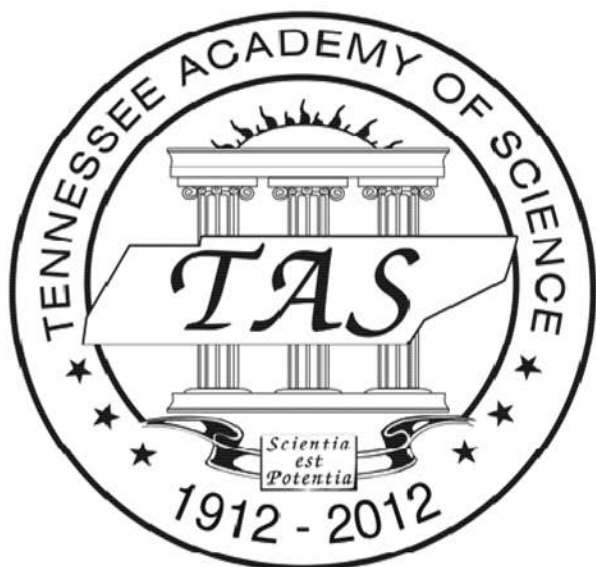




**125th Meeting
Tennessee
Academy of
Science
Program**



**November 20 , 2015
Middle Tennessee State
University,
Murfreesboro, Tennessee**

Celebrating 103 Years

Tennessee Academy of Science Institutional Sustaining Members

Austin Peay State University
East Tennessee State University
Middle Tennessee State University
Motlow State Community College
Rhodes College
Tennessee Technological University
The University of Tennessee–Martin
The University of the South
Volunteer State Community College

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Journal of the Tennessee Academy of Science

TAS Future Annual Meeting Sites

2016 - Austin Peay State University
Annual Meeting will be held on Saturday

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Welcome . . .

. . . to the 2015 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 our volunteers on the executive board 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!

Announcements

If not already members, presenters and attendees may register by mail or at the Annual Meeting.

Application forms will be available on-site, and they are available for download from the TAS web site.

www.tennacadofsci.org

Dues are collected at time of registration.

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

Journal subscription for libraries
please inquire with Treasurer

Registration and dues can be mailed
to the TAS Treasurer:
Dr. Steven Murphree,
Department of Biology, Belmont University,
1900 Belmont Boulevard,
Nashville, TN 37212-3758

Schedule of Events

Thursday, November 19, 2015

5:30-10:00pm	Executive Committee Meeting and Dinner Science Building Room 2004
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Friday, November 20, 2015

7:30 a.m. until 1:00 p.m.	Parking in the Rutherford Blvd Parking Lot—take RED route bus Registration Science Atrium Lobby
7:30 a.m. until 8:30 a.m.	Poster Setup Science Building Atrium (Poster board and easel provided—look for the designated area to set up your poster)
7:30 a.m. until 8:00am	Meeting of Section Chairs, Science Building 1017
8:30 a.m. until 9:45 a.m.	Poster Presentation and Judging Science Building Atrium
10:00 a.m. until 10:30 a.m.	TAS Business Meeting Keathley University Center Theater (KUC)
10:30a.m. until 11:30a.m.	Welcome by Dr. Bud Fischer, Dean, College of Basic & Applied Science Plenary Session – Keathley University Center Theater (KUC) Dr. Ian Anderson—Everything you wanted to know about neutrons - but were too scared to ask!
11:30 am until 1:00 p.m.	Lunch—Science Atrium Upstairs Pre purchased box lunches and water distributed here with seating inside and outside. Other lunch options are the KUC Grill or the Student Union Building
1:00 p.m. until finished	Afternoon Technical Sessions/ Section Business Meetings Business Aerospace Building, South Wing (BAS) BAS S277, BAS S274, BAS S126, BAS S213, BAS S276, BAS S275, BAS S279, BAS S264, BAS S208 BAS S270, BAS S262,

Meet our Keynote Speaker

10:30-11:30 Science Building Atrium

Dr. Ian S. Anderson, Oak Ridge National Laboratory

Dr. Ian Anderson is Director of Graduate Education and University Partnerships programs at Oak Ridge National Laboratory. He was previously director of the Neutron Scattering Science Division at ORNL and head of the Neutron Optics Laboratory in Grenoble, France. Dr. Anderson earned degrees in physics from Birmingham University and natural sciences from Cambridge University. He can often be seen on WBIR-TV Knoxville as Dr. Know, sharing advancements of science at ORNL with viewers throughout eastern Tennessee.

Presentation Title

**Everything you wanted to know about neutrons
- but were too scared to ask!**

Abstract

The Spallation Neutron Source (SNS) is the most recent major science facility to be made available to the international research community at Oak Ridge National Laboratory (ORNL).

