D. Tickle Engineering Building at UT. The MATHCOUNTS Competition Series is a national program that provides students the opportunity to compete in live, in-person contests against and alongside their peers. Created in 1983, it is the longest-running MATHCOUNTS program and is open to all sixth-, seventh- and eighth-grade students. See related article on page 8 of newsletter.
<b>March</b>	<b>Chem-E-Car Competition</b> AIChE's annual Chem-E-Car Competition® engages college students in designing and constructing a car powered by a chemical energy source, that will safely carry a specified load over a given distance and stop.
<b>March 9, 2017</b>	<b>Tate's School of Discovery Science Fair</b> Judges are needed for 3 <sup>rd</sup> , 4 <sup>th</sup> , and 5 <sup>th</sup> grade participants. Time: 8:00 AM - 2:00 PM Location: Tate's School of Discovery
<b>March 24 - 25 2017</b>	<b>Volunteer judges needed for FIRST Robotics</b> TNFIRST (For Inspiration and Recognition of Science and Technology in Tennessee) is seeking volunteers to serve as judges at the TNFIRST Robotics regional competition March 24-25.  During the competition, high school student participants build and program industrial-sized robots to play a difficult field game against like-minded competitors. Both technical and non-technical judges are needed since categories judged include business and sportsmanship as well as engineering and other technical fields. Volunteer judges must commit to attending from 7 a.m.-5 p.m. on both March 24 and March 25 at the Thompson-Boling Arena in downtown Knoxville. To volunteer or for more information, contact Patti Jones (PJK) at 241-8073.  FIRST is a 501 (c) (3) not-for-profit public charity founded in 1989 to design accessible, innovative programs that motivate young people to pursue education and career opportunities in science, technology, engineering and math, while building self-confidence, knowledge and life skills. TNFIRST's website is <a href="#">here</a> .
<b>March 27-30, 2017</b>	<b>Southern Appalachian Science &amp; Engineering Fair (SASEF)</b> UTK Thompson Boling Arena To register as a judge: <a href="http://sasef.com/">http://sasef.com/</a> . Select "Judges" and then "Register Online."
<b>March 31, 2017 – April 1, 2017</b>	<b>AIChE UT Student Chapter is hosting a regional conference</b> 2017 Southern Student Regional Conference March 31 - April 1, 2017 University of Tennessee, Knoxville Conference Highlights include Regional Chem-E-Car Competition, Regional ChemE Jeopardy Competition and Regional Student Paper and Poster Competitions. Conference Chairs: Mary McBride and Melanie Lindsey ( <a href="mailto:aiche_src17@utk.edu">aiche_src17@utk.edu</a> ) Advisor: Eric Boder ( <a href="mailto:boder@utk.edu">boder@utk.edu</a> )



April 3, 2017	<b>Regional Elementary Science Fair</b> Judges are needed for 3 <sup>rd</sup> , 4 <sup>th</sup> , and 5 <sup>th</sup> grade participants from regional private schools. Time: 9:30 AM - 5:00 PM Location: Knoxville Christian Center
May	
June	<b>Volkswagen-Sponsored Camp Introduces Students to UT, Engineering</b> With the Volkswagen-sponsored <a href="#">Engineering VOLunteers for Tenth Graders</a> , or eVOL10, now under way at the University of Tennessee, Knoxville, <a href="#">College of Engineering</a> , students in high school and middle school are getting a chance to take a deeper look into future possibilities in science, technology, engineering and mathematics, or STEM.
July	<b>AIChE K-OR Planning Meeting</b> for the upcoming academic year needs ideas and help planning speakers and arranging meeting locations.
August	
September	





