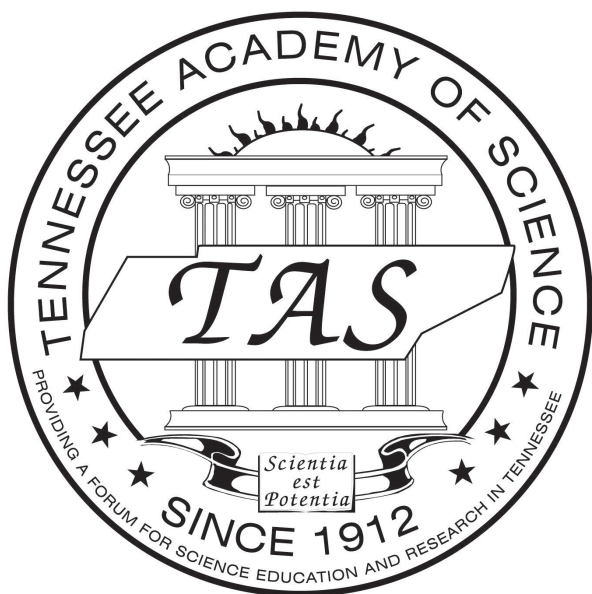




**128<sup>th</sup> Meeting  
Tennessee  
Academy of  
Science**



**November 17, 2018  
Austin Peay  
State University,  
Clarksville, Tennessee**

Celebrating 106 Years

**Tennessee Academy of Science  
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***TAS Future Annual Meeting Sites***

2019 - Columbia State Community College  
2020 - East Tennessee State University  
2021 - Tennessee Technological University

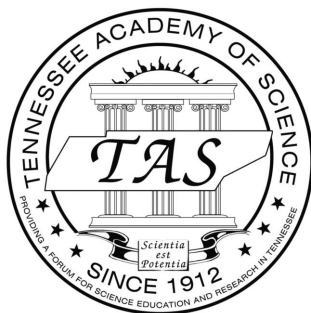
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## Welcome . . .

... to the 2018 Annual Meeting of the Tennessee Academy of Science! We hope you enjoy and benefit from this opportunity to present your research, to learn of other research going on in Tennessee, to interact in a relaxed atmosphere with other science professionals and to participate in the business of the Academy.

Please let members of the Executive Committee know if you have any needs or questions and if the meeting in any way does not meet (or if it exceeds) your expectations (e.g., the second Saturday “experiment” for our Annual Meeting). We are always striving to improve our Academy and its impact upon scientists in Tennessee and beyond.



# Announcements

If they are not already TAS members, presenters and attendees may register/become members by mail or at the Annual Meeting.

Registration/Membership forms will be available on-site, and they are available for download from the TAS website:

**[www.tennacadofsci.org](http://www.tennacadofsci.org)**

Dues can be paid in advance of the Annual Meeting or at on-site registration.

Student	\$10 annually
Emeritus	\$10 annually
Member	\$40 annually
Sustaining	\$50 annually
Supporting	\$100 annually
Life	\$400 single payment

In advance of the Annual Meeting, registration/membership forms can be mailed to the TAS Treasurer (please postmark by November 12):

Dr. Steve Murphree,  
Department of Biology, Belmont  
University, 1900 Belmont Boulevard,  
Nashville, TN 37212-3757

A limited number of **luncheon tickets** will be available for purchase at the registration tables.

## Meeting Schedule

**Friday, November 16, 2018**

5:30 until 10:00 p.m.	<b>Executive Committee Dinner and Meeting</b> Iris Room, Morgan University Center
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**Saturday, November 17, 2018**

7:30 a.m. until 1:30 p.m.	<b>Registration</b> Sundquist Science Complex Atrium
7:30 a.m. until 8:30 a.m.	<b>Poster Setup</b> Sundquist Science Complex Atrium (Poster board and easel provided— look for the designated area to set up your poster)
8:00 a.m. until 8:30 a.m.	<b>Meeting of Section Chairs</b> B310
8:30 a.m. until 9:45 a.m.	<b>Poster Presentation and Judging</b> Sundquist Science Complex Atrium and Halls
10:00 a.m. until 10:30 a.m.	<b>TAS Annual Business Meeting</b> Sundquist Science Complex E106
10:30 a.m. until 10:35 a.m.	<b>Welcome</b> Dr. Karen Meisch, Interim Dean, Col- lege of Science, Technology, Engi- neering and Mathematics Sundquist Science Complex E106
10:35 a.m. until 11:30 a.m.	<b>Plenary Session</b> Presented by Dr. Dwayne Estes Sundquist Science Complex E106
11:30 a.m. until 1:00 p.m.	<b>Luncheon</b> Sundquist Science Complex Atrium
1:00 p.m. until finished	<b>Afternoon Technical Sessions/ Section Business Meetings</b> Sundquist Science Complex B310, C120, C123, C220, C224, D210, D319, E203, E205, E206, E208, E303, E305, E306, E310

## **Meet our Keynote Speaker**

10:35 -11:30 Sundquist Science Complex E106

**Dr. Dwayne Estes**

**Austin Peay State University**

The plenary session for this year's meeting will feature Dr. Dwayne Estes, **Professor of Biology at Austin Peay State University**. Dr. Estes received his B.S. in Plant Biology from MTSU in 2003 and his Ph.D. in Ecology and Evolutionary Biology from UT, Knoxville in 2008. Dr. Estes' talk will be on The Southeastern Grasslands Initiative.

### **Presentation Title:**

## **Charting a New Course for Conservation in the 21<sup>st</sup> Century**

### **Abstract**

Grassland loss is the single greatest conservation issue currently facing eastern North American biodiversity. Southern grasslands are nearly extinct and the species that depend on them are fading fast. The Southeastern Grasslands Initiative (SGI) is a collaboration of leaders in international biodiversity conservation led by the Austin Peay State University Center of Excellence for Field Biology, in partnership with the Botanical Research Institute of Texas, North Carolina Botanical Garden, and Roundstone Native Seed.

Dwayne Estes serves as executive director for SGI. For ten years Dwayne has served as Professor of Biology at APSU and was promoted to Full Professor in 2015.

SGI seeks to integrate research, consultation, and education, along with the administration of grants, to create innovative solutions to address the multitude of complex issues facing Southeastern grasslands, the most imperiled ecosystems in eastern North America.