This unique facility, complements the capabilities offered by the High Flux Isotope Reactor, and provides the research community with access to the most intense pulsed neutron beams in the world. What can neutrons do for you? Why did DOE spend \$1.4 billion to build the SNS? The answer: SNS provides scientists and engineers around the world with the opportunity to carry out research at the forefront of physics, chemistry, materials science, engineering, and biology, delving deep into the structure of materials and providing answers to questions that only neutrons can provide. In particular the pulsed intensity permits unprecedented measurements on materials in transitional states and of equilibrium. Highlights of research carried out at SNS will be given and opportunities for future research directions will be discussed.

Oral Presentations

Agriculture

Chairs: Tony Johnston Ph.D.

BAS S277

1:00 p.m.– 4:20 p.m.

1:00—1:05 Business Meeting

1:05—1:20 Developing entrepreneurship skills in agribusiness students. **Joey Mehlhorn and Rachna Tewari**, *University of Tennessee at Martin, Martin, Tennessee.*

1:20— 1:35 Farmers' Market Nutrition Programs (FMNP) in west Tennessee: evaluating vendor and recipient perspectives. **Rachna Tewari, Scott Vann* and Joseph Mehlhorn**, *University of Tennessee at Martin, Martin, Tennessee.*

1:35—1:50 The importance of externship programs for veterinary health technology graduates. **Danny Walker and Jason Roberts**, *University of Tennessee at Martin, Martin, Tennessee.*

1:50— 2:05 Young drivers sharing the road with farm equipment. **Sandy Mehlhorn and Staci Williams***, *The University of Tennessee at Martin, Martin Tennessee*

2:05– 2:20 Ligase-Independent Cloning in synthesis of recombinant bacteriocins. **Ahsan Raza*and Samuel Nahashon**.*Tennessee State University, Nashville, Tennessee.*

2:20— 2:35 Performing surgical castration on cattle: does experience matter? **Renee Stubblefield*, Jason Roberts, and Emalee Buttrey**, *University of Tennessee at Martin, Martin, Tennessee.*

2:35— 2:50 Building Biotechnology into Agriculture and Natural Resources Curriculums. **Paula M. Gale* and Barbara A. Darroch**, *University of Tennessee at Martin, Martin, Tennessee.*

2:50— 3:05 Mechanism of action of Biological control agents for powdery mildew in *Cornus florida*. **E. Rotich, M.T Mmbaga, M. Zheng, P. Sikdar** *Tennessee State University, Department of Agricultural and Environmental Sciences, Nashville, Tennessee.*

* student author

presenting author, if not first author

3:05—3:20 Genetic Mapping of Powdery Mildew Disease Resistance in *Cornus florida*. **Lipi Parikh*, M.T Mmbaga, L. Mackasmiel, and G. Meru**, *Tennessee State University, College of Agri-culture, Nashville, Tennessee.*

3:20—3:35 Endophytic organisms in flowering dogwoods (*Cornus florida* L.) and their pharmacological potential. **Maheshwari Asha, Mmbaga Marga-ret, and Myles Albert**, *Tennessee State University, College of Agriculture, Nashville, Tennessee.*

3:35—3:50 Modifying soil science laboratory exercises based on student evaluations. **Barbara A. Darroch and Paula M. Gale**, *University of Tennessee at Martin, Martin, Tennessee*

3:50—3:50 NAD-dependent epimerase/dehydratase affects cell surface properties, virulence and extracellular enzyme production in the soft rot phytopathogen, *Pectobacterium caroto-vorum*. **Rabiul Islam*, Shyretha Brown and C. Korsi Dumenyo**, *Tennessee State University, Nashville, Tennessee.*

4:05—4:20 Inactivation of *rsmK* of *Pectobacterium carotovorum*, leads to overproduction of exoenzymes and hypervirulence. **U. Adhikari* and K.Dumenyo**, *Tennessee State University, Nashville, Tennessee.*

Botany

Chair: Allen Moore Ph.D.

BAS S126

1:00 p.m. – 2:20 p.m.

1:00 – 1:05 Business Meeting

1:05 – 1: 20 30th Anniversary of the Tennessee Rare Plant Protection and Conservation Act of 1985. **David Lincicome**, *Tennessee Department of Environment and Conservation, Division of Natural Areas, Nashville, Tennessee.*

1:20 – 1:35 An overview of monitoring and management of Tennessee's federally listed vascular plant species. **Sunny A. Fleming**, *Tennessee Division of Natural Heritage, Nashville, Tennessee.*

* student author

presenting author, if not first author

1:35—1:50 Spatial and Temporal Distribution of Rare Plant Records in Tennessee. **Todd Crabtree**, Tennessee Natural Heritage Program Nashville, Tennessee.

1:50—2:05 Status report for *Sagittaria rigida* Pursh (Alismataceae), the Sessile-Fruited Arrowhead, in Tennessee. **Edward W. Chester**, Austin Peay State University, Clarksville, Tennessee

2:05—2:20 Do early life history stages explain flower color variation in *Leavenworthia stylosa*? **M. Thilina R. Fernando***, **Chris Herlihy** and **Jeffrey L. Walck**. Middle Tennessee State University, Murfreesboro, Tennessee.

Cell and Molecular Biology

Chair: **Amy Thompson**

BAS S270

1:00 p.m. – 1:20 p.m.

