

Student Presentation Awards at the 128th Meeting of the Tennessee Academy of Science

Oral Presentations

Agriculture

- First Place—*Kyle D. McGearry*. Effects of Nitrogen and Cultivar Type on Germination and Soil Coverage in Winter Canola (*Brassica napus* L.) in Tennessee. *Tennessee State University, Nashville, Tennessee.*
- Second Place—*Winnie Mukuna*. Prevalence of antimicrobial resistance *Enterobacteriaceae* in plant-based milk. *Tennessee State University, Nashville, Tennessee.*
- Third Place (tie)—*Kaitlyn Courtney*. Analysis of necropsy data on cattle in West Tennessee with a focus on preventable disease. *The University of Tennessee at Martin, Martin, Tennessee.*
- Third Place (tie)—*Emily Rendlemen*. Solar swarm: effect of the August 2017 solar eclipse on *Apis mellifera*. *Austin Peay State University, Clarksville, Tennessee.*

Botany

- First Place—*Caleb Powell*. An overview of Tennessee's herbaria, based on digitized specimens. *University of Tennessee at Chattanooga, Chattanooga, Tennessee.*
- Second Place (tie)—*John Shelton*. Applications, methods, and examples of research projects using the burgeoning Southeastern Regional Network of Expertise and Collections database. *University of Tennessee at Chattanooga, Chattanooga, Tennessee.*
- Second Place (tie)—*Aron Felts*. Isolation of Sweet Sorghum microspores to identify the microsporogenesis stages towards creating double haploid plants. *Tennessee State University, Nashville, Tennessee.*
- Third Place—*Courtney Alley*. Evaluating the ranks of the Tennessee Invasive Plant Council Using Herbarium Specimen Data from the Developing SERNEC Database. *The University of Tennessee at Chattanooga, Chattanooga, Tennessee.*
- Honorable Mention—*Alaina Krakowiak*. Orchard Knob: The forgotten glades of Chattanooga and an update on *Clematis fremontii* populations in Tennessee. *The University of Tennessee at Chattanooga, Chattanooga, Tennessee.*

Cell and Molecular Biology

- First Place—*Briar Bell*. Pharmacological disruption of the microtubule array to determine the role of Golgi-nucleated microtubules in cancer cell migration. *Austin Peay State University, Clarksville, Tennessee.*
- Honorable Mention—*Shohana Huq*. Identification of motif and transcription factor binding sites in *Panicum hallii* by ChIP sequencing analysis. *Tennessee State University, Nashville, Tennessee.*

Chemistry

- First Place—*Anas Hajhussen*. Synthesis of unsymmetrical 1,10-bis(4-alkoxyppyridinium [*closo*-B₁₀H₁₀]²⁻ derivatives. *Middle Tennessee State University, Murfreesboro, Tennessee.*
- Second Place—*Allison Schmittou*. Environmentally friendly gold nanoparticles for catalytic applications. *Austin Peay State University, Clarksville, Tennessee.*
- Third Place—*Anastasia Kuvayskaya*. Synthesis of long-chain alkylbenzenes on heterogeneous superacidic catalyst. *East Tennessee State University, Johnson City, Tennessee.*

Ecology and Environmental Science

- First Place—*Robert Ryan*. Subspecies variation in song structure of Seaside Sparrow, *Ammodramus maritima*. *Austin Peay State University, Clarksville, Tennessee.*
- Second Place—*Shawn Snyder*. Detection and habitat modeling for the state threatened Western Pygmy Rattlesnake (*Sistrurus miliarius streckeri*) in Tennessee. *Tennessee State University, Nashville, Tennessee.*
- Third Place—*Ravneet Kaur*. Incidence of pharmaceuticals in a river drained by a rural watershed. *Tennessee State University, Nashville, Tennessee.*
- Honorable Mention—*Kayla Howard*. Examining fish species richness and abundance in a reclaimed mountaintop removal mining watershed. *Lincoln Memorial University, Harrogate, Tennessee.*