**Oral Presentations  
Agriculture**

**Chairs: Will Bird, Emalee Buttery, Rachna Tewari  
SSC D210**

**1:00 p.m.– 2:35 p.m.**

1:00-1:05 Business Meeting

1:05-1:20 Using data from nursing programs and the NCLEX as a model to predict success on the Veterinary Technician National Exam (VTNE) **Meera Patel\***, **Jason Roberts**, **Joseph Mehlhorn**, and **Scott Parrott**, *The University of Tennessee at Martin, Martin, Tennessee.*

1:20-1:35 Analysis of necropsy data on cattle in West Tennessee with a focus on preventable disease. **Kaitlyn Courtney\***, **Clint Ary**, and **Emalee Buttery**, *The University of Tennessee at Martin, Martin, Tennessee.*

1:35-1:50 Assessing cattle producer perceptions of calving management strategies. **Kimberly Inman\***, **Clint Ary**, **Will Bird**, **Jason Roberts**, and **Joey Mehlhorn**, *The University of Tennessee at Martin, Martin, Tennessee.*

1:50-2:05 Effects of Nitrogen and Cultivar Type on Germination and Soil Coverage in Winter Canola (*Brassica napus* L.) in Tennessee. **Kyle D. McGeary\***, **Jason P. de Koff**, **Priya Saini**, and **Richard Link**, *Tennessee State University, Nashville, Tennessee.*

2:05-2:20 Prevalence of antimicrobial resistance *Enterobacteriaceae* in plant-based milk. **Winnie Mukuna\*** and **Agnes Kilonzo-Nthenge**, *Tennessee state University, Nashville, Tennessee.*

2:20-2:35 A qualitative assessment of consumer preferences when buying fruits and vegetables, **Enefiok Ekanem** and **Mary Mafuyai**, *Tennessee State University, Nashville, Tennessee.*

\* student author

# presenting author, if not first author



**Botany**  
**Chair: Claude Bailey, Jr.**  
**SSC E205**  
**1:00 p.m. – 3:20 p.m.**

1:00-1:05 Business Meeting

1:05-1:20 Historical and currently-known distribution of *Trifolium reflexum* L. (Buffalo Clover, Fabaceae) in Tennessee. **Edward W. Chester**, *Austin Peay State University, Clarksville, Tennessee.*

1:20-1:35 Waves or Ripples? Whole genome duplication and plant community structure. **Michelle Gaynor\***, **Julienne Ng**, and **Robert G. Laport**. *University of Florida, Gainesville, Florida (MG), University of Colorado-Boulder, Boulder, Colorado (JN), Rhodes College, Memphis, Tennessee (RGL).*

1:35-1:50 Isolation of Sweet Sorghum microspores to identify the microsporogenesis stages towards creating double haploid plants. **Aron Felts\*** and **Ahmad Aziz**, *Tennessee State University, Nashville, Tennessee.*

1:50-2:05 Orchard Knob: The forgotten glades of Chattanooga and an update on *Clematis fremontii* populations in Tennessee. **Alaina Krakowiak\***, **John Shelton\***, and **Joey Shaw**, *The University of Tennessee at Chattanooga, Chattanooga, Tennessee.*

2:05-2:20 Applications, methods, and examples of research projects using the burgeoning Southeastern Regional Network of Expertise and Collections database. **John Shelton\*** and **Joey Shaw**, *The University of Tennessee at Chattanooga, Chattanooga, Tennessee.*

2:20-2:35 An overview of Tennessee's herbaria, based on digitized specimens. **Caleb Powell\*** and **Joey Shaw**, *The University of Tennessee at Chattanooga, Chattanooga, Tennessee.*

\* student author

# presenting author, if not first author

2:35-2:50 Evaluating the ranks of the Tennessee Invasive Plant Council Using Herbarium Specimen Data from the Developing SERNEC Database. **Courtney Alley\* and Joey Shaw**, *The University of Tennessee at Chattanooga, Chattanooga, Tennessee.*

2:50-3:05 Impacts of nutrient enrichment of the Harpeth River in Middle Tennessee by the Franklin Wastewater Treatment Facility on the composition of algae assemblages **Jefferson Lebkuecher, Sandra Bojic\*, Cooper Breeden\*, Samantha Childs\*, Matthew Evans\*, Bailey Hauskins\*, Zach Irick\*, Josh Kraft\*, Jonathan Krausfeldt\*, and Nicole Santoyo\***, *Austin Peay State University, Clarksville, Tennessee.*

3:05-3:20 The Tennessee Plant Conservation Alliance: a collaborative statewide initiative working toward effective conservation. **Cooper Breeden**, *Austin Peay State University, Clarksville Tennessee.*

### **Cell and Molecular Biology**

**Chair: Roger Jackson**

**SSC D319**

**1:00 p.m. – 1:35 p.m.**

1:00-1:05 Business Meeting

1:05-1:20 Pharmacological disruption of the microtubule array to determine the role of golgi-nucleated microtubules in cancer cell migration. **Briar Bell\* and Sarah Lundin-Schiller**, *Austin Peay State University, Clarksville, Tennessee.*

1:20-1:35 Identification of motif and transcription factor binding sites in *Panicum hallii* by ChIP sequencing analysis. **Shohana Huq\* and Suping Zhou**, *Tennessee State University, Nashville, Tennessee.*

### **Chemistry**

**Chair: Wilson Gichuhi**

**SSC C220**

**1:00 p.m. – 3:05 p.m.**

1:00-1:05 Business Meeting

1:05-1:20 Picotechnology and Quantum Atomics. **Preston J. MacDougall**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

\* student author

# presenting author, if not first author

1:20-1:35 Wavelength-Scanned Cavity Ring-Down Spectroscopic Measurements Reveal Strong Carbon Dioxide (CO<sub>2</sub>) to Carbon Monoxide (CO) Correlation in the Highland Rim Region. **Lahiru P. Gamage\*** and **Wilson K. Gichuhi**, Department of Chemistry (LPG, WKG) and School of Environmental Studies (LPG), Tennessee Technological University, Cookeville, Tennessee.

1:35-1:50 A comparison of iodine clock reactions using varied strengths of acids. **Caileigh Lavigne\*** and **Marcia Schilling**, Austin Peay State University, Clarksville, Tennessee.

1:50-2:05 Evaluation of N-Donor Ligands for Selective Minor Actinide Separations. **Morgan L. Brown\***, **Jesse D. Carrick**, and **Cory A. Hawkins**, Tennessee Technological University, Cookeville, Tennessee.

2:05-2:20 Environmentally friendly gold nanoparticles for catalytic applications. **Allison N. Schmittou\***, **Juan Soto**, **Peter J. Ponce II**, and **Rajalingam Dakshinamurthy**, Austin Peay State University, Clarksville, Tennessee.

2:20-2:35 Antibacterial Activity of Antibiotic Coated Gold Nanoparticle. **Purva Patel\***, **Peter J. Ponce II\***, **Allison N. Schmittou\***, **Juan Soto\***, **Ahrang Yee\***, **Sergie Markov**, and **Rajalingam Dakshinamurthy**, Austin Peay State University, Clarksville, Tennessee.

2:35-2:50 Synthesis of unsymmetrical 1,10-bis(4-alkoxypyridinium [closo-B<sub>10</sub>H<sub>10</sub>]<sup>2-</sup> derivatives. **Anas N. Hajhusein\***, **Loay S. Abuzahra\***, **Andrienne C. Friedli**, and **Piotr Kaszynski**, Middle Tennessee State University, Murfreesboro, Tennessee.

2:50-3:05 Synthesis of long-chain alkylbenzenes on heterogeneous superacidic catalyst. **Anastasia A. Kuvayskaya\*** and **Aleksey Vasiliev**, East Tennessee State University, Johnson City, Tennessee.