1:00—1:05 Business Meeting

1:05—1:20 Dual-color bioluminescent reporter reveals phase-dependent protein productivity during metabolic rhythms in *Saccharomyces cerevisiae*. **Archana Krishnamoorthy*** and **Brian Robertson**. Middle Tennessee State University, Murfreesboro, Tennessee.

Chemistry

Chair: **Daniel J. Swartling, Ph.D.**

BAS S276

1:00 p.m. – 1:50 p.m.

1:00—1:05 Business Meeting

1:05—1:20 Determination of Formaldehyde Concentration in Electronic Cigarettes. **Roland Landers*** and **Sarah S. Pierce**, Cumberland University, Lebanon, Tennessee.

1:20—1:35 Investigation of 1,2,4-triazinyl Complexants for Cadmium Extraction **Kelsey D. Richards*** and **Jesse D. Carrick**, Tennessee Technological University Cookeville, Tennessee.

1:35—1:50 Diversification of Triazinyl Complexant Scaffolds via Suzuki-Miyaura Coupling. **Ai Lin Chin***, and **Jesse D. Carrick**, Tennessee Technological University, Cookeville, Tennessee.

* student author

presenting author, if not first author

Ecology and Environmental Science

Chair: **Darlene Panvini**

BAS S275

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

1:00 —1:05 Business Meeting

1:05 —1:20 A Survey of Queen Anne's Lace on Nantucket Island and an assessment of its effect on native pollination. **Adam J. Ramsey***, **Jennifer R. Mandel**, University of Memphis, Memphis, Tennessee.

1:20—1:35 The use of species distribution models (SDMs) to evaluate the distribution of the Eastern Hellbender (*Cryptobranchus alleganiensis alleganiensis*) in Tennessee, U.S.A. **Jeronimo Gomes Da Silva Neto***, **William B. Sutton**, Tennessee State University, Nashville, Tennessee.

1:35—1:50 Nest site characteristics and spatial dispersion of Osprey nests at Reelfoot Lake, Tennessee. **H. Dawn Wilkins** and **Rachel E. Mowbray**, The University of Tennessee at Martin, Martin, Tennessee, and Georgia Southern University, Statesboro, Georgia.

1:50—2:05 *Didymosphenia geminata* distribution and food web impacts in the Upper Tennessee River watershed. **Justin N. Murdock***, **Lucas A. Hix**, and **Natalie E. Knorp**, Tennessee Tech

2:05—2:20 Evaluation of Containment Basins using Quantitative Dye Tracer Studies at Mammoth Cave National Park. **JeTara Brown***, **Thomas Byl**, **Rick-ard Toomey**, **Rick Olsen**, **David Solomon**, and **Lonnie Sharpe**, Tennessee State University, Nashville, Tennessee (JB, TB, DS, LS), U.S. Geological Survey, Nashville, Tennessee (TB), and Mammoth Cave National Park, Mammoth Cave, Kentucky (RT, RO).

2:20—2:35 Coupling bio/phytoremediation with switchgrass to biofuel feedstock production in mixed-contaminant soils. **Oluwatosin Ogunmayowa***, **Kudjo E. Dzan-tor**, and **Ekundayo Adeleke**, Tennessee State University, Nashville, Tennessee.

2:35—2:50 Detection of pharmaceuticals in surface water of rural and urbanizing sub-watershed of Middle Tennessee. **Ravneet Kaur***, **Anonya Akuley-Amenyenu**, **Qi Deng** and **Dr. Sam Dennis**, Tennessee State University, Nashville, Tennessee.

* student author

presenting author, if not first author

2:50—3:05 Woodland vernal pools of the Pennyroyal Plain: Investigating the effects of disturbance on aquatic macroinvertebrate communities. **Brandy N. Schnettler***, **Steven W. Hamilton**, and **Joseph R. Schiller**, *Austin Peay State University, Clarksville, Tennessee.*

3:05—3:20 First report of dictyostelid slime molds from aquatic habitats. **Adam W. Rollins**, **Eathan Gentry**, and **John C. Landolt**, *Lincoln Memorial University, Harrogate, Tennessee*, and *Shepherd University, Shepherdstown, West Virginia.*

3:20—3:35 Using microscopic invertebrates in lakes in Tennessee and Virginia to assess land use changes. **Melissa K. Lobegieler**, **Michelle B. Leb-kuecher***, and **Sarah A. Vangoor***, *Middle Tennessee State University, Murfreesboro, Tennessee* and *Grand Valley State University, Allendale, Michigan.*

Engineering and Engineering Technology

Chair: **Lucinda Fowinkle**

BAS S213

1:00 p.m. - 4:20 p.m.