Engineering & Engineering Technology

- First Place—*Saanyol Igbax*. Automation of the biodiesel processing by using sonication and electrostatic for increasing the yield and faster glycerol separation. *Tennessee Technological University, Cookeville, Tennessee.*
- Second Place (tie)—*Taylor Ross*. Characterization of mechanical properties and microstructure of wire+arc additively manufactured parts. *Tennessee Technological University, Cookeville, Tennessee.*
- Second Place (tie)—*Peyton Hunt*. Characterization of mechanical properties and microstructure of wire+arc additively manufactured parts. *Tennessee Technological University, Cookeville, Tennessee.*
- Third Place—*Mohammad Rahman*. Detection of cyber physical system attack using monitoring signal. *Tennessee State University, Nashville, Tennessee.*
- Honorable Mention (tie)—*Hannah Burns*. Automation of nutrient injection system in hydroponics system. *Tennessee Technological University, Cookeville, Tennessee.*

Honorable Mention (tie)—*Daniel Schlenker*. Automation of nutrient injection system in hydroponics system. *Tennessee Technological University, Cookeville, Tennessee.*

Geology and Geography

First Place—*Rodney Blackwell*. Results of microcystin toxin and nutrient analysis in the TSU wetland. *Tennessee State University, Nashville, Tennessee.*

Health and Medical Sciences

First Place—*Monica Henry*. Pressure-based inactivation of rifampicin-resistant *Cronobacter sakazakii* in infant formula. *Tennessee State University, Nashville, Tennessee.*

Second Place—*Abimbola Allison*. Prevention of planktonic and sessile foodborne pathogens of public health concern using an emerging technology. *Tennessee State University, Nashville, Tennessee.*

Third Place—*Jayashan Adhikari*. Inactivation of wild-type and acid-adopted *Salmonella* serovars and *Escherichia coli* O157:H7 using high pressure pasteurization. *Tennessee State University, Nashville, Tennessee.*

Mathematics & Computer Science

First Place—*Joseph Matthews*. Doubly-inflated negative binomial regression model. *Austin Peay State University, Clarksville, Tennessee.*

Second Place—*P. M. Watkins*. Numerical methods for fractional differential equations. *Austin Peay State University, Clarksville, Tennessee.*

Third Place—*Scott Howard*. On the evaluation of the American put Black-Scholes equation using an exponentially fitted Enright type method. *Austin Peay State University, Clarksville, Tennessee.*

Microbiology

First Place—*Dylan Shropshire*. The genetic basis of bacterial-induced infertilities in insects. *Vanderbilt University, Nashville, Tennessee.*

Second Place—*Emily Layton*. Lethality induced by pathogen-blocking bacteria increases with grandmother age in *Drosophila melanogaster*. *Vanderbilt University, Nashville, Tennessee.*

Third Place—*Shreya Singh Hamal*. Characterization of flagellin protein of *Campylobacter* species using monoclonal antibodies. *Tennessee State University, Nashville, Tennessee.*

Physics & Astronomy

First Place—*Megan McCracken*. The utilization of neural networks in solving for ionospheric fluid flow. *Austin Peay State University, Clarksville, Tennessee.*

Science and Mathematics Teaching

First Place—*Macy Osborne*. Esterification and molecular modeling of cinnamic acid esters. *Austin Peay State University, Clarksville, Tennessee.*

Second Place—*Velta Napoleon-Farris*. Enhancing scientific literacy with NOS cards. *Middle Tennessee State University, Murfreesboro, Tennessee.*

Third Place—*Rachel Marlin*. MTeach: Pathway to a successful career in chemical education. *Middle Tennessee State University, Murfreesboro, Tennessee.*

Zoology

First Place—*Joshua Hall*. Embryo development and global change: how do reptile embryos respond to ecologically relevant thermal stress? *Auburn University, Auburn, Alabama.*

Second Place—*Brent Newman*. Impacts of prescribed fire and forest thinning on tick populations and prevalence of tick-borne diseases in a southeastern mixed pine forest. *Tennessee State University, Nashville, Tennessee.*

Third Place—*L. Angelica Solano*. Gastrointestinal parasites of wild mammals in the Cumberland Gap Area of Tennessee. *Lincoln Memorial University, Harrogate, Tennessee.*

