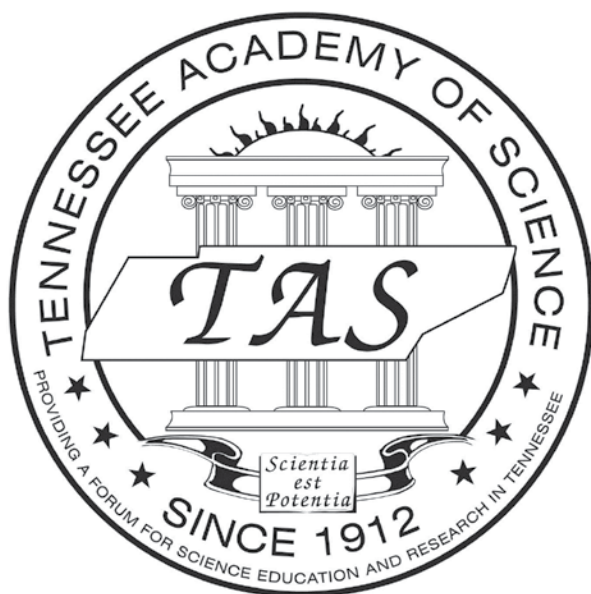




**129th Meeting
Tennessee
Academy of
Science**



**November 22, 2019
Columbia State
Community College,
Columbia, Tennessee**

Celebrating 107 Years

**Tennessee Academy of Science
Institutional Sustaining Members**

Austin Peay State University
 East Tennessee State University
 Middle Tennessee State University
 Motlow State Community College
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Journal of the Tennessee Academy of Science

TAS Future Annual Meeting Sites

2020 - East Tennessee State University
 2021 - Tennessee Technological University

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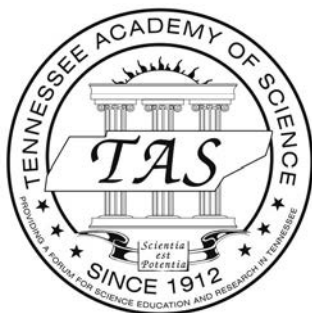
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Announcements

Welcome . . .

... to the 2019 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. We are always striving to improve our Academy and its impact upon scientists in Tennessee and beyond.



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

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
Thursday, November 21, 2019

5:30 until 10:00 p.m.	Executive Committee Dinner and Meeting Napier Room, Jones Student Center
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Friday, November 22, 2019

7:30 a.m. until 1:30 p.m.	Registration Waymon L. Hickman Building
7:30 a.m. until 8:30 a.m.	Poster Setup Waymon L. Hickman Building (Poster board and easel provided—look for the designated area to set up your poster)
8:00 a.m. until 8:30 a.m.	Meeting of Section Chairs Room 140 in Hickman
8:30 a.m. until 9:45 a.m.	Poster Presentation and Judging Hickman Building and Halls
10:00 a.m. until 10:30 a.m.	TAS Annual Business Meeting Cherry Theater, Hickman Building
10:30 a.m. until 10:35 a.m.	Welcome Dr. Janet F. Smith, President Columbia State Comm. College Cherry Theater, Hickman Building
10:35 a.m. until 11:30 a.m.	Plenary Session Presented by Dr. Larisa DeSantis Cherry Theater, Hickman Building
11:30 a.m. until 1:00 p.m.	Luncheon Hickman, Rooms 122, 123
1:00 p.m. until finished	Afternoon Technical Sessions/ Section Business Meetings Frank G. Clement Building: 101, 104, 105, 115, 203, 204, 205 and TBD. and J.H. Warf Building: 112, 118

Meet our Keynote Speaker
10:35 -11:30 Cherry Theater, Hickman Building

Dr. Larisa DeSantis
Vanderbilt University

The plenary session for this year's meeting will feature Dr. Larisa DeSantis. Dr. Larisa DeSantis, Assistant Professor in the Department of Earth and Environmental Sciences at Vanderbilt University, specializes in vertebrate paleontology, paleoecology, and paleoclimates. Her DREAM (Dietary Reconstructions and Ecological Assessments of Mammals) lab examines the ecology and biology of ancient mammals in response to global change. Dr. DeSantis earned her Ph.D. at the University of Florida, a M.E.M from Yale University, and a B.S. at the University of California, Berkeley. Featured on a NatGeo Wild program on The Future of Big Cats, Dr. DeSantis places her bets on tigers and cougars to be the top survivors in a world with major future changes!

Presentation Title:

Go Predators: Decoding the ecology of ancient predators and their prey

Oral Presentations

Agriculture-1
Plants and Pest Management
Chair: Will Bird
Clement 112
1:00 p.m.– 2:35 p.m.

1:00-1:05 Business Meeting

1:05-1:20 Simultaneous determination of major ginsenosides in wild American ginseng grown in Tennessee. **Ying Gao, Mengliang Zhang, Nate Phillips**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

1:20-1:35 Lethal and sublethal effects of reduced-risk and organophosphate-replacement insecticides on *Orius insidiosus* (Hemiptera: Anthocoridae). **Uzoamaka C. Abana* and Kaushalya G. Amarasekare**, *Tennessee State University, Nashville, Tennessee.*

1:35-1:50 Identification of bacterial isolates for Phytophthora disease management and plant growth promotion in Pepper (*Capsicum annuum*). **Bandana Bhusal*, Margaret T'Mmbaga, Ethan Swiggart**, *Tennessee State University, Nashville, Tennessee.*

1:50-2:05 Comparative performance of fungicides and biorational products in suppression of Botrytis blight in cut flower of hydrangea. **Ravi Bika*, Terri Simmons, and Fulya Baysal-Gurel** *Tennessee State University, Nashville, Tennessee.*

2:05-2:20 Comparing the life history of two green lacewing species *Chrysopa oculata* and *Chrysoperla rufilabris* (Neuroptera: Chrysopidae). **Kyle T. Williams*, Kaushalya G. Amarasekare and Uzoamaka C. Abana**, *Tennessee State University, Department of Agricultural and Environmental Sciences, College of Agriculture, Nashville, Tennessee.*

2:20-2:35 To Irrigate or Not to Irrigate: The Economic Dilemma. **Christopher Ables*, Sandy Mehlhorn, and Rachna Tewari**, *University of Tennessee at Martin.*

* student author

presenting author, if not first author

Agriculture-2
Animals, Food, and Economics
Chair: Clint Ary
Clement 118
1:00 p.m.– 2:50 p.m.