1:00—1:05 Business Meeting

1:05—1:20 Blended teaching method used in engineering technology courses, a try to inspire students. **Na Zhu**, *Austin Peay State University, Clarksville, Tennessee.*

1:20 —1:35 Problem solving and process improvement in the tempering process for a stabilizer bar heat treatment production line. **Jody Lee Alberd*** and **Adel Salama**, *Austin Peay State University, Clarksville, Tennessee.*

1:35—1:50 Air hockey table using optical tacking and an Arduino controlled paddle. **Brian Carnahan***, **Jason Parks***, **Christopher Morgan***, and **Chin-Zue Chen**, *Austin Peay State University, Clarksville, Tennessee.*

1:50—2:05 Ilizarov wire drill tip analysis. **Lucinda K. Fowinkle**, *Austin Peay State University, Clarksville, Tennessee.*

2:05— 2:20 The use of phase change materials for zero-energy buildings. **David W. Yarbrough**, *R&D Services, Inc., Cookeville, Tennessee.*

* student author

presenting author, if not first author

2:20—2:35 Bolt failure due to low-cycle fatigue. **Khalid H. Tantawi**, **Vishwas Badakar**, **Ahad Nassab**, **Hasan M. Tantawi**, *Motlow College, Smyrna, TN (KT)*, *Middle Tennessee State University, Murfreesboro, Tennessee (VB, AN)*, and *Fahad Bin Sultan University, Tabouk, KSA (HT).*

2:35 — 2:50 Design of a quadrotor with an open-loop control system. **Joseph Gasser***, **Thomas Norton***, **Nolan Ricke***, **Ivan Garcia***, **Patrick White***, **Jacob Dean***, and **Khalid H. Tantawi**, *Motlow State Community College, Smyrna, Tennessee.*

2:50 — 3:05 Design of a simple radar station. **Chance Ferguson***, **Ryan Mitchell***, **Nathaniel Jennette***, **Erin Valdez***, **Colton Dieters***, **Erik Eilers***, and **Khalid H. Tantawi**, *Motlow State Community College, Smyrna, Tennessee.*

3:05—3:20 Ladder logic toolbox of functions for motor controls. **Tyler Ethington***, **Kendall Carter***, **Jared Stacey***, **Aubrey Farmer***, **Yasha Darakhshanian***, **John Sivilaylack***, and **Khalid H. Tantawi**, *Middle Tennessee State University, Murfreesboro, Tennessee (TE, KC, JS, AF, YD, JS)* and *Motlow State Community College, Smyrna, Tennessee (KT).*

3:20—3:35 Dynamic modeling of vehicles for impact studies. **John Barton***, **Roger Martinez***, **Alicia Meadors***, and **Khalid H. Tantawi**, *Motlow State Community College, Smyrna, Tennessee.*

3:35 — 3:50 A study comparing concrete vs. wood structure in residential construction. **Ihab Habib**, **Jeffry Coward***, and **Charles Drury***. *Austin Peay State University, Clarksville, Tennessee.*

3:50 — 4:05 An experimental setup for renewable energy systems courses in the engineering curricula at Tennessee State University. **Briana A. Kemp***, **Robert D. Turner***, **Yvette Tolliver***, **Erdem Erdemir**, **S. Keith Hargrove**, *Tennessee State University, Nashville, Tennessee.*

4:05 — 4:20 Simulating multispectral imagery using airborne hyperspectral sensor imager. **Laura Trujillo***, **Henrique Momm**. *Middle Tennessee State University, Murfreesboro, Tennessee.*

* student author

presenting author, if not first author

Geology and Geography

Chair: Michael W. Bradley

BAS S279

1:00 p.m. – 2:50 p.m.

1:00—1:05 Business Meeting

1:05—1:20 Surface water characteristics and hydrogeology in the Collins' River Watershed **Randy M. Curtis**, *Gresham, Smith & Partners, Nashville, Tennessee.*

1:20—1:35 Tennessee Marble. **Don Byerly and Susan Knowles**, *The University of Tennessee, Knoxville, Tennessee, and Middle Tennessee State University, Murfreesboro, Tennessee.*

1:35—1:50 Preliminary assessment of enhanced bioremediation of mono-aromatic hydrocarbons in a karst aquifer, Franklin, Tennessee. **Tom Byl and Michael Bradley**, *U.S. Geological Survey, Nashville, Tennessee.*

1:50—2:05 Silicification of fossils from selected Paleozoic formations in West Tennessee. **Dillon Davis* and Michael A. Gibson**, *The University of Tennessee at Martin, Tennessee.*

2:05—2:20 A Late Ordovician carbonate beach complex, Lower Carters Limestone, middle Tennessee. **Clay D. Harris**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

2:20—2:35 Discrepancies in tornado databases in west Tennessee. **James Dollahite*, Lauren Dollahite*, and Robert M. Simpson**, *The University of Tennessee at Martin, Martin, Tennessee.*

2:35—2:50 Palynology of exhumed lignite blocks in Lauderdale County – implications and questions on Eocene paleoenvironment. **Michael W. Bradley, Debra Willard, Michael A. Gibson and Stan P. Dunagan**, *U.S. Geological Survey, Nashville, Tennessee (MB), U.S. Geological Survey, Reston, Virginia (DW), University of Tennessee at Martin, Martin, Tennessee (MG, SD).*

* student author

presenting author, if not first author

Health and Medical Sciences

Chair: Ashley D. Frazier, Ph.D.