## Judges Needed for MATHCOUNTS Competition

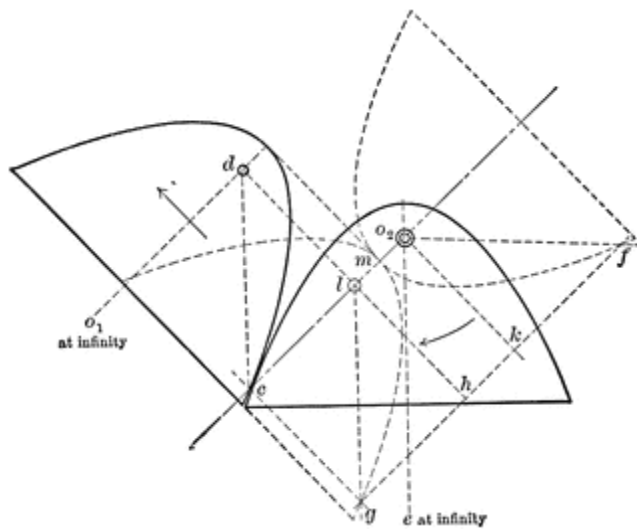
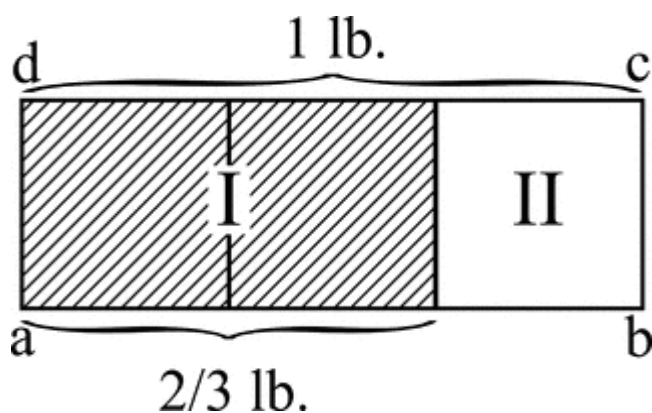
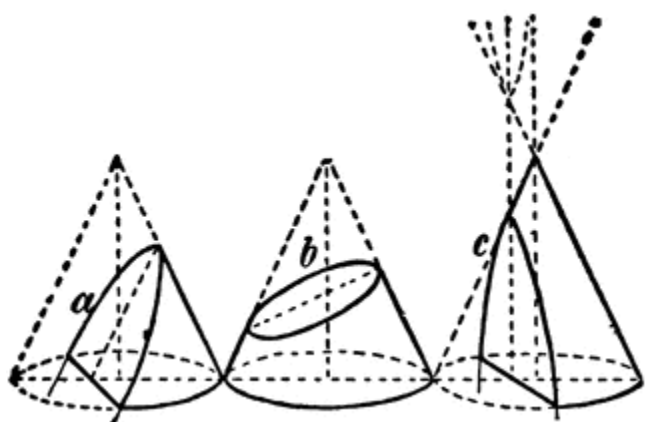
The Knoxville area MATHCOUNTS competition is scheduled for Saturday, February 25, 2017 in the John D. Tickle Engineering Building at the University of Tennessee. Judges are needed for this year's competition. If you are willing to serve in this capacity you will need to arrive by 9:15 a.m. on the day of the completion and remain available for duty until noon. Judges are also welcome to stay for lunch and to watch the countdown round.

About a dozen judges are needed. There is a new on-line scoring program this year and whoever ends up being the captain will be provided with access to the program.

Please let Chris Cox (see contact information below) know of your availability. He will send a follow up email to those that can serve with final details the week before the competition.

Your willingness to serve as a judge is appreciated.

Chris D. Cox, PhD, PE  
 Department Head and Robert M. Condra Professor  
 Department of Civil and Environmental Engineering  
 325 John D. Tickle Building  
 University of Tennessee  
 Knoxville, TN 37996-2313  
 voice: 865-974-7700  
[ccox9@utk.edu](mailto:ccox9@utk.edu)  
<http://cee.utk.edu/>



## Activities Calendar

Date	Time	Topic	Speaker	Location
Feb 21	6:00 PM	Joint meeting with ANS – Tennesseine (element 117) Discovery	Jim Roberto, ORNL	Rothchild's, Knoxville TN
Mar 23	6:00 PM	Joint meeting with UT Student Chapter – Unit Operations Lab Tour	TBD	UT – Dougherty
Mar 26-30		2017 Spring Meeting and 13th Global Congress on Process Safety		Henry Gonzalez Convention Center, San Antonio, TX
Apr 18	6:00 PM	A Peripatetic Life – The Life of an Engineer	Emory Ford, Emeritus Director of MTI	Rothchild's, Knoxville TN
Apr 20		UT Department of Chemical & Biomolecular Engineering Awards Banquet		TBD
May 16	6:00 PM	Finances	Jim Brogan, Brogan Financial	Rothchild's, Knoxville TN
Oct 29 – Nov 3		2017 AIChE Annual Meeting		Minneapolis Hilton and Convention Center, Minneapolis, MN

## 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!



(Chemical symbol for element 117, Tennesseine: <https://www.ornl.gov/news/tennessine-acknowledges-state-institutions-roles-element-s-discovery>)

## Officers

<b>Chair:</b>	Jae-Soon Choi	946-1368	<a href="mailto:choijs@ornl.gov">choijs@ornl.gov</a>
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<b>Secretary:</b>	David DePaoli	574-6817	<a href="mailto:depaolidw@ornl.gov">depaolidw@ornl.gov</a>
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<b>Website</b>			<a href="http://www.ornl.gov/aiche">http://www.ornl.gov/aiche</a>

*"The historic discovery of tennesseine is emblematic of the contributions Tennessee institutions like Oak Ridge National Laboratory, the University of Tennessee and Vanderbilt University make toward a better world."*

**Bill Haslam**

49th and current Governor of Tennessee  
Born 1958

## Knoxville - Oak Ridge Section

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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 Career Engineer*

Are you an AIChE member looking for a job or are you an employer trying to find qualified candidates? If so, checkout the [AIChE Career Engineer site](http://careerengineer.aiche.org/).

Job seekers can upload resumes, receive job alerts/notification, and search for positions by job title, key words, and/or location.

Employers have a wide range of options for posting and advertising positions.

(Source: <http://careerengineer.aiche.org/>)

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