

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

May 2016 Meeting

Date: Thursday, May 19, 2016 – ***Final meeting before summer hiatus***
Cost: \$10 (Cash or Check – **NOTE:** There is no cost for the program or PDH Certificate)
Location: Frank H. McClung Museum, The University of Tennessee, 1327 Circle Park Drive, Knoxville, TN - Park along the circle drive in front of the museum (just across from the torchbearer statue). No parking passes are needed. Come in the front door, and a guard will be available to direct you to the correct location.
5:30 pm AIChE Executive Committee Meeting (All members welcome),
6:00 pm Pizza and soft drinks at the Museum
7:00 pm Program – Dr. Stephanie Drumheller-Horton, Department of Earth and Planetary Sciences, Frank H. McClung Museum – *Not Just Living Fossils: Crocodylian Evolution and Diversity from the Age of Dinosaurs to the Present*

Abstract – Many of us have heard, at one time or another, that alligators and crocodiles are living fossils, unchanged since the time of the dinosaurs. However, a study of the group's fossil record reveals that this couldn't be further from the truth. Ancient crocodilians and their relatives included species that walked on two legs, others which were fully marine, some that ate only plants, and true giants, who could grow longer than a school bus. Come learn about the surprising history of this often understudied group.

Bio – Professor Drumheller-Horton's received her PhD from The University of Iowa in 2012 from the Department of Geoscience. Her Dissertation was entitled: *An actualistic and phylogenetic approach to identifying and interpreting crocodilian bite marks*. Her research interests center on vertebrate taphonomy, ichnology, paleopathology, and paleoecology. In particular, she studies bone surface modifications generated under modern and experimental conditions to better understand the processes which left similar traces on bone in the fossil record. Her current projects include:

- Testing methods for applying these modern analogies in a deep time perspective.
- Interpreting trophic interactions, behavior, and diet of different archosaurian groups.
- Identifying and differentiating historically understudied traces and pathologies, such as bite marks, shell disease, and plant or fungi mediated damage to bone.

Please make your reservations by either using the new [EventBrite](#) reservation / payment option (see article on page 2) or by contacting the following by end of the day on May 18

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

Knoxville-Oak Ridge Section of AIChE Presents Awards to Outstanding UTK-CBE Students

The University of Tennessee Department of Chemical & Biomolecular Engineering held the annual Honors Awards Banquet on April 20, 2016 at The Southern Depot, Knoxville Tennessee. Mark Swientoniewski, Chair of the Knoxville-Oak Ridge Section of the American Institute of Chemical Engineers, presented two AIChE Student Awards as recommended by the UT faculty. The AIChE Outstanding Student Award and a cash prize of \$200 was awarded to Mr. Alexander Parrott. The AIChE Outstanding Baccalaureate Award and a cash prize of \$200 was awarded to Mr. Travis Kever.

(Article courtesy of Mark Swientoniewski)



AIChE Outstanding Student Award winner, Mr. Alexander Parrott with Knoxville-Oak Ridge Section Chair, Mark Swientoniewski. Photo courtesy of Nick Myers.



AIChE Outstanding Baccalaureate Award winner, Mr. Travis Kever with Knoxville-Oak Ridge Section Chair, Mark Swientoniewski. Photo courtesy of Nick Myers.

New Payment Option Available for Local Section Meeting Attendees

The Knoxville-Oak Ridge Section of AIChE will continue 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/not-just-living-fossils-crocodylian-evolution-and-diversity-from-the-age-of-dinosaurs-to-the-present-tickets-25121751836>.

If you use this service, the cost for the May meeting will be \$11.54. If you do not want to use this web-based payment option, you may pay \$10 at the door by cash or check.

Student Poster Presentation at May Meeting

University of Tennessee Chemical and Biomolecular Engineering (CBE) PhD candidate, Aaron Prescott, will present a poster on his research, titled: *Redesigning T Cell Signaling Responses Using in Silico Evolution*, at the May meeting of the Knoxville-Oak Ridge Section of AIChE. You are invited to talk with Aaron about his work at 5:30-6:00 p.m. or after the program.