Honorable Mention—*Sarah Swing*. A comparison of biodiversity measures of small mammals at arboreal and ground levels in edge habitat of eastern deciduous forest in western Tennessee. *The University of Memphis, Memphis, Tennessee.*

Poster Presentations

Agriculture

First Place—*Christina Jennings*. Glyphosate resistant and susceptible horseweed seed germination rate and response to herbicide rate. *Tennessee State University, McMinnville, Tennessee.*

Second Place—*Uzoamaka Abana*. The effectiveness of herbivore induced plant volatiles for monitoring field populations of *Orius insidiosus* and thrips in sweet pepper in Tennessee. *Tennessee State University, Nashville, Tennessee.*

Third Place—*Alaina Kresovic*. Evaluation fertilizer type and compost rate for growth of vinca. *Middle Tennessee State University, Murfreesboro, Tennessee, and Tennessee State University, McMinnville, Tennessee.*

Botany

First Place—*Caitlin Barnes*. Cloud forest epiphyte diversity, elevation and climate change. *Belmont University, Nashville, Tennessee.*

Second Place—*Alexander Wharton*. Observing Potential Synergistic and Antagonist Effects of Acid and Radiation Stress on both Invasive and Native *Lonicera*. *Belmont University, Nashville, Tennessee.*

Third Place—*Kayla Howard*. Determining the presence of heavy metals in an intertidal grass species and seagrass

species. *Lincoln Memorial University, Harrogate, Tennessee.*

Cellular and Molecular Biology

- First Place—*Justin Lawrence*. Mitochondria localization during MDA-MB-231 cell migration *in vitro*. *Austin Peay State University, Clarksville, Tennessee.*
- Second Place—*Dillon Nall*. Effect of brown recluse spider venom on sodium channels. *Austin Peay State University, Clarksville, Tennessee.*
- Third Place—*Casey Kelly*. The effects of talcum powder on germline morphology and apoptosis in *C. elegans*. *Lincoln Memorial University, Harrogate, Tennessee.*
- Honorable Mention—*Jerry Reed*. Fluorescent microscopy reveals apoptosis occurring in MDA-MB-231 breast cancer cells in response to brown recluse whole venom treatment. *Austin Peay State University, Clarksville, Tennessee.*

Chemistry

- First Place—*Isabella Barnett*. Differentiation of ignitable liquids by using Direct Analysis in Real Time Mass Spectrometer (DART-MS). *Middle Tennessee State University, Murfreesboro, Tennessee.*
- Second Place—*Kiran Donthula*. Artificial neural network predictions of carbonyl reactivity and spectroscopic properties from a database of charge density descriptors. *Middle Tennessee State University, Murfreesboro, Tennessee.*
- Third Place—*Adekunle Akinmola*. Cation exchange of chalcogenide nanocrystals using non-toxic starting materials. *Middle Tennessee State University, Murfreesboro, Tennessee.*

Ecology and Environmental Science

- First Place—*Caroline Wilford*. 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.*
- Second Place (tie)—*Bradley Nissen*. Evaluating spatial ecology of Eastern Hellbenders (*Cryptobranchus alleganiensis alleganiensis*) in Southeast Tennessee. *Tennessee State University, Nashville, Tennessee.*
- Second Place (tie)—*Emily Nolan*. Evaluating spatial ecology of Eastern Hellbenders (*Cryptobranchus alleganiensis alleganiensis*) in Southeast Tennessee. *Tennessee State University, Nashville, Tennessee.*
- Third Place—*Matthew Purucker*. Characterizing and predicting site productivity using geocentric approach. *Tennessee State University, Nashville, Tennessee.*
- Honorable Mention (tie)—*Jacob Lanning*. Use of pit tags in a mark-recapture study to assess survival and growth of two endangered freshwater mussels in the Powel River, Tennessee. *Lincoln Memorial University, Harrogate, Tennessee.*
- Honorable Mention (tie)—*Samantha Rodriguez*. The effects of native and non-native plant species on CO₂ soil flux

levels in relation to bacterial community diversity. *Belmont University, Nashville, Tennessee.*