BAS S264

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

1:00—1:05 Business Meeting

1:05—1:20 Utilization of Rat Pups as an Animal Model for Investigation of the Development of Infant Sepsis. **Patrick C. Gurley*, Clark R. Sims and Philip R. Mayeux**, *Department of Biology, Christian Brothers University, Memphis TN and Department of Pharmacology and Toxicology, University of Arkansas for Medical Sciences, Little Rock Arkansas.*

1:20—1:35 Functional Gait Recovery After Underwater Treadmill Training for Spinal Cord Injured Individual: a Case Study. **James D Dolbow*, Sandra L. Stevens, Timothy Jones, Michael Wieting, David R. Dolbow**, *Middle Tennessee State University, Murfreesboro, Tennessee (JD,SS). Lincoln Memorial University, Harrogate, Tennessee (JD, MW). Tennessee State University, Nashville, Tennessee (TJ). University of Southern Mississippi, Hattiesburg, Mississippi (DD).*

History of Science

Chair: Brother Kevin Ryan

Co-Chair: Martin V. Stewart

BAS S208

1:00 p.m. – 2:20p.m.

1:00 —1:05 Business Meeting

1:05 —1:20 The Alaskan earthquake of 1964 **Brother Kevin Ryan**, *Christian Brothers University, Memphis, Tennessee.*

1:20 —1:35 Where did the new Science Building at MTSU come from? **Martin V. Stewart**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

1:35 —1:50 Four prohibitions of the General Congregation of Jesuits in 1651. **John J. Schommer**, *University of Tennessee at Martin, Martin, Tennessee.*

1:50—2:20 Expansion meeting of the History of Science Section of the Tennessee Academy of Science. **Brother Kevin Ryan and Martin V. Stewart**, *Christian Brothers University, Memphis, Tennessee, and Middle Tennessee State University, Murfreesboro, Tennessee.*

A tour of the new Science Building will follow the conclusion of the History of Science Section.

* student author

presenting author, if not first author

Math and Computer Science
Chair: David R. Grimmer, P.E., Ph.D.
BAS S264
No oral presentations.

Microbiology
Chair: Chris Barton Ph.D.
BAS S270
1:20 p.m.—2:10 p.m.

1:20—1:25 Business Meeting

1:25—1:40 Ligase-Independent Cloning in synthesis of recombinant bacteriocins. **Ahsan Raza*** and **Samuel Nahashon**. *Tennessee State University, Nashville Tennessee.*

1:40 – 1:55 Novel floating-type photobioreactor for microalga growth and biofuel production. **Jared K. Averitt*** and **Sergei A. Markov**, *Austin Peay State University, Clarksville, Tennessee.*

1:55 – 2:10 Immunoproteasome Subunit Activation by TNF- α via JAK2 Signaling. **Mark Mitchell*** and **Amanda D. Williams**. *Lipscomb University, Nashville, Tennessee.*

Physics and Astronomy
Chair: Eugene de Silva, Ph.D., FRSA
BAS S262
1:00 p.m. – 1:50 p.m.

1:00—1:05 Business Meeting

1:05—1:20 Diffraction of sound waves through an aperture. **Max A. Kriegel*** and **Scott Hawley**, Belmont University, Nashville, Tennessee.

1:35 —1:50 Implementation of 3D audio through cochlear implant simulations. Nashville, TN. **Jesse Montagna***, **Scott H. Hawley**. *Belmont University, Nashville, Tennessee.*

Science and Math Teaching
Chair: Angela Malone
BAS S270
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 STEM GIRLS Workshop Experiences at Columbia State, **Marlene Garcia***, **Rachel E Hohl***, **Andrew Wright**, **Holly Brew**, **Marilee Murray**, and **Angela Malone**, *Columbia State Community College, Columbia, Tennessee.*

1:20 —1:35 The community college undergraduate research initiative: a case study of Volunteer State Community College in year four. **Parris F. Powers** and **Maryam F. Flagg**, *Volunteer State Community College, Gallatin, Tennessee*

1:35 —1:50 What else can this community rain garden do? An undergraduate research opportunity at a teaching institution. **Kelsie Barnes*** and **Kim Atwood**, *Cumberland University, Lebanon, Tennessee.*

1:50 —2:05 Linking Science Fiction and Physics Courses. **Krista K. McBride**, Belmont University, Nashville, Tennessee.