**Ecology and Environmental Science  
Chair: Brent C. Newman  
SSC E306  
1:00 p.m. - 3:35 p.m.**

1:00-1:05 Business Meeting

\* student author

# presenting author, if not first author

1:05-1:20 Using EDX to find the nutritional quality of elk forage, Pineville Kentucky. **Tanner Denton\*** and **LeRoy Brandt**, *Lincoln Memorial University, Harrogate, Tennessee.*

1:20-1:35 Assessing growth and recapture of Cumberlandian Combshell mussels, *Epioblasma brevidens*, stocked in the Powell River, Tennessee. **R. Jones\*** and **Agnes Vanderpool**, *Lincoln Memorial University, Harrogate, Tennessee.*

1:35-1:50 Incidence of Pharmaceuticals in a River drained by a rural watershed. **Ravneet Kaur\***, **Anonya A. Amenyenu**, and **Sam Dennis**, *Tennessee State University, Nashville, Tennessee.*

1:50-2:05 Examining Fish Species Richness and Abundance in a Reclaimed Mountaintop Removal Mining Watershed. **Kayla D. Howard\*** and **Agnes Vanderpool**, *Lincoln Memorial University, Harrogate, Tennessee.*

2:05-2:20 Detection and habitat modeling for the state Threatened Western Pygmy Rattlesnake (*Sistrurus miliarius streckeri*) in Tennessee. **Shawn D. Snyder\*** and **William B. Sutton**, *Tennessee State University, Nashville, Tennessee.*

2:20-2:35 Does the Louisiana Waterthrush (*Parkesia motacilla*) Avoid Nest Predators in Central Tennessee? **Sylvia D. Powell\*** and **Stefan Woltmann**, *Austin Peay State University, Clarksville, Tennessee.*

2:35-2:50 Assessing effectiveness of PIT tags for recapture of an endangered freshwater mussel, *Epioblasma capsaeformis*, released into the Powell River, Tennessee. **Michelle A. Russell\*** and **Agnes Vanderpool**, *Lincoln Memorial University, Harrogate, Tennessee.*

2:50-3:05 Ecosystem Restoration at Kilbride Nature Sanctuary. **Patricia Cole**, *Tennessee Wesleyan University, Athens, Tennessee.*

\* student author

# presenting author, if not first author

3:05-3:20 Subspecies variation in song structure of Seaside Sparrow, *Ammospiza maritima*. **Robert M. Ryan\* and Stefan Woltmann**, Austin Peay State University, Clarksville, Tennessee.

3:20-3:35 Subspecies variation in song structure of Seaside Sparrow, *Ammospiza maritima*. **Robert M. Ryan\* and Stefan Woltmann**, Austin Peay State University, Clarksville, Tennessee.

### **Engineering & Engineering Technology**

**Chair: Ahmed ElSawy**

**SSC E203**

**1:00 p.m. - 3:35 p.m.**

1:00-1:05 Business Meeting

1:05-1:20 Automation of nutrient injection system in hydroponics system. **Hannah Burns\*, Michael Colby, Austin Ribley, Daniel Schlenker, Garrett Thompson, Elijah White, Michael Best, and Ahmed ElSawy**, Tennessee Technological University, Cookeville, Tennessee.

1:20-1:35 Automation of the biodiesel processing by using sonication and electrostatic for increasing the yield and faster glycerol separation. **Robbie Manankara\*, Anthony Taylor, Caleb Parker, Kareem Williams, Warren Klapp, Saanyol Igbax\*, and Ahmed ElSawy**, Tennessee Technological University, Cookeville, Tennessee.

1:35-1:50 Characterization of mechanical properties and microstructure of wire+arc additively manufactured parts, **Taylor Ross\*, Peyton Hunt\*, Md. Ahsan\*, Ali Tanvir\*, Ahmed ElSawy, and Duck Bong Kim**, Tennessee Technological University, Cookeville, Tennessee.

1:50-2:05 Detection of Cyber Physical System Attack Using Monitoring Signal. **Mohammad A. Rahman\*, Liang Hong, and L.H. Keel**, Tennessee State University, Nashville, Tennessee.

2:05-2:20 In-Situ Evaluation of Attic Radiant Barrier Assemblies. **David W. Yarbrough\*, Khar San Teh, and Chin Haw Lim**, R&D Services, Inc., Cookeville, TN and Solar Energy Institute, Universiti Kebangsaan, Bangi, Malaysia.

\* student author

# presenting author, if not first author

2:20-2:35 Design Labs for Electromechanical Devices and Instrumentation. **Russ Longhurst\***, *Austin Peay State University, Clarksville, Tennessee.*

2:35-2:50 Capstone to career. **Eric S. Friend\* and Chin-Zue Chen**, *Austin Peay State University, Clarksville, Tennessee.*

2:50-3:05 Autonomic function assessment in Alzheimer's patients with yoga practicing using kernel method and entrainment techniques. **Ahmed K. Kamal\***, *Tennessee Technological University, Cookeville, Tennessee.*

3:05-3:20 Integrating Smart Manufacturing in Technical Education. **Ryan Arnold\*, Ismail Fidan, and Khalid H. Tantawi**, *Motlow State Community College, Smyrna, Tennessee (RA,KT), and Tennessee Technological University, Cookeville, Tennessee (IF).*

3:20-3:35 Potential associated eye and certain other health symptoms while driving or occupying a vehicle. **Louise Katz\*, Jenny Holcombe, Glenn Hudson, and Frank Andrasik**, *Columbia State Community College, Columbia, Tennessee, The University of Tennessee at Chattanooga, Chattanooga, Tennessee, Columbia State Community College, Columbia, Tennessee (retired), and The University of Memphis, Memphis, Tennessee.*

## **Geology and Geography**

**Chair: Lisa Mayo**

**SSC C120**

**1: 00 p.m. – 1:50 p.m.**

1:00- 1:05 Business Meeting

1:05-1:20 Results of microcystin toxin and nutrient analysis in the TSU wetland. **Rodney Blackwell, Jr.\*, De'Etra Young, Taylor Ribeiro, and Tom D. Byl**, *Tennessee State University, Nashville, Tennessee (RB, DY, TR), U.S. Geological Survey, Nashville, Tennessee (TDB).*

1:20-1:35 Paleoliquifaction features in the Newton Sandstone (Lower Pennsylvanian) near Spencer, Tennessee. **Michael A. Gibson**, *The University of Tennessee at Martin, Martin, Tennessee.*

\* student author

# presenting author, if not first author

1:35-1:50 Promoting diversity in the geosciences through university - government partnerships. **Tom D. Byl, De'Etra Young, Jessica Oster, Rickard Toomey, and Eleanour Snow**, U.S. Geological Survey, Nashville, Tennessee (TDB, ES), Tennessee State University, Nashville, Tennessee (DY), Vanderbilt University, Nashville, Tennessee (JO), Mammoth Cave National Park, Mammoth Cave, Kentucky (RT).

### **Health and Medical Sciences**

**Chair: Julie Phillips**

**SSC E303**

**1:00 p.m. - 2:05 p.m.**

1:00-1:05 Business Meeting

1:05-1:20 Inactivation of wild-type and acid-adopted *Salmonella* serovars and *Escherichia coli* O157:H7 using high pressure pasteurization. **Jayashan Adhikari\* and Aliyar Fouladkhah**, Tennessee State University, Nashville, Tennessee.

1:20-1:35 Prevention of planktonic and sessile foodborne pathogens of public health concern using an emerging technology. **Abimbola Allison\*, Shahid Chowdhury, and Aliyar Fouladkhah**, Tennessee State University, Nashville, Tennessee.

1:35-1:50 Pressure-based inactivation of rifampicin-resistant *Cronobacter sakazakii* in infant formula. **Monica Henry\*, Shahid Chowdhury, and Aliyar Fouladkhah**, Tennessee State University, Nashville, Tennessee.

1:50-2:05 Inhibition of herpes simplex viruses by ginsenoside Rg3. **Stephen M. Wright**, Middle Tennessee State University, Murfreesboro, Tennessee.