Abstract: T cells act as cellular detectors of infection, translating information about receptor binding to a cellular response. Engineering T cells and other cell types for applications such as cellular immunotherapy will likely benefit from the ability to rationally design network responses. Here, we consider the earliest part of the T cell receptor (TCR) signaling network and demonstrate that the network, with fixed topology but variable kinetic parameters, can produce a variety of input-output relations (quantified as the level of TCR phosphorylation as a function of the characteristic TCR binding time). We utilize *in silico* evolution to search for combinations of kinetic parameters that give rise to input-output relations including: (i) sigmoidal responses with the activation threshold varied over 6 orders of magnitude, (ii) a graded response, and (iii) an inverted response in which short TCR binding times lead to activation. For each targeted input-output relation, we conduct many independent runs of the evolutionary algorithm and use nonlinear dimensionality reduction to embed the resulting data in two dimensions. Using the embedded data, we partition

the results into groups and characterize constraints placed on the parameters by the different targeted response curves. Our approach provides a way (i) to guide the design of kinetic parameters of fixed-topology networks to generate novel input-output relations and (ii) to constrain ranges of biological parameters using experimental data. In the case of T cell receptor signaling, the network topology exhibits significant flexibility in generating alternative response curves, with distinct patterns of kinetic rates emerging for different targeted responses.

Bio: Mr. Prescott began his career by enlisting in the US Navy. There, he served as an analytical radiochemist monitoring plant conditions of the nuclear propulsion system of modern aircraft carriers. Following the completion of his military service, he earned his BS in Biochemistry from Washington State University. He then went on to spend two years working as a laboratory technician for the US Department of Agriculture, performing experiments measuring soil pathogen levels using nucleic acid quantification techniques. For the past 3 years, Mr. Prescott has been pursuing his Ph.D. in Chemical and Biomolecular Engineering at the University of Tennessee, Knoxville under the advisement of Dr. Steven Abel. His research seeks to gain mechanistic insights of cellular signal transduction networks

using *in silico* optimization to explore the parameter space of numeric models that describe the response behavior of these systems.



Aaron Prescott

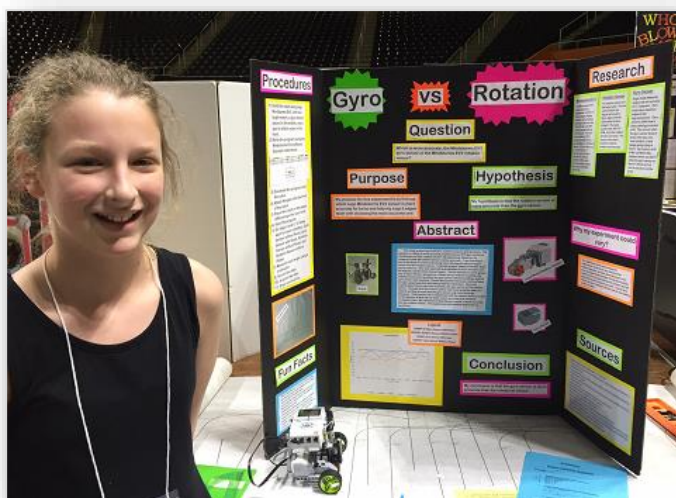
Southern Appalachian Science and Engineering Fair

Knoxville-Oak AIChE Section Officers Mark Swientoniewski and Paul Taylor selected the winners of the Junior and Senior level projects to receive the AIChE Special Awards. The Local Section provides \$75 awards for the best chemical engineering related projects.

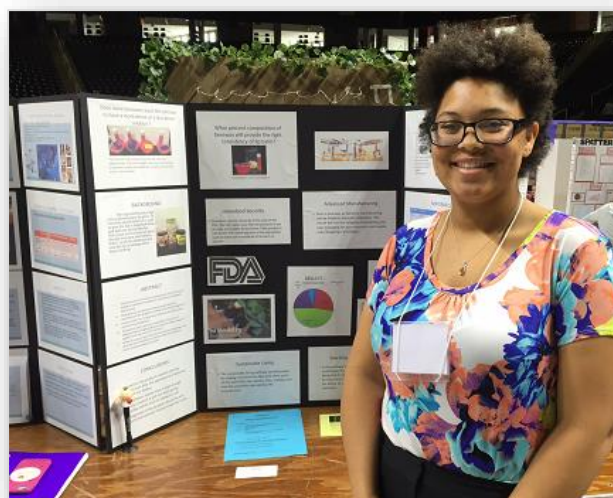
The winner of the Junior project was Alex Shannafield, for her project: **Gyro vs. Rotation**. Alex measured the accuracy of two methods for controlling the turning angle of a wheeled robot, using either a built-in gyroscope or a rotation counter on the wheels.