2:05—2:20 Balancing Patience with Urgency: A Classroom Lesson and Original Research Conducted by Students in SCED 3310. **Anant Godbole**, *East Tennessee State University, Johnson City, Tennessee.*

2:20—2:35 Implementation of a Highly Structured Flipped Classroom to Improve Student Success in Anatomy & Physiology. **Weston Dulaney** and **Aleshia Seaton**, *Columbia State Community College, Columbia, Tennessee.*

2:35 — 2:50 Does a Modified Think-Pair-Share Strategy Affect D-F-W Rates in Anatomy and Physiology I Lecture? **Angelique Troelstrup***, **Alicja K. Lanfear**, and **Cindi Smith-Walters**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

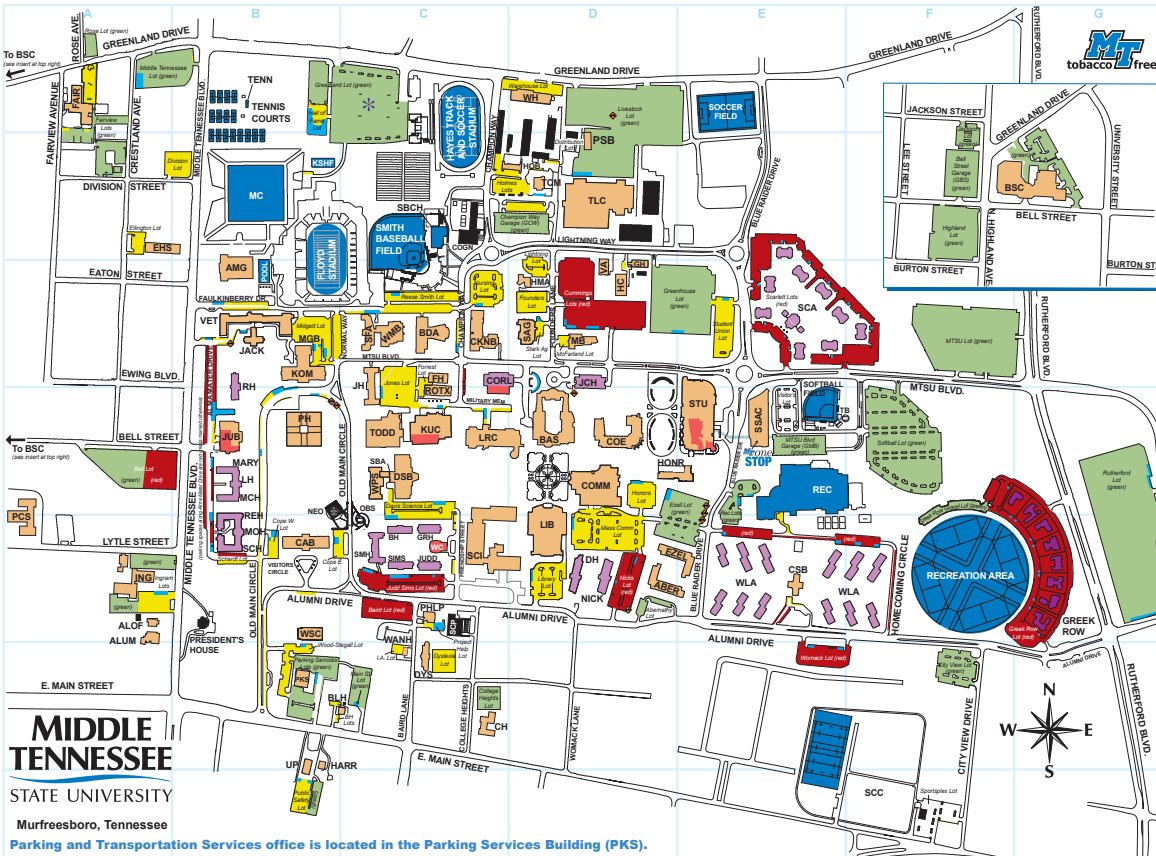
2:50 —3:05 Using Word-Sorts and Concept Maps to Increase Student Engagement in Anatomy and Physiology I Lab. **Velta Napoleon-Fanis***, **Alicja K. Lanfear**, and **Cindi Smith-Walters**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

3:05 —3:20 Clickers and required attendance: effects on students and teachers. **Amy E. Jetton**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

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presenting author, if not first author

2015-2016 Parking Map

Campus Map Legend (abbreviations shown are for location only, NOT mailing)



Building Abbreviations:

- ABSC: Abney Hall, 1716 Union Drive, C2
- ALM: Alumni Office, 2303 Middle Tennessee Boulevard, A6
- ALM2: Alumni Memorial Gym, 2010 Middle Tennessee Boulevard, A5
- ANG: Business and Accounting Building, 1642 MTSU Boulevard, C4
- ANP: Business Administration Building, 1642 MTSU Boulevard, C4
- BDA: Business Administration Building, 1642 MTSU Boulevard, C4
- BE: Bell Street Parking, 1642 MTSU Boulevard, C4
- BS: Board of Trustees, 1642 MTSU Boulevard, C4
- BSA: Board of Trustees, 1642 MTSU Boulevard, C4
- BSB: Board of Trustees, 1642 MTSU Boulevard, C4
- BSM: Board of Trustees, 1642 MTSU Boulevard, C4
- BSN: Board of Trustees, 1642 MTSU Boulevard, C4
- BSO: Board of Trustees, 1642 MTSU Boulevard, C4
- BSR: Board of Trustees, 1642 MTSU Boulevard, C4
- BSU: Board of Trustees, 1642 MTSU Boulevard, C4
- BSV: Board of Trustees, 1642 MTSU Boulevard, C4
- BSW: Board of Trustees, 1642 MTSU Boulevard, C4
- BSX: Board of Trustees, 1642 MTSU Boulevard, C4
- BSY: Board of Trustees, 1642 MTSU Boulevard, C4
- BSZ: Board of Trustees, 1642 MTSU Boulevard, C4
- CA: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF2: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF3: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF4: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF5: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF6: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF7: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF8: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF9: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF10: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF11: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF12: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
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- CAF31: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF32: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
- CAF33: Center for Academic and Career Services, 1642 MTSU Boulevard, C4
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MIDDLE TENNESSEE STATE UNIVERSITY