### **History of Science**

**Chair: Martin V. Stewart**

**SSC C224**

**1:00 p.m. – 1:35 p.m.**

1:00-1:05 Business Meeting

\* student author

# presenting author, if not first author

1:05-1:20 It's Always the Last Place You Look.  
**John J. Schommer**, *University of Tennessee at Martin, Martin, Tennessee.*

1:20-1:35 Contributions of Jeanette Moore King to early science education in Tennessee. **Martin V. Stewart# and Hunter D. Hudson\***, *Middle Tennessee State University, Murfreesboro, Tennessee.*

### **Mathematics and Computer Science**

**Chair: Sumen Sen**

**SSC E208**

**1:00 p.m. - 3:35 p.m.**

1:00-1:05 Business Meeting

1:05-1:20 Modeling the relationship between Stock Prices and Interest Rates using Improved Euler's Method. **Mutiu A .Samiyu\***, **Wasiu Shittu\***, and **Samuel N. Jator**, *Austin Peay State University, Clarksville, Tennessee.*

1:20-1:35 Numerical integration of time fractional Cahn-Hilliard equation using a hybrid method. **Amarachi B. Mbakwe\***, **Samuel N. Jator**, and **Nicholas O. Kirby**, *Austin Peay State University, Clarksville, Tennessee.*

1:35-1:50 A least square Improved Euler's Method for the Black-Scholes Partial Differential Equation. **Osazeme Ahanor\***, **Kazeem Babatunde Tijani\***, and **Samuel N. Jator**, *Austin Peay State University, Clarksville, Tennessee .*

1:50-2:05 On the Block third derivative method for solving hyperbolic partial differential equations with Dirichlet and Neumann boundary conditions, **Emmanuel Adetayo Akoja\***, and **Samuel N. Jator**, *Austin Peay State University, Clarksville, Tennessee.*

2:05-2:20 A Comparison of Interest Rate Models. **Tinchie F Stevye\*** and **Vajira A Manathunga**, *Austin Peay State University, Clarksville, Tennessee.*

\* student author

# presenting author, if not first author



2:20-2:35 On the evaluation of the American put Black-Scholes equation using an exponentially fitted Enright type method. **Scott T. Howard\*** and **Samuel N. Jator**, *Austin Peay State University, Clarksville, Tennessee.*

2:35-2:50 Pricing Bermudan options using option pricing models specific to America and European options. **Samuel N. Jator**, **Israel Olugbade\***, and **Kehinde Ajibade\***, *Austin Peay State University, Clarksville, Tennessee.*

2:50-3:05 Comparison of computational methods for modeling steady-state heat distribution. **Lance Schneider\*** and **Daniel Mayo**, *Austin Peay State University, Clarksville, Tennessee.*

3:05-3:20 Doubly-inflated negative binomial regression model. **Joseph Mathews\*** and **Sumen Sen**, *Austin Peay State University, Clarksville, Tennessee.*

3:20-3:35 Numerical methods for fractional differential equations. **P. M. Watkins\*** and **Samuel N. Jator**, *Austin Peay State University, Clarksville, Tennessee.*

**Microbiology**  
**Chair: Sergei Markov**  
**SSC E206**  
**1:00 p.m. - 1:50 p.m.**

1:00-1:05 Business Meeting

1:05-1:20 The genetic basis of bacterial-induced infertilities in insects. **Dylan Shropshire\***, **Daniel LePage\***, **Sarah Bordenstein**, **Danny On\***, **Emily Layton\***, **Helen Zhou\***, and **Seth Bordenstein**, *Vanderbilt University, Nashville, Tennessee.*

1:20-1:35 Lethality induced by pathogen-blocking bacteria increases with grandmother age in *Drosophila melanogaster*. **Emily M. Layton\***, **Jungmin On\***, **J. Dylan Shropshire\***, **Jessamyn I. Perlmutter\***, and **Seth R. Bordenstein**, *Vanderbilt University, Nashville, Tennessee.*

\* student author

# presenting author, if not first author

1:35-1:50 Characterization of flagellin protein of *Campylobacter* species using monoclonal antibodies. **Shreya Singh Hamal\*** and **Fur Chi-Chen**, Tennessee State University, Nashville, Tennessee.

### Physics and Astronomy

Chair: Mary Kidd

SSC B310

1:00 p.m. – 1:50 p.m.

1:00-1:05 Business Meeting

1:05-1:20 What's new for the SDSS standard star network? **J. Allyn Smith, Douglas L. Tucker, and Sahar S. Allam**, Austin Peay State University, Clarksville, Tennessee (JAS), and Fermi National Accelerator Lab, Batavia, Illinois (DLT, SSA).

1:20-1:35 The Utilization of Neural Networks in Solving for Ionospheric Fluid Flow. **Megan McCracken\***, Austin Peay State University, Clarksville, Tennessee.

1:35-1:50 Neutron Inelastic Scattering on  $^{134}\text{Xe}$  at  $E_n = 5 - 8$  MeV. **Mary Kidd, Werner Tornow, Sean Finch, Fnu Krishichayan, and Megha Bhike**, Tennessee Technological University, Cookeville, Tennessee (MK) TUNL/ Duke University, Durham, North Carolina (WT, SF, FK, MB).

### Science and Math Teaching

Chair: Weston Dulaney

SSC E305

1:00 p.m. – 2:50 p.m.

1:00-1:05 Business Meeting

1:05-1:20 MTeach: Pathway to a successful career in chemical education, **Rachel Marlin\*** and **Judith Iriarte-Gross**, Middle Tennessee State University, Murfreesboro, Tennessee .

1:20-1:35 Enhancing scientific literacy with NOS cards. **Velta Napoleon-Fanis\***, Middle Tennessee State University, Murfreesboro, Tennessee.

\* student author

# presenting author, if not first author

1:35-1:50 Esterification and Molecular modeling of cinnamic acid esters. **Anuradha Liyana Pathiranage, Leah J. Martin, Macy Osborne\*, and Kirsten Meaker\***, Department of Chemistry, Austin Peay State University, Clarksville, Tennessee (ALP, MO, KM) and Department of Chemistry, Columbia State Community College, Columbia, Tennessee (LJM).

1:50-2:05 Of ontogeny and phylogeny in the new science education paradigm. **Philip C. Short**, Austin Peay State University, Clarksville, Tennessee.

2:05-2:20 Preparing the table for 10 billion: Thinking globally and teaching locally about entomophagy. **Donald L. Sudbrink, Jr. and Amy M. Wright**, Austin Peay State University, Clarksville, Tennessee.

2:20-2:35 We need not image what we can otherwise detect. **Marcia M. Schilling**, Austin Peay State University, Clarksville, Tennessee.

2:35-2:50 Using thinking routines and graphic organizers to support learning on a study abroad course. **Darlene Panvini**, Belmont University, Nashville, Tennessee.

**Zoology**  
**Chair: Danny L. Bryan**  
**SSC E310**  
**1:00 p.m. – 3:05 p.m.**

1:00-1:05 Business Meeting

1:05-1:20 Characterization of solitary feeding in Eastern Woodrats (*Neotoma floridana illinoensis*) in Western Tennessee. **Jessica Davin\* and Michael L. Kennedy**, The University of Memphis, Memphis, Tennessee.

1:20-1:35 A comparison of biodiversity measures of small mammals at arboreal and ground levels in edge habitat of eastern deciduous forest in western Tennessee. **Sarah E. Swing\* and Michael L. Kennedy**, The University of Memphis, Memphis, Tennessee .