1:00-1:05 Business Meeting—Combined with Agriculture-1 in Warf 115

1:05-1:20 Agricultural technology: are we at the dawn of a new era?. **Enefiok Ekanem and Mary Mafuyai**, *Tennessee State University, Nashville, Tennessee.*

1:20-1:35 Economic Importance of Local Food Systems: Implications for Tennessee. **Oluwatooni Ajayi*, Enefiok Ekanem and, Mary Mafuyai**, *Tennessee State University, Nashville, Tennessee.*

1:35-1:50 Farmers' Reactions to Climate Change. **Shannon Sullivan and Abi Sartain**, *The University of Tennessee at Martin, Martin, Tennessee.*

1:50-2:05 Willing or unwilling to pay? How agriculture students perceive climate change mitigation efforts. **Abigayle Bartholomew Sartain*, Rachna Tewari, Mark Simpson, Joey Mehlhorn, Naveen Musunuru and Brian Parr**, *The University of Tennessee Martin, Martin, Tennessee (ABS, RT, MS, JM), and Murray State University, Murray, Kentucky (NM, BP).*

2:05-2:20 An Analysis of Ostertagia Resistance in the UTM Beef Herd. **Hudson McAllister*, Diana Watson, Jason Roberts, and Dennis M. Pierce**, *University of Tennessee at Martin, Martin, Tennessee.*

2:20-2:35 Local food marketing: opportunities and constraints. **Blessing C. Ajumobi*, Enefiok Ekanem and Mary Mafuyai**, *Tennessee State University, Nashville, Tennessee.*

2:35-2:50 Do higher levels of corn ethanol in blended gasoline change our preconceptions of price pass-through behavior? **Scott Parrott*, Joey Mehlhorn, Tommy Cates**, *University of Tennessee- Martin, Martin, Tennessee.*

* student author

presenting author, if not first author

Botany
Chair: Joey Shaw
Warf 101
1:00 p.m. – 2:50 p.m.

1:00-1:05 Business Meeting

1:05-1:20 Vascular Flora of Haynes Bottom Wildlife Management Area, Montgomery County, Tennessee. **Edward W. Chester**, *Austin Peay State University, Clarksville, Tennessee.*

1:20-1:35 Status Update for Two State Endangered Species in Tennessee, *Eurybia saxicastellii* and *Marshallia grandiflora*. **Todd Crabtree**, *The Tennessee Natural Heritage Program, Nashville, Tennessee.*

1:35-1:50 Preliminary Vascular Flora of Walls of Jericho State Natural Area, Franklin County, Tennessee. **Nate Parrish* and Joey Shaw**, *The University of Tennessee at Chattanooga, Chattanooga, Tennessee.*

1:50-2:05 *Saxifraga tridactylites* (Saxifragaceae) is naturalized in the southeastern and northwestern United States, with a center of distribution in Tennessee. **Courtney Alley* and Joey Shaw**, *The University of Tennessee at Chattanooga, Chattanooga, Tennessee.*

2:05-2:20 Using digitized herbarium specimens to predict potential distributions of Tennessee's historical angiosperm species. **Erica Rylander* and Joey Shaw**, *The University of Tennessee at Chattanooga, Chattanooga, Tennessee.*

2:20-2:35 Comparing biodiversity of power line right-of-way to surrounding forest habitats by conducting a floristic study of these adjacent sites in Marion County, Tennessee. **Megon Stepaniuk* and Joey Shaw**, *The University of Tennessee at Chattanooga, Chattanooga, Tennessee.*

2:35-2:50 Release of the Tennessee-Kentucky Plant Atlas: an online, comprehensive resource for the plant species of these two states. **Joey Shaw**, *The University of Tennessee at Chattanooga, Chattanooga, Tennessee.*

* student author

presenting author, if not first author

Cell and Molecular Biology
Chair: Marcia Schilling
Warf 106
1:00 p.m. – 2:05 p.m.

1:00-1:05 Business Meeting

1:05-1:20 Analysis of broiler chicken microflora using metabolomics and transcriptome to understand probiotic and host relationship. **Thyneice Taylor-Bowden*, Sarayu Bogoju, and Samuel Nahashon**, *Tennessee State University, Nashville, Tennessee.*

1:20-1:35 Identification of drought responsive genes from molecular studies of *Panicum hallii*. **Shohana Huq*, and Suping Zhou**, *Tennessee State University, Nashville, Tennessee.*

1:35-1:50 Segregation of parental genetic markers in sweet sorghum microspores individually isolated as natural protoplasts. **Aron Felts*, Binod Gyawali*, and Ahmad Aziz**, *Tennessee State University, Nashville, Tennessee.*

1:50-2:05 Effect of lysine on transcriptome profile and expression of selected cationic amino acid transporters in broiler chickens. **Collins N. Khwatenge* and Samuel N. Nahashon**, *Tennessee State University, Nashville, Tennessee.*

Chemistry
Chair: Wilson Gichuhi
Warf 104
1:00 p.m. – 2:35 p.m.

1:00-1:05 Business Meeting

1:05-1:20 Alleviation of unnatural amino acid-associated toxicity via media supplementation. **Austin R. Hill*, Jeffrey O. Boles**, *Tennessee Technological University, Cookeville, Tennessee.*

1:20-1:35 Isolation and silica-coating of iron nanoparticles for collecting nucleic acid from biological samples. **Baily W. Ford* and Marcia M. Schilling**, *Austin Peay State State University, Clarksville, Tennessee.*

* student author

presenting author, if not first author

1:35-1:50 Development of alkoxy-substituted scaffolds for minor actinide separations. **Mariah L. Tedder*** and **Jesse D. Carrick**, *Tennessee Technological University, Cookeville, Tennessee.*

1:50-2:05 Specific deprotection of BOC-containing heterocyclic substrates through addition-elimination with simple amines. **Zachary Z. Gullede*** and **Jesse D. Carrick**, *Tennessee Technological University, Cookeville, Tennessee.*

2:05-2:20 An analysis of the effect of pH on natural indicators. **Madison Lane*** and **Maria D. Garrett**, *Belmont University, Nashville, Tennessee.* Anthocyanins are found in many fruits, vegetables and plants.

2:20-2:35 Greener alternatives for kinetic studies: determining the activation energy for carbon dioxide producing neutralization reactions. **Nancy Henin*** and **Maria D. Garrett**, *Belmont University, Nashville, Tennessee.*

Ecology and Environmental Science

Chair: LaRoy Brandt

Warf 105

1:00 p.m. - 2:20 p.m.