Murfreesboro, Tennessee

Parking and Transportation Services office is located in the Parking Services Building (PKS).

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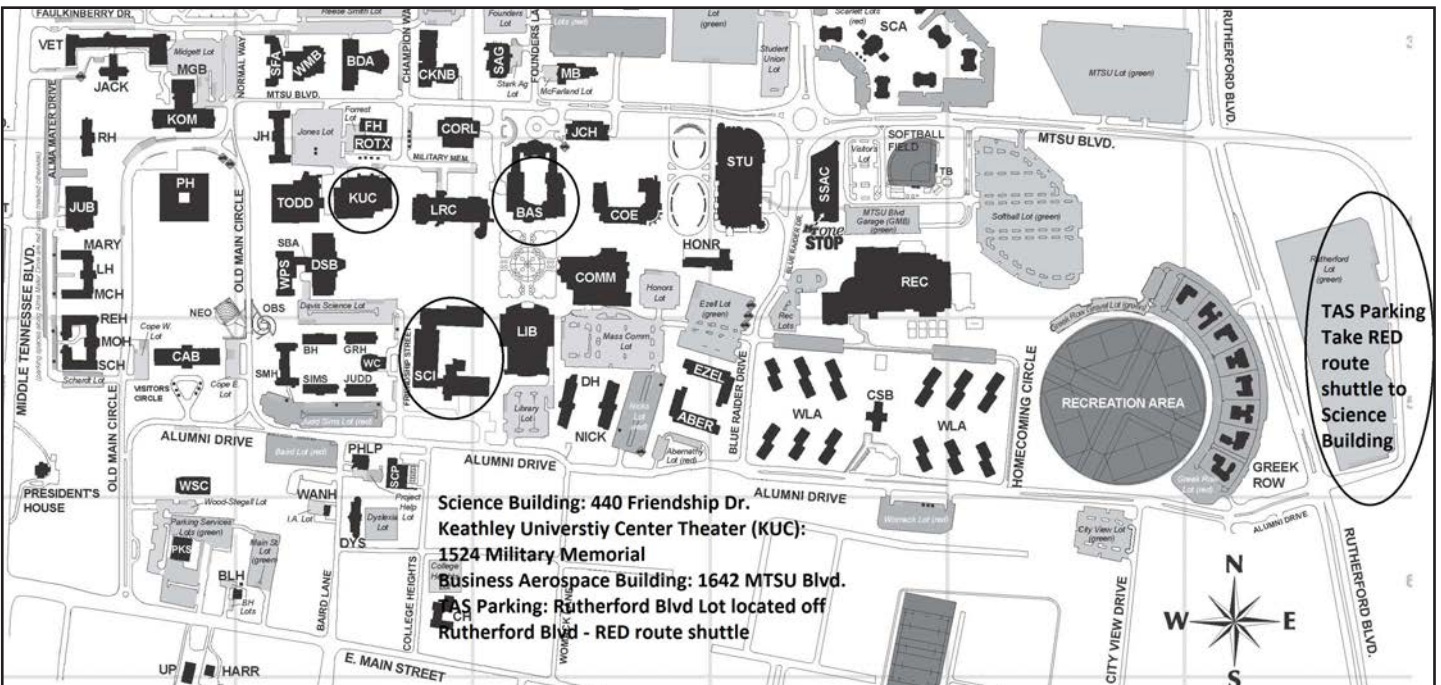
Color code for parking designation

- Faculty, Staff, Administration (white permit)
- Green Permit Parking
- Disabled Parking (blue permit)
- Red Permit Parking (MTSU Housing residents only)
- Metered parking
- Motorcycle parking area
- Residents may also park in these green spaces 24 hours a day.
- Skywalk bridges

Color code for buildings/sports areas

- Residence Halls
- Academic/Administrative
- Dining
- Athletics/Recreation
- Greek Housing
- one Located in SSAC
- one STOP (see grid area E4)

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Science Building: 440 Friendship Dr.
Keathley University Center Theater (KUC): 1524 Military Memorial
Business Aerospace Building: 1642 MTSU Blvd.
TAS Parking: Rutherford Blvd Lot located off Rutherford Blvd - RED route shuttle

TAS Parking Take RED route shuttle to Science Building

3:20—3:35 An interdepartmental collaborative approach to increase laboratory exposure and learning in undergraduate anatomy courses. **Christopher E. Barton**, Belmont University, Nashville, Tennessee.