\* student author

# presenting author, if not first author

1:35-1:50 Embryo development and global change: how do reptile embryos respond to ecologically relevant thermal stress? **Joshua M. Hall\*** and **Daniel A. Warner**, Auburn University, Auburn, Alabama.

1:50-2:05 Gastrointestinal parasites of wild mammals in the Cumberland Gap Area of Tennessee. **L. Angelica Solano\***, **Linnea Hansen\***, **Vina Faulkner**, and **Barbara C. Shock**, Lincoln Memorial University, Harrogate, Tennessee.

2:05-2:20 Impacts of prescribed fire and forest thinning on tick populations and prevalence of tick-borne diseases in a southeastern mixed pine forest. **Brent C. Newman\***, **William B. Sutton**, **Bharat Pokharel**, **Abelardo Moncayo**, and **Thomas Moore**, Tennessee State University, Nashville, Tennessee (BCN, WBS, BP), and Tennessee Department of Health, Vector Borne Diseases Program, Nashville, Tennessee (AM, TM).

2:20-2:35 Rickettsia proliferation in fleas and ticks on small mammals by the detection of ompA and gltA proteins. **Rebecca A. Butler\***, **Rebecca Trout Fryxell**, **Allan E. Houston**, **Emerson K. Bowers**, **David Paulsen**, **Lewis B. Coons**, and **Michael L. Kennedy**, Department of Biology, University of Memphis, Memphis, Tennessee (RAB, EKB, LBC, MLK), Department of Entomology and Plant Pathology, University of Tennessee, Knoxville, Tennessee (RTF, DP), Department of Forestry, Wildlife and Fisheries, University of Tennessee, Knoxville, Tennessee (AEH).

2:35-2:50 Creating a protocol for Tardigrades. **Safaa Abid\***, Lincoln Memorial University, Harrogate, Tennessee.

2:50-3:05 One Health biosurveillance for mosquitoes as potential disease vectors atop the Cumberland Plateau of southern Tennessee. **David Bruce Conn**, **Denise Andriot Conn**, and **Viktória Čabanová**, Harvard University Museum of

\* student author

# presenting author, if not first author

*Comparative Zoology, Cambridge Massachusetts (DBC), Berry College One Health Center, Mount Berry, Georgia (DBC), NASCENT, Monteagle, Tennessee (DBC, DAC), and Slovak Academy of Sciences Institute of Parasitology, Košice, Slovakia (VČ).*

## **Poster Presentations**

**Sundquist Science Complex Atrium**

**Set Up: 7:30—8:30 (Poster board & easel are provided; posters are displayed by**

**technical section name and number)**

**Display: 8:30 – 9:45**

**Judging: 8:30 – 9:45**

**(Presenters should be near their displays during the judging to answer questions.)**

## **Agriculture Posters**

**1-01** Farm to retail: A view into cost of production and retail margins in fresh strawberry. **Christian Smith\***, **Omobolaji Omobitan\***, **Aditya Khanal**, **Dharma Pitchay**, and **Ravi Ramasamy**, *Tennessee State University, Nashville, Tennessee.*

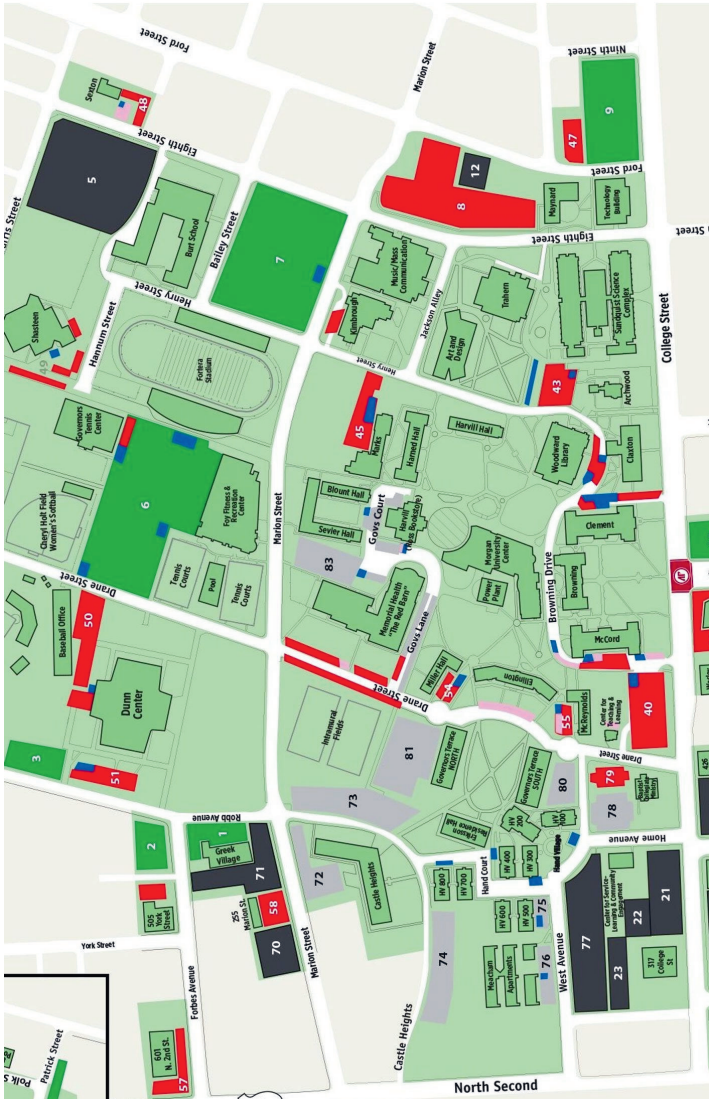
**1-02** *Where ‘fun in the farm’ is located in Tennessee? Examining agritourism location and structural factors.* **Emmanuel Wallace\***, **Ummey Honey\***, **Aditya Khanal**, **Michael Crawford\***, and **Omobolaji Omobitan\***, *Tennessee State University, Nashville, Tennessee.*

**1-03** Effects of compost rate and type of fertilizer for growth of petunia. **Abagayle Morton\*** and **Anthony Witcher**, *Middle Tennessee State University, Murfreesboro, Tennessee, and Tennessee State University, McMinnville, Tennessee.*

**1-04** Evaluation fertilizer type and compost rate for growth of vinca. **Alaina Kresovic\*** and **Anthony Witcher**, *Middle Tennessee State University, Murfreesboro, Tennessee, and Tennessee State University, McMinnville, Tennessee.*

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## PARKING

Lot numbers are for lot identification and location.  
 Lot outline and number color indicate the APSU permit required.

- Faculty & Staff Parking
- Residential Parking
- Commuters, Emerald Hill & Two Rivers Parking
- ANY valid APSU permit
- P Public Parking; no APSU permit required
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- Visitor Parking\*

\*Visitor parking spaces are indicated in pink for illustration purposes

only and "Visitor" painted white at each location.