1:00-1:05 Business Meeting

1:05-1:20 Estimating species richness using echolocation monitoring. **Hunter Wyatt*** and **LaRoy Brandt**. *Lincoln Memorial University, Harrogate, Tennessee.*

1:20-1:35 Burrowing success of endangered juvenile *Epioblasma capsaeformis* in relation to rearing conditions and substrate type. **Jacob. S. Lanning***, **Aggy Vanderpool**, *Lincoln Memorial University, Harrogate, Tennessee.*

1:35-1:50 Monitoring the movement and burrowing behavior of endangered *Epioblasma brevidens*, the Cumberlandian combshell mussel, in relation to rearing conditions and substrate type. **Justin Anderson-Woodard***, **Dr. Aggy Vanderpool**, *Lincoln Memorial University, Harrogate, Tennessee.*

* student author

presenting author, if not first author

1:50-2:05 Above ground biomass estimation and mapping using airborne LiDAR. **Durga P. Joshi***, **Bharat Pokharel**, *Department of Agricultural and Environmental Sciences, Tennessee State University, Nashville Tennessee.*

2:05-2:20 "Coping" with hurricanes. **John Nelson***, **LaRoy Brandt**, and **Stan Kunigelis**, *Lincoln Memorial University, Harrogate, Tennessee.*

Engineering & Engineering Technology

Chair: Ahmed EISawy

Warf 205

1:00 p.m. - 2:35 p.m.

1:00-1:05 Business Meeting

1:05-1:20 Wire + arc Additive Manufacturing of High-performance Materials, **Peyton Hunt***, **Clayton Kawasaki***, **Josef Bangean***, **Christopher Eckartz***, **Md. Ahsan***, **Ali Tanvir***, **Kevin Goodwin**, **Gijeong Seo**, **Ahmed Elsawy**, and **Duck Bong Kim**, *Tennessee Technological University, Cookeville, Tennessee.*

1:20-1:35 Student Learning Outcomes through Senior Capstone Experience. **Adel Salama***, **Chinzue Chen**, *Austin Peay State University, Clarksville, Tennessee.*

1:35-1:50 Design of a Solar Water Evaporation and Condensation System for the Production of Drinking Water. **Nathan Ghattas***, **Hunter Hinshaw***, **Kiran Lankalapalli***, **Ahmed EISawy**, and **Stephen Idem**, *Tennessee Tech University, Cookeville, Tennessee.*

1:50-2:05 Home Keyless Entry Capstone Project Experience. **Adel Salama**, **Matthew Purdy***, **Maverick Sproul**, and **Madelyn Mercer**, *Austin Peay State University, Clarksville, Tennessee.*

2:05-2:20 Biodiesel Yield Based on the Different Oil Composition and Mixture Ratio. **Jacob T. Wilson***, **Jared Partain***, **Cullen Nowell***, **Igbax Saanyol*** and **Ahmed EISawy**. *Tennessee Technological University, Cookeville, Tennessee.*

* student author

presenting author, if not first author

2:20-2:35 Investigation of Mechanical Property Variations in 3D-printed ABS Plastic Based on Brand Choice and Coloration. **Jenna Smith***, **Jared Teague**, **T. Damyan Hinson**, and **Ray Witmer**, *University of Tennessee at Martin, Martin, Tennessee (JS, JT, RW)*, and *Commercial Metals Co., Knoxville, Tennessee (TDH)*.

2:35-2:50 From Industry 3.0 Automation to Industry 4.0 Collaboration, **Khalid H. Tantawi**, *University of Tennessee at Chattanooga, Chattanooga, TN*.

2:50-3:05 Construction of an automated and programmable electronic cigarette (ECIG) aerosol generator. **Jordan Caudill*** and **Dominic Palazzolo**, *Lincoln Memorial University, Harrogate, Tennessee*.

Geology and Geography

Chair: **Thomas Byl**
Clement 122

1: 00 p.m. – 2:20 p.m.

1:00- 1:05 Business Meeting

1:05-1:20 A potpourri of unusual taphonomic preservations and biotic interactions from the Silurian and Devonian of West Tennessee. **Michael A. Gibson**, *University of Tennessee at Martin, Tennessee*.

1:20-1:35 Groundwater monitoring in the deepest caves in Tennessee. **Michael Bradley** and **Benjamin Miller**, *U.S. Geological Survey, Nashville, Tennessee*.

1:35-1:50 Water temperature variation and karst hydrology in the Virgin Falls area of White County, Tennessee. **Randy M. Curtis**, *Tennessee Registered Professional Geologist (unaffiliated)*.

1:50-2:05 Harmful algal blooms: microcystin toxin and nutrient analysis in the Tennessee State University wetland. **Rodney Blackwell, Jr. ***, **De'Etra Young**, **Thomas Byl**, *Tennessee State University, Nashville, Tennessee (RB, DY, TB)*, *US Geological Survey, Nashville, TN (TB)*.

* student author

presenting author, if not first author

2:05-2:20 Production of microcystin by the terrestrial cyanobacteria *Nostoc commune*. **Shakarah Nelson**, **De'Etra Young**, **Tom Byl**, *Tennessee State University, Nashville, Tennessee (SN, DY, TB)*, *US Geological Survey, Nashville, TN (TB)*.

Health and Medical Sciences

Chair: **Aliyar Fouladkhah**
Warf 115

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

1:00-1:05 Business Meeting

1:05-1:20 Pressure-based inactivation of *Listeria monocytogenes* as augmented by nisin. **Sadiye Aras***, **Aliyar C. Fouladkhah**, *Public Health Microbiology Laboratory, Tennessee State University, Nashville, Tennessee*.

1:20-1:35 Investigating the cause and clinical implications of splenic tortuosity. **Kristen J. Robertson**, **Sunny D. Patel MS**, **Andrew Villasenor MS**, **Jason Villasenor MS**, **Justin M. Foreman MS**, **Jeremy Polman MS**, **Michael A. Teesdale MS**, **Adam Kolatorowicz PhD**, *Lincoln Memorial University – School of Mathematics and Sciences, Alabama College of Osteopathic Medicine, Lincoln Memorial University – DeBusk College of Osteopathic Medicine*.

1:35-1:50 Decontamination of pressure-stressed sessile bacteria of public health concern and microbial spores. **Abimbola Allison***, **Aliyar C. Fouladkhah**, *Public Health Microbiology Laboratory, Tennessee State University, Nashville, Tennessee*.

1:50-2:05 Use of an emerging technology and evidence-based recommendations for control of pathogenic *Cronobacter* and *Salmonella* serovars in infant formula. **Monica Henry-Smith***, **Aliyar C. Fouladkhah**, *Public Health Microbiology Laboratory, Tennessee State University, Nashville, Tennessee*.

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presenting author, if not first author

History of Science
Chair: Martin V. Stewart
Warf 103
1:00 p.m. – 1:35 p.m.