- Honorable Mention (tie)—*George Bukonya*. The effects of native and non-native plant species on CO₂ soil flux levels in relation to bacterial community diversity. *Belmont University, Nashville, Tennessee.*
- Honorable Mention (tie)—*Paige Ulrich*. The use of green roofs by avian species and their preference in green roof characteristics. *Belmont University, Nashville, Tennessee.*

Health and Medical Sciences

- First Place—*Heather Herring*. Effects that sleep has on mental health in college science students. *Lee University, Cleveland, Tennessee.*

History of Science

- First Place—*Hunter Hudson*. Contributions of Early MTSNS Faculty in Establishing the Tennessee Academy of Science. *Tennessee State University, Murfreesboro, Tennessee.*

Mathematics and Computer Science

- First Place (tie)—*Latoria Brown*. Modeling the thermal transfer of sparklers using the heat equation. *Austin Peay State University, Clarksville, Tennessee.*
- First Place (tie)—*LaQuinton Dunn*. Modeling the thermal transfer of sparklers using the heat equation. *Austin Peay State University, Clarksville, Tennessee.*

Microbiology

- First Place (tie)—*Rachel Hongo*. Examining the presence of antibiotic resistant *Escherichia coli* in Nashville, TN's Cumberland River. *Belmont University, Nashville, Tennessee.*
- Second Place (tie)—*Micah Shook*. Effect of ECIG-generated aerosol and conventional cigarette smoke on the planktonic growth of commensal oral bacteria. *Lincoln Memorial University, Harrogate, Tennessee.*
- Second Place (tie)—*John Nelson*. Effect of ECIG-generated aerosol and conventional cigarette smoke on the planktonic growth of commensal oral bacteria. *Lincoln Memorial University, Harrogate, Tennessee.*
- Third Place—*Isria Jarett*. Characterization of a novel *Clostridium difficile* virulence target: a structural biology approach. *Belmont University, Nashville, Tennessee.*
- Honorable Mention (tie)—*Abimbola Allison*. High pressure pasteurization against O157 and Non-O157 Shiga toxin-producing *Escherichia coli*. *Tennessee State University, Nashville, Tennessee.*
- Honorable Mention (tie)—*Devendra Bhandari*. Kinetic analysis and epitope mapping of monoclonal antibodies to *Salmonella typhimurium* flagellin using a Surface Plasmon Resonance biosensor. *Tennessee State University, Nashville, Tennessee.*

Honorable Mention (tie)—*Siqin Liu*. Prevalence and antimicrobial susceptibility of pathogenic and indicator bacteria in edible offal and muscle meat retailed in Nashville, Tennessee. *Tennessee State University, Nashville, Tennessee.*

Physics and Astronomy

First Place—*Jamin Welch*. Dolidze-35: A study of under-observed galactic star clusters: I. *Austin Peay State University, Clarksville, Tennessee.*

Second Place—*Margaret Seage*. Thermal Stability and crystallization of Bi and P modified chalcogenide glasses. *Austin Peay State University, Clarksville, Tennessee.*

Science and Math Teaching

First Place—*Joseph Pelren*. UT Martin greenway geological display for Earth science laboratories and public education. *Westview High School, Martin, Tennessee.*

Second Place—*Aleigha Carroll*. Comparing undergraduate biology majors outlook on science to that of under-

graduate non-majors. *Martin Methodist College, Pulaski, Tennessee.*

Zoology

First Place—*Mariah Schlis-Elias*. Island-inhabiting voles have larger skulls than their mainland relatives: indications of the Island Rule? *Austin Peay State University, Clarksville, Tennessee.*

Second Place—*Randy Gillespie III*. 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. *University of Tennessee at Martin, Martin, Tennessee.*

Third Place—*Benjamin Allen*. Mechanosensory sensitivity of naïve hawkmoths. *The University of Tennessee at Martin, Martin, Tennessee.*

Honorable Mention—*Aubree Weitzel*. Seasonal differences in bat species diversity and activity at the Beech Ridge Unit of the Obion River Wildlife Management Area. *University of Tennessee at Martin, Martin, Tennessee.*