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Austin Peay State University's street address is: 601 College Street,  
Clarksville, TN 37044**

- 1-05** Gene expression studies per microRNAs profiles in the stem and leaf of sweet sorghum (*Sorghum bicolor* L.) as bio-fuel crop. **Binod Gyawali\* and Ahmad N. Aziz**, Tennessee State University, Nashville, Tennessee.
- 1-06** Glyphosate resistant and susceptible horseweed seed germination rate and response to herbicide rate. **Christina S. Jennings\* and Anthony L. Witcher**, Tennessee State University, McMinnville, Tennessee.
- 1-07** Growth of *Andropogon gerardii* with 10-10-10 fertilizer. **Daniel Campos\* and A. Darlene Panvini**, Belmont University, Nashville, Tennessee.
- 1-08** Varying 10-10-10 fertilizer concentration for the optimal growth of Kentucky fescue (*Lolium arundinaceum*). **Nicholas Alexander\* and A. Darlene Panvini**, Belmont University, Nashville, Tennessee.
- 1-09** Fermentation of soybeans and ginseng by *Bacillus Subtilis* Natto. **Fred Marino\*, Tony Johnston, Iris Gao, and Seockmo Ku**, Middle Tennessee State University, Murfreesboro, Tennessee.
- 1-10** Demographic background of the online student: the case for agriculture. **Jessica Crews Garcia, Joey Mehlhorn, and Rachna Tewari**, The University of Tennessee at Martin, Martin, Tennessee.
- 1-11** Producer input purchase decisions of agricultural products among variable size operations. **Austin Kendall\*, Joey Mehlhorn, Rachna Tewari, and Barbara Darroch**, The University of Tennessee Martin, Martin, Tennessee.
- 1-12** Seasonal abundance of pest insects and natural enemies of soybean in middle Tennessee. **Kaushalya Amarasekare and Richard Link**, Tennessee State University, Nashville, Tennessee.
- 1-13** Antibacterial Activity of Endophytic Fungi Isolated from Arkansas *Vitis aestivalis* (Norton / Cynthiana) Vegetative Tissue. **Kayley Stallings\* and Tony Johnston**, Middle Tennessee State University, Murfreesboro, Tennessee.

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**1-14** Use of herbivore induced plant volatiles to monitor the seasonal abundance of green lacewings in tree-fruit orchards in middle Tennessee. **Kyle T. Williams\***, **Kaushalya G. Amarasekare**, and **Richard H. Link**, *Tennessee State University, Nashville, Tennessee.*

**1-15** Curiosity in agricultural classrooms. **Rachna Tewari**, **Isaac Lepcha**, **Chrissie Segars**, and **Joey Mehlhorn**, *The University of Tennessee at Martin, Martin, Tennessee.*

**1-16** Student loyalty toward higher education institutions as influenced by experiential learning: perceptions of graduating seniors in agriculture. **Rachna Tewari\***, **Barbara Darroch**, **Kevin Hammond**, **Bonnie Daniel**, and **Hui Chen**, *The University of Tennessee at Martin, Martin, Tennessee.*

**1-17** Volatile profile of fruit juices by electronic nose. **Michael Addogoh\*** and **Ramasamy Ravi**, *Tennessee State University, Nashville, Tennessee*

**1-18** The effectiveness of herbivore induced plant volatiles for monitoring field populations of *Orius insidiosus* and thrips in sweet pepper in Tennessee. **Uzoamaka C. Abana\***, **Kaushalya G. Amarasekare**, and **Richard H. Link**, *Tennessee State University, Nashville, Tennessee.*

**1-19** A qualitative investigation of how mid and late career agricultural educators cope with job stress and burnout. **Jeffrey Sartain\*** and **Will Bird**, *The University of Tennessee at Martin, Martin, Tennessee.*

## **Botany Posters**

**2-01** Determining the presence of heavy metals in an intertidal grass species and seagrass species. **Kayla D. Howard\*** and **LaRoy Brandt**, *Lincoln Memorial University, Harrogate, Tennessee.*

**2-02** Observing Potential Synergistic and Antagonist Effects of Acid and Radiation Stress on both Invasive and Native *Lonicera*. **Alexander P. Wharton\*** and **A. Darlene Panvini**, *Belmont University, Nashville, Tennessee.*

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**2-03** Cloud Forest Epiphyte Diversity, Elevation and Climate Change **Caitlin Barnes\*** and **John Niedzwiecki**, Belmont University, Nashville, Tennessee.

## Cell and Molecular Biology Posters

**3-01** Effect of brown recluse spider bite treatment on plasma membrane of epithelial cells. **Cord Beck\***, **Christina Ross\***, **Ashlyn Whittaker\***, and **Amy Thompson**, Austin Peay State University, Clarksville, Tennessee.

**3-02** Detecting gluten in flour and foods using FDA approved gluten ELISA kits. **Olivia Calvert\***, **Makayla Dixon\***, and **Amy Thompson**, Austin Peay State University, Clarksville, Tennessee.

**3-03** Identification of a novel interaction between the centrosomal protein centriolin and the E3 ligase HectD1. **Alexander Garcia\***, **Vancy Zora\***, **Sean Dornbush\***, **Zeynep Gromley**, and **Adam Gromley**, Lincoln Memorial University-DeBusk College of Osteopathic Medicine, Harrogate, Tennessee.

**3-04** The effects of talcum powder on germline morphology and apoptosis in *C. elegans*. **Casey T. Kelly\*** and **Julie Hall**, Lincoln Memorial University, Harrogate, Tennessee.

**3-05** Mitochondria localization during MDA-MB-231 cell migration *in vitro*. **Justin Lawrence\*** and **Sarah Lundin-Schiller**, Austin Peay State University, Clarksville, Tennessee.

**3-06** Effect of brown recluse spider venom on sodium channels. **Dillon C. Nall\*** and **Amy Thompson**, Austin Peay State University, Clarksville, Tennessee.

**3-07** Fluorescent microscopy reveals apoptosis occurring in MDA-MB-231 breast cancer cells in response to brown recluse whole venom treatment. **Jerry Reed\*** and **Amy Thompson**, Austin Peay State University, Clarksville, Tennessee.

\* student author

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## Chemistry Posters

**4-01** Differentiation of ignitable liquids by using Direct Analysis in Real Time Mass Spectrometer (DART-MS). **Isabella Barnett\* and Mengliang Zhang**, Middle Tennessee State University, Murfreesboro, Tennessee.

**4-02** Antimicrobial activity of peptides. **Ahrang Yee, Purva Patel, Peter J. Ponce II, Allison N. Schmittou, Juan Soto, Alexis Ayala, Dr. Sergei Markov, Nsoki Phambu\*, and Rajalingam Dakshinamurthy**, Austin Peay State University, Clarksville, Tennessee and Tennessee State University, Nashville.

**4-03** Cation exchange of chalcogenide nanocrystals using non-toxic starting materials. **Adekunle Titus Akinmola\*, Amadou Fall, Chen Lin, and P. Gregory Van Patten**, Middle Tennessee State University, Murfreesboro, Tennessee.

**4-04** Single-Step Synthesis of Biofriendly Gold Nanoparticles. **Alexis Ayala, Juan Soto, Allison N. Schmittou, Peter J. Ponce II, and Dr. Rajalingam Dakshinamurthy**, Austin Peay State University, Clarksville, Tennessee.

**4-05** Differentiation of ignitable liquids by using Direct Analysis in Real Time Mass Spectrometer (DART-MS). **Isabella Barnett\* and Mengliang Zhang**, Middle Tennessee State University, Murfreesboro, Tennessee.

**4-06** Single Step Synthesis of Antibiotic Oxytetracycline Encapsulated Gold Nanoparticles. **Juan Antonio Soto, Purva Patel, Chloe Yee, Allison Schmittou, Peter Ponce, Alexis Ayala, and Rajalingam Dakshinamurthy**, Department of Chemistry, Austin Peay State University, Clarksville, Tennessee.