1:00-1:05 Business Meeting (Meets with Physics & Astronomy)

1:05-1:20 Brother Kevin Ryan, FSC (1938 – 2017).
Martin V. Stewart, *Middle Tennessee State University, Murfreesboro, TN.*

1:20-1:35 Metaphysics in Ptolemy's *Almagest*.
John J. Schommer, *University of Tennessee at Martin, Martin, TN.*

Mathematics and Computer Science
Chair: Vajira Manathunga
Warf 201
1:00 p.m. - 3:05 p.m.

1:00-1:05 Business Meeting

1:05-1:20 The Van Arsdale twins in basketball: A statistical analysis. **Arjun Tan**, *Alabama A & M University, Normal, Alabama.*

1:20-1:35 Rotating Parabolas in Flatland. **Mark Miller and Chase Weimer**, *Lipscomb University, Nashville, Tennessee.*

1:35-1:50 Using Exponentially Fitted Backward Differentiation Formula for pricing non-dividend options. **Ramanjit K. Sahi**, *Austin Peay State University, Clarksville Tennessee.*

1:50-2:05 Statistical analysis of points scored by Michael Jordan, Scottie Pippen and Chicago Bulls in NBA playoffs. **Arjun Tan**, *Alabama A & M University, Normal, Alabama.*

2:05-2:20 Finding Efficient Portfolios, **Zachary R. Marlow* and Ramanjit K. Sahi**, *Austin Peay State University, Clarksville Tennessee.*

* student author

presenting author, if not first author

2:20-2:35 Smart Shelve Design Using Convolutional Neural Networks and the Concept of Internet of Things. **Ahanor Izuwa* and Daniel Mayo**, *Austin Peay State University, Clarksville Tennessee.*

2:35-2:50 Symmetrical Molecules and Mathematics. **Courtney Ann Frazier* and Ramanjit K. Sahi**, *Austin Peay State University, Clarksville Tennessee.*

2:50-3:05 The Delaporte Distribution and automobile insurance claims. **Chrisantus Bongbeebina*, Sumen Sen and Vajira Manathunga**, *Austin Peay State University, Clarksville Tennessee.*

Microbiology
Chair: Sergei Markov
Clement 118
1:00 p.m. - 2:35 p.m.

1:00-1:05 Business Meeting

1:05-1:20 The molecular basis for host regulation of bacterial symbionts. **Karissa L. Cross*, Edward J. van Opstal, Brittany A. Leigh, and Seth R. Bordenstein**, *Vanderbilt University, Nashville, Tennessee.*

1:20-1:35 Characterization and genomic analysis of novel bacteriophages Vanisius and Manatee. **Gregory Markov*, Ximena Leon, Jenna R. St. Pierre, Carter E. Woehlert, Tessa Cote, Tristan Watson and Elvira Eivazova**, *Columbia State Community College, Tennessee.*

1:35-1:50 *In vivo* evaluation of *Monascus* pigment derivatives with anti-obesity activities. **Deokyeong Choe*, Tony V. Johnston, and Seockmo Ku**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

* student author

presenting author, if not first author

1:50-2:05 Planktonic growth and biofilm formation of oral commensal streptococcal bacteria following exposure to electronic cigarette (ECIG)-generated aerosol or conventional cigarette smoke. **John Nelson, Giancarlo Cuadra and Dominic Palazzolo**, Lincoln Memorial University, Harrogate, Tennessee (DP, JN) and Muhlenberg College, Allentown, Pennsylvania (GC).

2:05-2:20 Examining potential retrovirus diversity and prevalence in Mycetozoa. **Autumn Silva*, Barbara C. Shock**, Lincoln Memorial University, Harrogate, Tennessee.

2:20-2:35 Construction of saturated GFP-tagged transposon Tn5 insertion mutant library of the soft rot pathogen, *Pectobacterium carotovorum*. **Bimala Acharya*, Raqibul Hasan, Ali Taheri and C. Korsi Dumenyo**, Tennessee State University, Nashville, Tennessee.

2:35-2:50 Evaluation of the mechanical properties of films from cellulose combined with chitosan and polyvinyl alcohol. **Patricia Cazón*, Manuel Vázquez, Gonzalo Velázquez, Seockmo Ku, Tony V. Johnston**, Instituto Politécnico Nacional CICATA, Querétaro (México), University of Santiago de Compostela, Lugo (Spain) and Middle Tennessee State University, Murfreesboro, Tennessee.

Physics and Astronomy

Chair: **Mary Kidd**
Warf 103

1:00 p.m. – 2:20 p.m.

1:00-1:05 Business Meeting (meets with History of Science)

1:35-1:50 First limit on neutrinoless quadruple beta decay of ^{150}Nd to the 0^+_1 state of ^{150}Gd . **Mary F Kidd**, Tennessee Technological University, Cookeville, Tennessee.

1:50-2:05 Variable Stars in the Field of Dolidze-35. **J. Allyn Smith and Jamin E. Welch**, Austin Peay State University, Clarksville, Tennessee (JAS), and Vanderbilt University, Nashville, Tennessee (JEW).

* student author

presenting author, if not first author

2:05-2:20 Are all Be star close binaries? **Richard Ignace**, East Tennessee State University, Johnson City, Tennessee.

Science and Math Teaching

Chair: **Kristin Jernigan**
Warf 204

1:00 p.m. – 3:05 p.m.

1:00-1:05 Business Meeting

1:05-1:20 Utilizing HIV-1 Protease inhibitor drugs to teach drug discovery and molecular modelling in the organic chemistry lab. **Monica B. Pan*, Macy L. Osborne*, Autumn L. Maczko*, Leslie A. Hiatt, Anuradha Liyana Pathirana**, Austin Peay State University, Clarksville, Tennessee.

1:20-1:35 3D printing of biomolecules to enhance classroom learning. **Lukas K. Hollis*, Julie Baker Phillips**, Cumberland University, Lebanon, TN.

1:35-1:50 Foldables and Doodles in the Collegiate Chemistry Class. **Sarah S. Pierce**, Cumberland University, Lebanon, Tennessee.

1:50-2:05 A better egg lab? Scaffolding to improve non-scientist's understanding of the scientific method. **Alicja K. Lanfear and Danielle D. Brown**, Middle Tennessee State University, Murfreesboro, Tennessee.

2:05-2:20 Internationalization of the pre-health sciences biology curriculum. **Weston P. Dulaney**, Columbia State Community College, Columbia, TN.

2:20-2:35 Encouraging reflective thinking: using pop-science books in the classroom. **Julie Baker Phillips**, Cumberland University, Lebanon, Tennessee.

2:35-2:50 Differentiated Perspectives: Interdisciplinary instruction for a summer camp. **Ryan C. Badeau, Radhika S. Ramjee**, Columbia State Community College, Franklin, Tennessee.