The winner of the Senior project was Alaysia Dyer for her project: **Chemistry of Cosmetics**. Alaysia measured the physical properties of various compositions of lipstick that she had compounded.

(Article courtesy of Paul Taylor)



Alex Shannafield, winner of the Junior Award for her project: **Gyro vs. Rotation**.



Alaysia Dyer, winner of the Senior Award for her project: **Chemistry of Cosmetics**.

Information about the Frank H. McClung Museum

The McClung Museum at the University of Tennessee, Knoxville, aims to advance the understanding of natural history and culture through our collections, exhibitions, research, and outreach programming. The McClung Museum, which was opened in 1963, has strong collections in anthropology, archaeology, decorative arts, local history, and natural history.

Exhibits at the museum showcase the geologic, historical, and artistic past of Tennessee, as well as cultures from around the globe. In doing so, the museum seeks to promote a better understanding and respect for the world's cultural heritage.

As a part of the university, the McClung supports and participates in the mission to serve the state, region, and nation through scholarship, teaching, artistic creation, professional practice, and public service. A member of the [Smithsonian Institution Affiliate Program](#), the McClung is also one of only eighteen museums in Tennessee to be accredited by the [American Alliance of Museums](#), reflecting the institution's commitment to excellence.

CURRENT EXHIBITS AT MCCLUNG MUSEUM

- [Edmontosaurus annectens](#)
Meet the McClung Museum's newest addition, and University of Tennessee's newest and oldest Vol—an *Edmontosaurus annectens* recently named "Monty" by popular vote. This dinosaur is now on permanent display in front of the museum on Circle Park Drive. Learn more below, tag your best photos of the dino with #mcclungdino, and see real duck-billed dinosaur bones in the McClung Museum's permanent exhibit, [The Geology and Fossil History of Tennessee](#)
- [Ancient Egypt: The Eternal Voice](#)
Through the art, artifacts, and writings in this exhibition, the ancient Egyptians still speak to us. A fine collection of original objects, most manufactured more than 2,000 years ago, shed light on the daily life, religion, and writing of these captivating people. A small number of replicas complement the ancient objects, allowing the visitor insight into an ancient way of life.
- [Archaeology & Native Peoples of Tennessee](#)
The incredibly rich Native American heritage of the state of Tennessee and the archaeological work that has assisted in understanding that past are revealed in this comprehensive and engaging exhibition. Based on more than sixty-five years of research by University of Tennessee archaeologists, the exhibit features many of the finest artifacts of the museum's world-class archaeological research collection, including its widely known examples of prehistoric Native American art.
- [The Decorative Experience](#)
For the permanent exhibition *The Decorative Experience* we have selected 175 items from the museum's collection that embody an aesthetic component. These items come from cultures and societies throughout the world and range in age from 2400 BC to the twenty-first century. Every type of medium is represented in the objects—ceramics, textiles, stone, metal, glass, wood, paint, bone, shell, and combinations of these. Almost all of the exhibition's items were acquired as gifts, many coming to the university before the museum opened in 1963.
- [Geology & Fossil History of Tennessee](#)
A life-size replica of the skeleton of a Cretaceous mosasaur, a large extinct marine reptile, looms overhead, greeting visitors to the *Geology & Fossil History of Tennessee* gallery. Exhibits include hundreds-of-millions-of-years-old fossils, more recent Ice Age fossils, and ongoing accounts of present day geological and climatic events.
- [Human Origins: Searching for our Fossil Ancestors](#)
The question "where did we come from?" has interested theologians for millennia and scientists for centuries. In the permanent exhibition, *Human Origins*, the McClung Museum presents a comprehensive overview of the scientific understanding of the last six million years of the evolution of hominids—humans and our ancestors.