**4-07** GCMS quantitation of nicotine from electronic cigarette smoke collected using a student-built smoking machine. **Kristofer L. Conrad\*, Parth H. Patel, and Leslie A. Hiatt**, Austin Peay State University, Clarksville, Tennessee.

\* student author

# presenting author, if not first author

**4-08** Silicone microspheres: synthesis, characterization, and application. **Savannah Metheny\***, **Logan Rahm\***, **Robert Kenworthy\***, **John Overcash**, and **Jen Esbenshade**, *The University of Tennessee at Martin, Martin, Tennessee.*

**4-09** Synthesis of polymeric microspheres using ultrasonic spray photopolymerization. **Michaela Short\***, **Logan Rahm\***, **John Overcash**, and **Jen Esbenshade**, *The University of Tennessee at Martin, Martin, Tennessee.*

**4-10** Density functional model for nondynamic correlation optimization and benchmarking. **Matthew Wang\***, **Dwayne John**, **Jianguo Yu**, **Fenglai Liu**, and **Jing Kong**, *Middle Tennessee State University, Murfreesboro, Tennessee (MW, DJ, JY, JK)*, *Vanderbilt University, Nashville, Tennessee (FL).*

**4-11** Quantitative analysis of Local Water Samples for Algal Toxin: Microcystin-LR. **Vishaka Motheramgari\***, **Frank C. Bailey**, and **Mengliang Zhang**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

**4-12** Artificial Neural Network Predictions of Carbonyl Reactivity and Spectroscopic Properties from a Database of Charge Density Descriptors. **Kiran K. Donthula\*** and **Preston J. MacDougall**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

## **Ecology and Environmental Science Posters**

**5-01** Biological Survey of the Interior Coppice of San Salvador. **Dawn M. Ford**, **Jessica Wicker\***, **Laurel Jobe\***, **Nick Perry\***, **Stephanie Swart\*** and **Thomas Wiegand\***, *The University of Tennessee at Chattanooga, Chattanooga, Tennessee.*

**5-02** Assessment of biodiversity relationships in turtle and leech parasite-host assemblages in middle Tennessee wetlands across a disturbance gradient. **Laura Horton\*** and **William Sutton**, *Tennessee State University, Nashville, Tennessee.*

\* student author

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- 5-03** The effect of acidification on the antipredator behavior of the aquatic snail, *Elimia laqueta*. **Tanner Augello\***, and **John Niedzwiecki**, Belmont University, Nashville, Tennessee.
- 5-04** Characterizing and predicting site productivity using geocentric approach. **Mathew Purucker\*** and **Bharat Pokharel**, Tennessee State University, Nashville, Tennessee.
- 5-05** The Effects of Steroid Estradiol on Growth and Development of *Danio rerio*. **Mallory Arstikaitis\*** and **Lori McGrew**, Belmont University, Nashville, Tennessee.
- 5-06** Use of pit tags in a mark-recapture study to assess survival and growth of two endangered freshwater mussels in the Powel River, Tennessee. **Jacob S. Lanning\*** and **Agnes Vanderpool**, Lincoln Memorial University, Harrogate, Tennessee.
- 5-07** The efficacy of bait-trap methods in butterfly monitoring in an urban park in Nashville, Tennessee. **Marcie Bulla\*** and **A. Darlene Panvini**, Belmont University, Nashville, Tennessee.
- 5-08** Comparing carbon dioxide flux on a green roof and community garden in Nashville, Tennessee. **David Gustitus\*** and **A. Darlene Panvini**, Belmont University, Nashville, Tennessee.
- 5-09** The effects of native and non-native plant species on CO<sub>2</sub> soil flux levels in relation to bacterial community diversity. **Samantha L. Rodriguez\***, **George W. Bukenya\***, and **A. Darlene Panvini**, Belmont University, Nashville, Tennessee.
- 5-10** The use of green roofs by avian species and their preference in green roof characteristics. **Paige N. Ulrich\*** and **A. Darlene Panvini**, Belmont University, Nashville, Tennessee.
- 5-11** Use of DNA barcoding as an effective tool in earthworm identification for diversity analysis in native and exotic plant plots. **Erin Laubacher\***, **Bailee Powell\***, **Chris Barton**, and **A. Darlene Panvini**, Belmont University, Nashville Tennessee.

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**5-12** Evaluating Spatial Ecology of Eastern Hellbenders (*Cryptobranchus alleganiensis alleganiensis*) in Southeast Tennessee. **Bradley D. Nissen\***, **Emilly Nolan\***, and **William Sutton**  
*Tennessee State University, Nashville, Tennessee.*

**5-13** The functional roles of cattle and bison grazing in North American grasslands: a meta-analysis. **Caroline R. Wilford\*** and **Jason L. Malaney**. *Austin Peay State University, Clarksville, Tennessee.*

**5-14** Effects of sub-lethal levels of antibiotics on the growth of freshwater algae. **Asia Gladney\*** and **Matthew J. Heard**, *Belmont University, Nashville, Tennessee.*

**5-15** Reptile Diversity Study on Kentucky Natural Lands Trust property. **Kiersten C. Dunaway\*** and **LaRoy Brandt**, *Lincoln Memorial University, Harrogate, Tennessee.*

**5-16** Characterizing habitat use of a riparian-obligate songbird in agriculturally-dominated watersheds. **Nicole Santoyo\*** and **Steven Hamilton**, *Austin Peay State University, Clarksville, Tennessee.*

**5-18** Impact of invasive hydrilla senescence on nutrient availability, periphyton colonization, and macroinvertebrates in the Obed River Watershed, TN. **Sandra Bojić\*** and **Steven Hamilton**, *Austin Peay State University, Clarksville, Tennessee.*

**5-19** Frequency of occurrence of native planktivorous fishes in relation to the establishment of bigheaded carps. **Maria S. Brauer\***, **Jennifer T. Thomas**, and **Jennifer M. McBride**, *Belmont University, Nashville, Tennessee (JTT) and Southern Illinois University, Edwardsville, Illinois (JMM).*

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# presenting author, if not first author

## Engineering and Engineering Technology Posters

No poster presentations

## Geology and Geography Posters

No poster presentations

## Health and Medical Science Posters

**6-1** Epidemiology of foodborne disease outbreaks in Tennessee and the United States: analysis of CDC National Outbreak Reporting System data of 1998 to 2016. **Anita Scales\***, **Monica Henry and Aliyar Fouladkhah**, *Tennessee State University, Nashville, Tennessee.*

**6-2** Effects that sleep has on mental health in college science students. **Heather Herring\***, **Joseph Daft, and Pamela Hobbs.** *Lee University, Cleveland, Tennessee.*

**6-3** Investigating the moral compass of the dietetics profession: The Professional Code. **Terra L. Smith and Loveday E. Nwobilor**, *The University of Memphis, Memphis, Tennessee and Shelby Residential and Vocational Services, Inc. Memphis, Tennessee.*

## History of Science Posters

**7-1** Contributions of Early MTSNS Faculty in Establishing the Tennessee Academy of Science. **Hunter D. Hudson\*** and **Martin V. Stewart**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

## Math and Computer Science Posters

**8-1** The Three Terrible Ws of West Indian Cricket: Probability, Statistics and Cluster Analysis. **Arjun Tan and Marius Schamschula**, *Alabama A & M University, Normal, Alabama.*

\* student author

# presenting author, if not first author

## Microbiology Posters

**9-1** High pressure pasteurization against O157 and Non-O157 Shiga toxin-producing *Escherichia coli*. **Abimbola Allison\***, **Shahid Chowdhury** and **Aliyar Fouladkhah**, Tennessee State University, Nashville, Tennessee.