2:50-3:05 Take time to celebrate: an impactful strategy for end-of-course reflection. **Jennifer T. Thomas**, Belmont University, Nashville, Tennessee.

* student author

presenting author, if not first author

Zoology

Chair: H. Dawn Wilkins

Warf 203

1:00 p.m. – 2:50 p.m.

1:00-1:05 Business Meeting

1:05-1:20 New records of phlebotomines and mosquitoes as potential disease vectors atop the Cumberland Plateau of Tennessee. **David Bruce Conn, Denise Andriot Conn, and DeLacy V. L. Rhodes**, Berry College, Mount Berry, Georgia (DBC, DVLR), Harvard University, Cambridge Massachusetts (DBC), and NASCENT, Monteagle, Tennessee (DBC, DAC).

1:20-1:35 A rather bold anopheline: Molecular evidence for an *Anopheles squamosus* species complex and its importance for malaria elimination in southern Zambia. **Jordan E Hoffman*, Limonty Simubali, Twig Mudenda, William J Moss, Douglas E Norris, and Jennifer C Stevenson**, Southern and Central Africa International Centers of Excellence for Malaria Research, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland (JEH, WJM, DEN, JCS) and Macha Research Trust, Macha, Zambia (LS, TM).

1:35-1:50 *Borrelia* spp. detected in rodent spleens from the Cumberland Gap Area of Tennessee, Virginia, and Kentucky. **Molly A. Ramsey*, Ashley V. Taschner*, Joey Morgan, Beth Kitts-Morgan, Lauren Fansler*, Vina Faulkner, Barbara C. Shock**, Lincoln Memorial University, Harrogate, Tennessee.

1:50-2:05 Seasonality of questing ticks in Claiborne County, Tennessee. **Emily Burke* and Barbara C. Shock**, Lincoln Memorial University, Harrogate, Tennessee.

2:05-2:20 Flower-inspection behavior of a hawkmoth in response to floral textures. **Benjamin T. Allen* and Joaquín Goyret.**, The University of Tennessee at Martin, Martin, Tennessee.

* student author

presenting author, if not first author

2:20-2:35 Variation in bat use of an ephemeral wetland in western Tennessee. **Aubree Weitzel*, Jeremy Dennison, and Nancy Buschhaus**, University of Tennessee at Martin, Martin, Tennessee (AW, NB), and Tennessee Wildlife Resources Agency Region 1, Jackson, Tennessee (JD).

2:35-2:50 Distance of separation in first order relatives associated with precipitation level in the raccoon in southwestern Tennessee. **Noah White*, Jillian P. Sturtevant*, Evelyn Chukwurah, John R. Hisey, Michael L. Kennedy, and Brian D. Carver**, Lee University, Cleveland, Tennessee (NW, JPS, JRH), University of South Carolina, Columbia, South Carolina (EC), University of Memphis, Memphis, Tennessee (MLK), and Tennessee Tech University, Cookeville, Tennessee (BDC).

Poster Presentations

Waymon L. Hickman Building

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 Predatory Natural Enemy monitoring in Soybean. **Kaushalya G. Amarasekare and Richard H. Link**, Tennessee State University, Nashville, Tennessee.

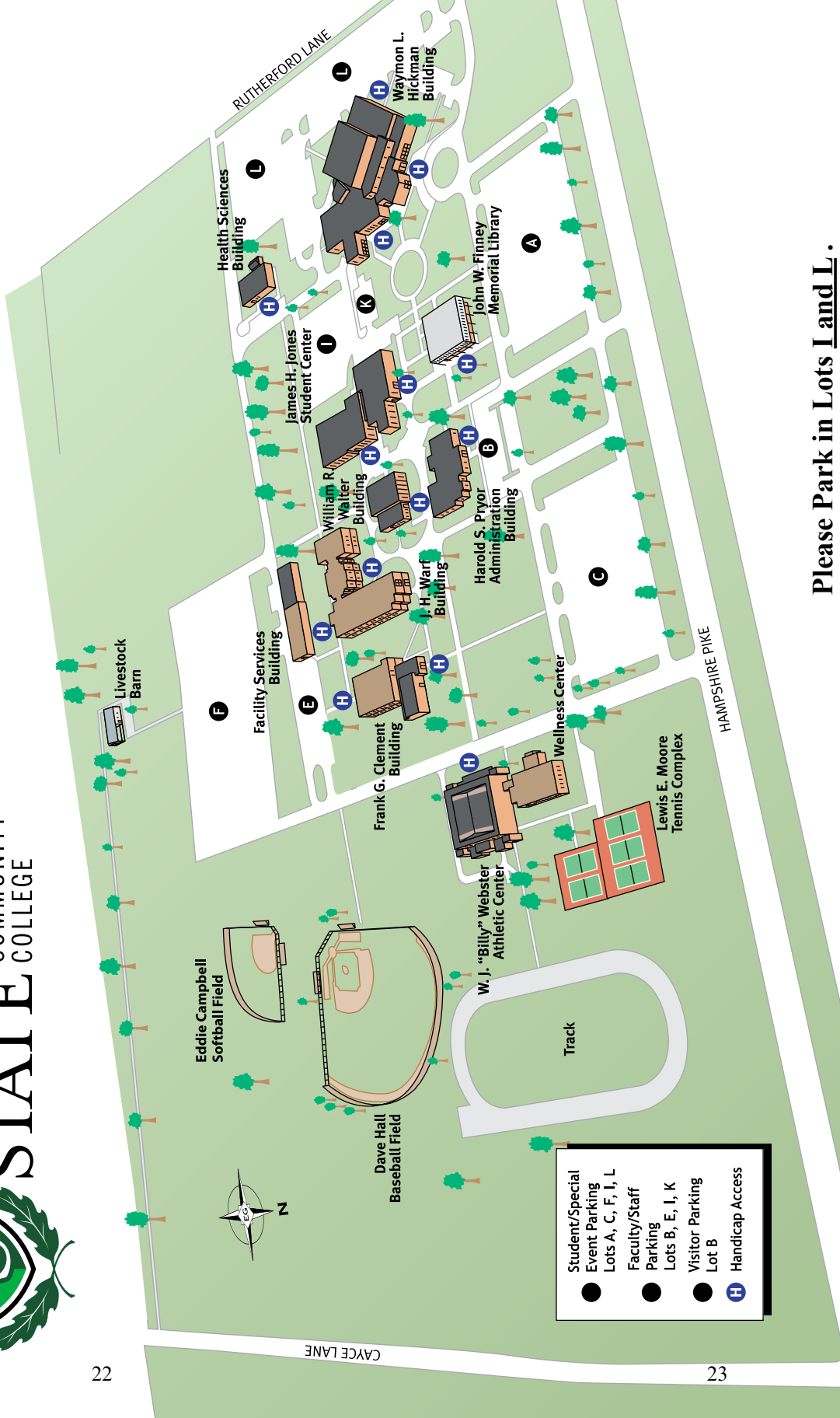
1-02 The influence of dietary kudzu leaf meal supplementation on broiler performance and carcass characteristics. **Joseph P. Gulizia*, Kevin M. Downs, and Maegan E. Hollis**, Middle Tennessee State University, Murfreesboro, Tennessee.