- [The Civil War in Knoxville: The Battle of Fort Sanders](#)

The Civil War in Knoxville begins with an overview of the national political situation in the fall of 1863 and then focuses on the pivotal role of Knoxville's Battle of Fort Sanders and East Tennessee during the American Civil War. Original artifacts, both family heirlooms and archaeologically excavated items, as well as primary source documents, photographs, and video illustrate key elements of this historically significant time and place.

- [Tennessee Freshwater Mussels](#)

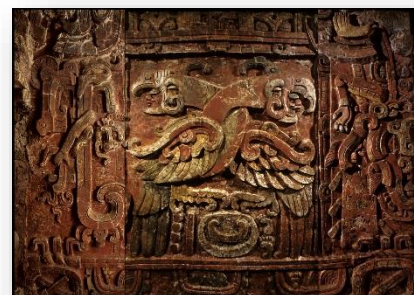
Tennessee Freshwater Mussels is divided into three broad subject areas: the biology and diversity of freshwater mussels; the Native American use of freshwater mussels; and the commercial use of freshwater mussels—the button and pearl industries, both cultured and natural. In addition, the exhibit offers two video segments, one on the life cycle of freshwater mussels and the other on freshwater pearl cultivation in Tennessee. The exhibit is sponsored by Knox County, the Lucille S. Thompson Family Foundation, and the American Pearl Company, Inc. in Nashville.

SPECIAL EXHIBITS

Maya: Lords of Time

January 23, 2016 – May 22, 2016

Maya: Lords of Time explores the time-ordered universe through the Maya's intricate calendar systems and investigates how their history and culture followed a rhythm set by the motion of heavenly bodies. Learn the story of how divine kings used their control over the calendar and its grand public rituals to assert their power.



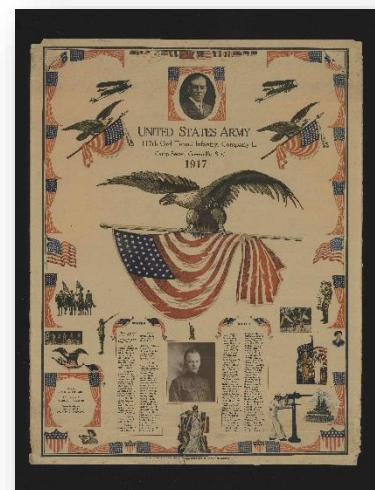
With award-winning interactives, numerous full-sized monumental replicas, and many Central American artifacts, visitors can trace the rise and fall of the Maya kingdoms and follow how ideas of time and the calendar changed before and after the Spanish conquest.

This exhibition also explores how those long-standing beliefs can still be found in Mayan regions today.

The First World War and Knoxville: Through the Eyes of Harry Moreland

March 30, 2016 – June 30, 2016

The First World War and Knoxville: Through the Eyes of Harry Moreland explores the First World War through the personal military memorabilia of Moreland (1899–1969), a Knoxville native and University of Tennessee Law School alum (1922) who enlisted with the 117th Infantry and deployed to the Western Front shortly after the United States entered the war on April 2, 1917.



The mini-exhibition, mounted in honor of the 99th anniversary of the US entry into the war, sheds light on how the "Great War" affected so many, including those right here in Knoxville and at UT.

Life on the Roman Frontier

July 10, 2013 – ongoing

The first Romans reached Mogontiacum, which is located in present-day Germany, in 57 or 56 BCE during the Gallic War—a series of military campaigns waged by Julius Caesar against Gallic Tribes. With its location at the confluence of the Rhine and Mainz Rivers, the region quickly became an area of strategic importance to the Roman Empire. After the end of Roman rule, the settlement continued, becoming the city of Mainz, Germany. The artifacts in Life on the Roman Frontier were collected in Mainz by University of Tennessee historian Dr. Arthur Haas in the early 1960s from the rubble and landfill created by urban renewal.