**9-2** Effect of ECIG-generated aerosol and conventional cigarette smoke on the planktonic growth of commensal oral bacteria. **John Nelson\***, **Micah Shook**, **Joshua Lewis**, and **Dominic Palazzolo**, Lincoln Memorial University, Harrogate, Tennessee.

**9-3** Examining the presence of antibiotic resistant *Escherichia coli* in Nashville, Tennessee's Cumberland River. **Rachel Hongo\*** and **Matthew J. Heard**, Belmont University, Nashville, Tennessee.

**9-4** Kinetic analysis and epitope mapping of monoclonal antibodies to *Salmonella typhimurium* flagellin using a Surface Plasmon Resonance biosensor. **Devendra Bhandari\*** and **Fur-Chi Chen**, Tennessee State University, Nashville, Tennessee.

**9-5** Prevalence and antimicrobial susceptibility of pathogenic and indicator bacteria in edible offal and muscle meat retailed in Nashville, Tennessee. **Siqin Liu\*** and **Agnes Kilonzo-Nthenge**, Tennessee State University, Nashville, Tennessee.

**9-6** Investigating the Possible Correlation Between Microplastic Abundance and the Presence of *Escherichia coli* in the Cumberland River. **Chandler Phelps\*** and **Matthew J. Heard**, Belmont University, Nashville, Tennessee.

**9-7** Comparison of antibacterial properties in selected plant parts of *Spigelia marilandica*. **Sarah E. Crossan\***, **Jennifer Thomas**, and **A. Darlene Panvini**, Belmont University, Nashville, Tennessee.

\* student author

# presenting author, if not first author



**9-8** Characterization of a novel *Clostridium difficile* virulence target: A structural biology approach. **Isria C. Jarrett\***, **Heather K. Kroh**, **A. Darlene Panvini**, and **D. Borden Lacy**, Belmont University, Nashville, Tennessee (ICJ, ADP), and Vanderbilt University, Nashville, Tennessee (HKK, DBL).

**9-9** Variance and antimicrobial properties in soil bacteria among native and exotic plant species in Nashville, Tennessee. **Adria Payne\***, **Britney Sams\***, **Jennifer Thomas**, and **A. Darlene Panvini**, Belmont University, Nashville, Tennessee.

**9-10** Effect of ECIG-generated aerosol and conventional cigarette smoke on the planktonic growth of commensal oral bacteria. **John Nelson\***, **Micah Shook**, **Joshua Lewis**, and **Dominic Palazzolo**, Lincoln Memorial University, Harrogate, Tennessee.

## Physics and Astronomy Posters

**10-1** Dolidze-35: A study of under-observed galactic star clusters: I, **Jamin Welch\***, **J. Allyn Smith**, **Deborah J. Gulledege**, **Elizabeth Juelfs**, **H.Hope Head**, **Douglas L. Tucker**, and **Sahar S. Allam** Austin Peay State University, Clarksville, Tennessee.

**10-2** 'Special Theory' of Gabbard diagram formation for satellite fragmentation in a circular orbit. **Arjun Tan**, **Robert C. Reynolds**, and **Marius Schamschula**, Alabama A & M University, Normal, Alabama (AT, MS), and STAR Dynamics, Hilliard, Ohio (RCR).

**10-3** 'General Theory' of Gabbard diagram formation for satellite fragmentation in an elliptical orbit. **Arjun Tan**, **Robert C. Reynolds**, and **Marius Schamschula**, Alabama A & M University, Normal, Alabama (AT, MS), and STAR Dynamics, Hilliard, Ohio (RCR).

**10-4** Emission spectroscopy of rocket exhaust plumes. **Nathan Williamson\*** and **Jason Alexander**, The University of Tennessee at Martin, Martin, Tennessee.

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## Science and Math Teaching Posters

**11-1** UT Martin Greenway Geological Display for Earth Science Laboratories and Public Education. **Joseph Pelren\*** and **Michael A. Gibson**, *Westview High School, Martin, Tennessee (JP) and The University of Tennessee at Martin, Martin, Tennessee (MAG).*

## Zoology Posters

**12-1** Seasonal differences in bat species diversity and activity at the Beech Ridge Unit of the Obion River Wildlife Management Area. **Aubree Weitzel\***, **Jeremy Dennison**, and **Nancy Buschhaus**, *The University of Tennessee at Martin, Martin, Tennessee (AW, NB) and Tennessee Wildlife Resources Agency, Region 1, Jackson, Tennessee (JD).*

**12-2** Correlation of bat species richness and bat activity with habitat type, insect diversity, and insect biomass at Reelfoot Lake. **Parker Blayne Judkins\***, **Jack Grubaugh**, and **Nancy Buschhaus**, *The University of Tennessee at Martin, Martin, Tennessee.*

**12-3** A preliminary examination of the microbiome of bat feces from a White Nose Syndrome negative site. **Georgia Casio\***, **James Smart**, **Jeremy Dennison**, and **Nancy Buschhaus**, *The University of Tennessee at Martin, Martin, Tennessee (GC, JS, NB) and Tennessee Wildlife Resources Agency, Region 1, Jackson, Tennessee (JD).*

**12-4** Island-inhabiting voles have larger skulls than their mainland relatives: indications of the Island Rule? **Mariah C. Schlis-Elias\*** and **Jason L. Malaney**, *Austin Peay State University, Clarksville, Tennessee.*

**12-5** Differences in the number of songbirds flushed in response to calls given by bird eating and non-bird eating hawks at a feeding station in northwest Tennessee. **Randy Z. Gillespie III\*** and **H. Dawn Wilkins**, *The University of Tennessee at Martin, Martin, Tennessee.*

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**12-6** Tick-transmitted pathogens (*Borrelia* spp. and *Babesia* spp.) detected in blood-fed and questing ticks from the Cumberland Gap region. **Elizabeth L. Maggard\*** and **Barbara C. Shock**, *Lincoln Memorial University, Harrogate, Tennessee* .

**12-7** Mechanosensory sensitivity of naïve hawkmoths. **Benjamin T. Allen\*** and **Joaquín Goyret**, *The University of Tennessee at Martin, Martin, Tennessee*.

**12-8** Identity of “*Tylocephalum*” larvae from Gulf of Mexico bivalves. **Derrick Lau\*** and **John Gunderson**, *Tennessee Technological University, Cookeville, Tennessee*.

**12-9** The use of Shelby Bottoms Greenway and Natural Area trails by mammalian wildlife. **Kerra L. Gaona\*** and **A. Darlene Panvini<sub>1</sub>**, *Belmont University, Nashville, Tennessee*.

\* student author

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## **TAS Standing Committees 2018**

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Dr. Alicja K. Lanfear, Middle Tennessee State University

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Membership Committee Chair - Karen Kendall-Fite  
[kkendallfite@columbiastate.edu](mailto:kkendallfite@columbiastate.edu)

Necrology Committee Chair—Dr. Martin V. Stewart  
[mstewart@mtsu.edu](mailto:mstewart@mtsu.edu)

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## Notes

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