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C and F lots will be closer to the afternoon sessions.

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1-03 Wild-simulated American ginseng (*Panax quinquefolius* L.) seedling growth in response to environment and planting method.. **Killen Middleton***, **Federico Vollmer***, **Daniel Bess***, **Nate Phillips**, and **Ying Gao**, *Middle Tennessee State University, Murfreesboro Tennessee.*

1-04 Investment opportunities for alfalfa growers: comparative economic analysis of alfalfa hay vs. pellet production. **Ryan Smith***, **Prabodh Illukpitiya**, *Tennessee State University, Nashville, Tennessee.*

1-05 Assessment of root system architecture of *Arabidopsis thaliana* seedling under copper stress condition. **Ekundayo Adeleke***, and **Ali Taheri**, *Tennessee State University, Nashville, Tennessee.*

1-06 Analysis of necropsy data on pneumonia in West Tennessee cattle. **Kaitlyn Courtney***, **Clint Ary**, and **Emalee Buttrey**, *The University of Tennessee at Martin, Martin, Tennessee.*

1-07 Biotransformation of major ginseng saponins in ginseng wort via *Saccharomyces cerevisiae* accompanied with ginseng beer production. **Jordan S. Bevill**, **Caldwell V. Charlet**, **Mengliang Zhang**, **Ying Gao**, **Tony V. Johnston**, and **Seockmo Ku**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

1-08 Variation analysis of root system development in Wheat seedlings using root phenotyping system. **Ekundayo Adeleke***, and **Ali Taheri**, *Tennessee State University, Nashville, Tennessee.*

1-09 Effects of amendment and inoculation strategies on switchgrass biomass production in degraded soil. **Ekundayo O. Adeleke*** and **E. Kudjo Dzantor**, *Tennessee State University, Nashville, Tennessee.*

1-10 Evaluating the effects of *Lactobacillus reuteri* and zinc bacitracin on the growth performance of guinea fowl broilers. **Alexis T. Pigg***, **Samuel N. Nahashon**, *Tennessee State University, Nashville, Tennessee.*

1-11 Efficacy of biofumigation with solarization for the control of Phytophthora root rot of boxwood. **Fulya Baysal-Gurel**, **Terri Simmons**, **Sandhya Neupane***, **Milan Panth**, **Ravi Bika**, **Samuel Hassler**, and **Krishna Neupane**. *Tennessee State University, Nashville, Tennessee.*

1-12 Evaluation of fungicides for the control of rose black spot caused by *Diplocarpon rosae*. **Christina Jennings***, **Terri Simmons**, and **Fulya Baysal-Gurel**. *Tennessee State University, Nashville, Tennessee.*

1-13 First report of *Phytophthora vexans* causing root and crown rot of ginkgo. **Milan Panth***, **Terri Simmons**, **Farhat Avin**, and **Fulya Baysal-Gurel**, *Tennessee State University, Nashville, Tennessee.*

1-14 Evaluation of breed, milk production, and udder characteristics on somatic cell count and udder pathogens in lactating Holstein and Jersey cows. **Britney Brown***, **Jessica Carter** and **Maegan Hollis**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

1-15 Evaluation of compost and lime rate for growth of annual flower crops. **Hannah Haw***, **Justin Caldwell**, and **Anthony Witcher**, *Tennessee Tech University, Cookeville, Tennessee (HH, JC), and Tennessee State University, McMinnville, Tennessee (AW).*

1-16 Physical and chemical properties of compost-amended substrates for growth of annual flower crops. **Justin Caldwell***, **Hannah Haw**, and **Anthony Witcher**, *Tennessee Tech University, Cookeville, Tennessee (JC, HH), and Tennessee State University, McMinnville, Tennessee (AW)*

1-17 Weed control in cutting propagation of nursery crops. **Isha Poudel*** and **Anthony Witcher**, *Tennessee State University, McMinnville, Tennessee.*

1-18 Hemp breaks ground in Central Decatur County. **Zachariah Mills**, **David Townsend**, *University of Tennessee at Martin, Martin, Tennessee.*

* student author

presenting author, if not first author

* student author

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1-19 Perceptions and ideas to achieve success from UTM freshman pre-vet majors as compared to Veterinary School students and alumni. **Elizabeth Whitt*, Clint Ary, Jason Roberts, Joey Mehlhorn,** *The University of Tennessee at Martin, Martin, Tennessee.*

1-20 Tennessee Governor's School for the Agricultural Sciences scholar's perceptions of the veterinary profession. **Emily Lewis*, Joey Mehlhorn, and Jason Roberts,** *University of Tennessee – Martin, Martin, Tennessee.*

1-21 Predatory natural enemy monitoring in soybean. **Kaushalya Amarasekare and Richard Link,** *Tennessee State University, Dept. of Agricultural and Environmental Sciences, College of Agriculture, Nashville, Tennessee.*

1-22 Lethal and sublethal effects of reduced-risk and organophosphate-replacement insecticides on *Orius insidiosus* (Hemiptera: Anthracoridae). **Uzoamaka C. Abana* and Kaushalya G. Amarasekare,** *Tennessee State University, Department of Agricultural and Environmental Sciences, College of Agriculture Nashville, Tennessee.*

1-23 Consumer perceptions and purchasing habits related to antibiotic free meat products. **Lindsey Newman, Joey Mehlhorn, Philip Smartt, and Barbara Darroch,** *University of Tennessee at Martin, Martin Tennessee.*

1-24 Identification of bacterial canker pathogens on sweet cherry trees in Marmara region of Turkey. **Cansu Oksel*, Fulya Baysal-Gurel, and Mustafa Mirik,** *Tennessee State University, Nashville, Tennessee (FBG), and Namik Kemal University, Tekirdag, Turkey (CO, MM).*

1-25 Agricultural Education Teacher's Perceptions of Student's Career Choice from Participation in the Tennessee State Veterinary Science FFA Career Development Event. **Amanda Waldon, Danny Walker, and Will Bird,** *University of Tennessee at Martin, Martin, TN.*

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1-26 Analyzing the physiological impacts of diet in cats. **Marissa Parks*, Matthew Chestnut, Zachary Morphis, Emalee Buttrey, and Clint Ary,** *The University of Tennessee at Martin, Martin, Tennessee.*