From building materials and sacred goddesses, to dishes and military boots, the objects in this exhibit give us a glimpse into the everyday lives of soldiers and civilians who lived in the area.

**Birds of Tennessee: Celebrating the Centennial of the Tennessee Ornithological Society
October 5, 2015 – ongoing**

To celebrate the centennial of the [Tennessee Ornithological Society](#) (TOS), the museum is displaying fifty-six engravings and lithographs featuring the birds of Tennessee.

The TOS is an independent, non-profit, educational and scientific organization devoted to the study and conservation of birds. It was founded October 7, 1915, and the first chapter was established in Nashville, followed by Knoxville in 1923.

Spanning two hundred years from 1731 to 1931, the prints on view are by twelve artists: Eleazar Albin, Mark Catesby, Xaviero Manetti, Alexander Wilson, Titian Ramsay Peale, Alexander Rider, Prideaux John Selby, John James Audubon, John Gould, Daniel Giraud Elliot, Henry Eeles Dresser, and Rex Brasher.



The works on view are drawn from the museum's extensive collection of over three thousand ornithological prints and are on display in the pull-out drawer case in the entrance to the Decorative Arts gallery.

UPCOMING EXHIBITS

Dinosaur Discoveries: Ancient Fossils, New Ideas

June 4, 2016–August 28, 2016

This exhibition showcases the world of modern paleontology, introducing a dynamic vision of dinosaurs and the scientists who study them. New discoveries and technologies reveal how dinosaurs lived, moved and behaved. Find out how advanced technologies allow scientists to look at fossils in fresh ways. Examine realistic models and casts, and see dinosaurs walk, run and move their long necks in fantastic computer simulations.

Knoxville Unearthed: Archaeology in the Heart of the Valley

September 7, 2016–January 8, 2017

In honor of Knoxville's 225th anniversary, this exhibition explores the city's heritage as seen through archaeological discoveries in the "Heart of the Valley." Using historic artifacts unearthed in and around Knoxville, along with historical images, maps, documents, and oral histories, the exhibition tells the story of Knoxville's development from a frontier settlement to an industrialized city.

Divine Felines: Cats of Ancient Egypt

February 3, 2017–April 3, 2017

From domesticated cats to mythic symbols of divinity, felines played an important role in ancient Egyptian imagery for thousands of years. *Divine Felines: Cats of Ancient Egypt* explores the role of cats, lions, and other feline creatures in Egyptian mythology, kingship, and everyday life through nearly thirty different representations of cats from the Brooklyn Museum's world-famous Egyptian collection.

(Source: The University of Tennessee, McClung Museum of Natural History & Culture web site: <http://mcclungmuseum.utk.edu/>)

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/or 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.

Activities Calendar

Date	Time	Topic	Speaker	Location
May 19	5:30 PM	Not Just Living Fossils: Crocodylian Evolution and Diversity from the Age of Dinosaurs to the Present	Stephanie Drumheller-Horton	McClung Museum
August	TBD	Planning Meeting		TBD

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!



(Researcher using single crystal diffractometer at ORNL's High Flux Isotope Reactor, <https://www.flickr.com/photos/oakridgelab/9068882498/sizes/m/>)

"Excellence is not a skill. It is an attitude."

Officers

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Ralph Marston

1907-1967

Professional football player

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We're on the Web!

See us at:
www.ornl.gov/sci/aiche/

Editor: B. Lewis

About Our Organization – Discounted Member Products & Services

As a member of AIChE, you are part of an elite worldwide community recognized as the global leader in the chemical engineering profession.

AIChE offers its members a wide array of services and resources—information, career, professional connections, education, recognition, savings, and personal benefits. Some of these products include:

Insurance Plans, Emergency Assistance Programs, Office Depot discounts, AZIGO online shopping mall discounts, Travel benefits, Legal assistance plans,

UPS discounts, and LifeLine Screening. The following links provide complete lists of these offerings:

Financial Benefits Guide:

<http://www.nxtbook.com/ygsreprints/AICHE/aichemember/>

Complete Member Benefits:

<http://www.aiche.org/community/membership/benefits>

(Excerpts from national AIChE web site:
<http://www.aiche.org/resources/member-services>)

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