Botany Posters

2-01 Progress towards establishing an arboretum at Freed-Hardeman University using DNA identification. **Asmihan Anamer, Paul Fader, and Caleb Kersey,** *Freed-Hardeman University, Henderson, Tennessee.*

2-02 Germination performance of grass seeds pretreated with smoke water for three Florida pine rockland species. **Jared Patel* and Lisa M. Krueger,** *The University of Tennessee at Martin, Martin, Tennessee.*

Cell and Molecular Biology Posters

3-01 Effect of amodiaquine on gene expression and apoptosis in colorectal cancer cells. **Holly Pyles* and Chris Barton,** *Belmont University, Nashville, Tennessee.*

3-02 Lichen DNA barcoding: an aid in lichen identification and air quality assessment. **Taylor Gerson*, Chris Barton, and Darlene Parvini,** *Belmont University, Nashville, Tennessee.*

3-03 Anti-proliferative effects of amodiaquine on multiple cancer cell types. **Spenser Johnson* and Chris Barton,** *Belmont University, Nashville, Tennessee.*

3-04 The role of mitochondrial ATP in MDA-MB-231 cell migration in vitro. **Justin Lawrence* and Sarah Lundin-Schiller,** *Austin Peay State University, Clarksville, Tennessee.*

3-05 Apoptotic Effect of Amodiaquine on HCT116 Colon Cancer Cells. **Sandra Tomas* and Chris Barton,** *Belmont University, Nashville, Tennessee.*

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Chemistry Posters

4-01 Quantitation of Ethanol in Different Yeasts. **Tensaye M. Taye*** and **Sarah S. Pierce**, *Cumberland University, Lebanon, Tennessee.*

4-02 Synthesis and characterization of various luminescent terbium(III) complexes. **Jacob Utley***, **Justin Stace**, *Belmont University, Nashville, Tennessee.*

4-03 Solubilization of Phosphate in Soil Using Ozone Treated Biochar and Its Effect on Seed Germination. **Johana Fernandez-Solano***, **Issac Mukooza**, **Gyanendra Kharel** and **James Lee**, *Columbia State Community College, Columbia, Tennessee (JFS), Hampton University, Hampton, Virginia (IM) and Old Dominion University, Norfolk, Virginia (GK, JL).*

Ecology and Environmental Science Posters

5-01 Microsatellite transferability between *Boechera perstellata* and *B. laevigata* (Brassicaceae). **Annie Lindsey***, **Lydia Deason***, **Charles Fitch***, and **Carol Baskauf**, *Austin Peay State University, Clarksville, Tennessee.*

5-02 Identification of the presence of Eastern Hellbenders (*Cryptobranchus alleganiensis*) in the Powell River, Tennessee utilizing environmental DNA detection methods. **Hana Hess***, **Whitney Kistler**, *Lincoln Memorial University, Harrogate, Tennessee.*

5-03 The survey of earthworm density and its impact on soil quality and study of the initiation of earthworm aestivation at Reelfoot Lake station and residential sites at Martin in summer and winter 2019. **Chloe Smotherman*** and **Donald Shaw**, *University of Tennessee at Martin, Martin, Tennessee.*

5-04 Population densities, size distribution, and genetic analysis of crayfish species at local streams in Giles County, Tennessee. **Madison Yurewitch*** and **Stanton G. Belford**, *Martin Methodist College, Pulaski, Tennessee.*

* student author

presenting author, if not first author

5-05 Phylogenetic analysis of the rock-boring sea urchin *Echinometra lucunter* (Echinoidea) along the north eastern coast of a tropical Atlantic reef. **Hailey Browning*** and **Stanton G. Belford**, *Martin Methodist College, Pulaski, Tennessee.*

5-06 Intensity of development and impervious substrate cover as indicators of urban plant diversity and community composition. **Faith Martin*** and **Darlene Panvini**, *Belmont University, Nashville, Tennessee.*

5-07 Occurrence of soil arthropods along a pH gradient at an urban protected site in Nashville, Tennessee. **Merna Fayik*** and **Darlene Panvini**, *Belmont University, Nashville, Tennessee.*

5-08 Occurrence of invertebrates along a dry streambed gradient in an urban park in Nashville, Tennessee. **Gabe Newton*** and **Darlene Panvini**, *Belmont University, Nashville, Tennessee.*

5-09 Evaluating soil microbial diversity during degraded land biomass production (DLBP). **Ekundayo O. Adeleke*** and **E. Kudjo Dzantor**, *Tennessee State University, Nashville, Tennessee.*

Engineering and Engineering Technology Posters

No poster presentations

Geology and Geography Posters

6-01 The Relationship of Atmospheric Blocking to Prolonged Severe Tornado Outbreaks In The United States. **Savannah Tennyson*** and **Robert M. Simpson**, *University of Tennessee at Martin, Martin, Tennessee.*

6-02 Geochemical and Petrographic Attributes of Lavas Erupted at Small Volcanic Centers in Northern Oregon. **Lily Medley***, **Brannon Cox***, **Warner Cribb**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

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presenting author, if not first author

6-03 Algal adaptations to low light in Mammoth Cave. **Nakana'ela Morton***, **De'Etra Young, Rickard Toomey, and Tom Byl**, *Tennessee State University, Nashville, Tennessee (NM, DY, TB), Mammoth Cave National Park, Kentucky (RT) and U.S. Geological Survey, Nashville, Tennessee (TB)*.

6-04 Changing groundwater flow directions in a fuel-contaminated karst aquifer in Nashville, Tennessee. **Darius Lawson, Chris Vanags, De'Etra Young, Jessica Oster, Tom Byl**, *Tennessee State University, Nashville, Tennessee (DL, DY, TB), Vanderbilt University, Nashville, Tennessee (CV, JO), US Geological Survey, Nashville, TN (TB)*.

6-05 The use of a fluorescence probe to characterize lampenflora in Mammoth Cave National Park. **Brittaney Hogan***, **Rickard Toomey, De'Etra Young, Thomas Byl**. *Tennessee State University, Nashville, Tennessee (BH, DY, TB), Mammoth Cave National Park, Kentucky (RT), US Geological Survey, Nashville, Tennessee (TB)*.

Health and Medical Science Posters

7-01 A pilot project to increase stairway traffic and decrease elevator usage on a college campus. **Amy L. Richards and Lori L. Littleton**, *University of Tennessee at Martin, Martin, Tennessee*.

7-02 Public health burden of *Listeria monocytogenes*: secondary analyses of recent epidemiological studies. **Tyler Keene***, **Aliyar C. Fouladkhah**, *Public Health Microbiology Laboratory, Tennessee State University, Nashville, Tennessee*.

7-03 Who is caring for the college students: Revisiting food pantry programs on Tennessee's public campuses. **Terra L. Smith, and Loveday E. Nwobilor**, *The University of Memphis, Memphis, Tennessee (TLS), SRVS, Memphis, Tennessee (LEN)*.

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7-04 The effects of time-restricted feeding on salivary levels of cortisol, insulin, and C-reactive protein in adult humans. **Aleya Brent***, **Elizabeth L. Campbell***, and **Ann D. Gathers**, *The University of Tennessee at Martin, Martin, Tennessee*.

7-05 Sensitivity of pathogenic and non-pathogenic *Salmonella enterica* serovars to pressure-based pasteurization. **Anika Chowdhury***, **Aliyar C. Fouladkhah**, *Public Health Microbiology Laboratory, Tennessee State University, Nashville, Tennessee*.

7-06 Analyzing the ability of amodiaquine to function in combination with starvation and additional chemotherapeutic compounds. **Kailey Shannon and Chris Barton**, *Belmont University, Nashville, Tennessee*.

7-07 Drug Repurposing: Anti-malarial compounds decrease the viability of multiple cervical cancer cell lines. **Hannah Moore and Chris Barton**, *Belmont University, Nashville, Tennessee*.

7-08 Decontamination of *Staphylococcus aureus* by pressure-based pasteurization. **Jyothi George***, **Aliyar C. Fouladkhah**, *Public Health Microbiology Laboratory, Tennessee State University, Nashville, Tennessee*.

History of Science Posters

No poster presentations

Math and Computer Science Posters

No poster presentations

Microbiology Posters

8-01 Presence and Diversity of Mycoviruses and Mimiviruses in Myxomycetes. **Madison Booker***, **Autumn Silva***, **Barbara C. Shock**, *Lincoln Memorial University, Harrogate, Tennessee*.

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8-02 Thirteen novel bacteriophages isolated from Middle Tennessee ecosystems. **Gregory Markov***, **Ximena Leon**, **Jenna R. St. Pierre**, **Carter E. Woehlert**, **Tessa Cote**, **Tristan Watson**, **Swati Bisht**, **Johana Fernandez-Solano** and **Elvira Eivazova**, *Columbia State Community College, Tennessee.*

8-03 Effect of E-liquid composition on the growth of commensal oral bacteria. **Dong Keun Lee ***, **John Nelson**, **Giancarlo Cuadra** and **Dominic Palazzolo**, *Lincoln Memorial University, Harrogate, Tennessee (DL, JN, DP) and Muhlenberg College, Allentown, Pennsylvania (GC).*

8-04 Effect of E-liquid Flavoring on the growth of commensal oral bacteria. **Swapna Sista***, **Michael Helou**, **Shivam Patel**, **Jacob Fischman**, **Giancarlo Cuadra** and **Dominic Palazzolo**, *Lincoln Memorial University, Harrogate, Tennessee (SS, MH, SP, DP) and Muhlenberg College, Allentown, Pennsylvania (JF, GC).*

8-05 An Exploration of Endophytes Within Known Medicinal Plants in Pursuit of Novel Antibiotic Synthesis. **Zaid Hatem***, **Ethan Lilly***, **Emily Rotich**, **Matthew Heard**, *Belmont University, Nashville, Tennessee (ZH, ER, MH), and Montgomery Bell Academy, Nashville, Tennessee (EL).*

8-06 Characterization and Analysis of Binding Interaction of *Campylobacter* Flagellin Protein with the Aid of Monoclonal Antibodies using Surface Plasmon Resonance. **Shreya Singh Hamal** and **Fur-Chi Chen***, *Tennessee State University, Nashville, Tennessee.*

Physics and Astronomy Posters

9-01 Temperature dependence of the fundamental optical absorption edge in As-S glasses. **James Forsythe***, **Roman Golovchak**, *Austin Peay State University, Clarksville, Tennessee.*

9-02 Observations on the Variable Star IN Lib. **Justin Prevatte***, **M. Claire Elrod***, *Austin Peay State University, Clarksville, Tennessee.*

* student author

presenting author, if not first author

9-03 Analysis of pole breaking in pole vault events. **Arjun Tan**, *Alabama A & M University, Normal, Alabama.*

Science and Math Teaching Posters

10-01 Development of virtual soil pits for improved agricultural and biological education. **Seth Shannon***, **Donald Sudbrink**, and **Tiffany Carter**, *Austin Peay State University, Clarksville, Tennessee.*

Zoology Posters

11-01 Ixodid ticks associated with horses in eastern Tennessee. **Matilda M. Tate***, **Barbara C. Shock**, *Lincoln Memorial University, Harrogate, Tennessee.*

11-02 Phylogenetic analysis of zoanthid color morphotypes. **Aerial Williams*** and **Stanton G. Belford**, *Martin Methodist College, Pulaski, Tennessee.*

11-03 The effect of cannabidiol and lamotrigine on action potentials in earthworms ventral giant fibers and sciatic nerves in frogs and mice. **Zachary James*** and **Donald Shaw**, *University of Tennessee at Martin, Martin, Tennessee.*

11-04 Vertical layering of animals in forested ecosystems in northwest Tennessee. **Jessica A. Roberts*** and **H. Dawn Wilkins**, *The University of Tennessee at Martin, Martin, Tennessee.*

11-05 The effects of a stream restoration project on condition factor, growth, and diet of Bluegill Sunfish (*Lepomis macrochirus*). **Mason Ferrell***, **Jake Hollows***, and **Tom Blanchard**, *The University of Tennessee at Martin, Martin, Tennessee.*

11-06 Impact of noise pollution on the diversity and abundance of bird species at feeders in two urban neighborhoods. **David Feng*** and **Darlene Panvini**, *Belmont University, Nashville, Tennessee.*

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presenting author, if not first author

11-07 Prevalence of *Ophryocystis elektroscirrha* in *Danaus plexippus* during fall migration through Nashville, Tennessee. **Nicole Pope*** and **Darlene Panvini**, Belmont University, Nashville, Tennessee.

11-08 Survey of birds in the Lawrenceburg area of Middle Tennessee. **Theresa Anne Scott***, Columbia State Community College, Columbia, Tennessee.

11-09 Intrasexual behaviors of the nonnative mediterranean house gecko, *Hemidactylus turcicus*. **Clinton Warren*** and **Matthew Klukowski**, Middle Tennessee State University, Murfreesboro, Tennessee.

11-10 Comparison of bird diversity reported at an eBird hotspot and a banding station in an urban natural area park in Nashville, Tennessee. **Mia Melendez*** and **Darlene Panvini**, Belmont University, Nashville, Tennessee.

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