Zoology
Chair: Juliann Waits, Ph.D.
BAS S274
1:00 p.m. – 2:20 p.m.

1:00—1:05 Business Meeting

1:05—1:20 Spatial variation in sexual-size dimorphism of the American black bear (*Ursus americanus*) in eastern North America. **Brittany M. Pope***, **Phyllis K. Kennedy**, **Steven G. Mech** and **Michael L. Kennedy** The University of Memphis, Memphis, Tennessee (BMP, PKK, MLK) and Albright College, Reading, Pennsylvania (SGM).

1:20 —1:35 Annual Activity Patterns of the Eastern Woodrat (*Neotoma floridana*) in Western Tennessee. **Jessica Davin***, **Lauren A. Maderia**, and **Michael L. Kennedy**, The University of Memphis, Memphis, Tennessee.

1:35—1:50 Ecological studies of small mammals in eastern deciduous forests. **Sarah E. Swing***, **Michael L. Kennedy**, The University of Memphis, Memphis, Tennessee.

1:50— 2:05 An assessment of haplotype diversity in the southern short-tailed shrew (*Blarina carolinensis*). **A. Christopher Grow***, **Juliann L. Waits**, **Michael C. Wooten**, **Melvin L. Beck**, and **Michael L. Kennedy**, The University of Memphis, Memphis, Tennessee (ACG, MLB, MLK), Auburn University, Auburn, Alabama (MCW), and Southwest Tennessee Community College, Memphis, Tennessee (JLW).

2:05—2:20 Effects of sex and age on winter survival of communally roosting Eastern Bluebirds. **T. David Pitts**, University of Tennessee at Martin, Martin, Tennessee.

* student author

presenting author, if not first author

Poster Presentations
Science Building Atrium
Set Up: 7:30—8:30 (Poster boards & easels are provided; posters are displayed by technical section name)
Display: 8:30 – 9:45
Judging: 8:30 – 9:45
(Presenters should be near their displays during the judging to answer any questions.)
Agriculture Posters

Comparison of smartphone GPS accuracy to recreation grade units. **Will Bradshaw***, **Luke Davenport***, **Zach Malone***, **Radford McDavid***, **Mason Peale***, **Thais Rodrigues de Oliveira***, **Ben Webb***, **Andrew Webster***, **Kaine Winstead***, and **Sandy Mehlhorn**, The University of Tennessee at Martin, Martin Tennessee.

Rapid assessment of nitrogen concentration of two bio-energy feedstock grasses using near infrared reflectance spectroscopy. **Todd R. Pirtle***, **Song Cui**, and **Nate Phillips**, Middle Tennessee State University, Murfreesboro, Tennessee.

Destruction of toxic chemicals by chlorine dioxide. **Zebbyn M. Chong*** and **Beng G. Ooi**, Middle Tennessee State University, Murfreesboro, Tennessee.

Legal Requirements Pertaining to the Flight and Operation of Unmanned Aerial Vehicles, **Samuel S. Hubbell***, **Justin G. Gardner**, **Douglas E. Campbell**, and **Song Cui**, Middle Tennessee State University, Murfreesboro, Tennessee.

Characterization of Proteins Associated with Adipose Tissue Accretion in Broiler Chickens **Boniface Kimathi***, **Thyneice Taylor-Bowden**, and **Samuel Nahashon**, Tennessee State University, Nashville Tennessee.

Effect of Varying of Dietary Lysine Concentrations on Growth Performance of the Pearl Grey Guinea Fowl Replacement Pullet. **Sarayu Bhogaju***, **Thyneice Taylor-Bowden**, and **Samuel N.**

Assessment of somatic cell count, milk production, and hygiene in dairy cows housed in a compostbedded pack barn. **Emily L. Grosskreutz*** and **Jessica G. Carter**, Middle Tennessee State University, Murfreesboro, Tennessee.

Systematic Investigation of Spermatogonial Stem Cell Culture and Transfer. **Warren Gill, James West, Song Cui, and John Haffner**, Middle Tennessee State University, Murfreesboro, Tennessee (WG, SC, JH), and Vanderbilt University, Nashville, Tennessee (JW).

The effects of cover crops over soil hydraulic conductivity in soybean production systems. **April Jones*, Liz Lillge*, Jonathan Wilson*, and Dr. Paula Gale** The University of Tennessee at Martin, Martin, Tennessee.

Sensitivity of Red and Yellow Cherry Tomato Cultivars to Juglone. **Michelle Shelly*, Warren Anderson, Nate Phillips** School of Agribusiness/ Agriscience, Middle Tennessee State University, Murfreesboro, Tennessee.

Microbial Diversity in Dogwood Seed and their Potential Applications. **Mmbaga, M.T., Macksmiel, L.A. and J.O. Joshua** Tennessee State University, Department of Agricultural and Environmental Sciences, Nashville Tennessee.

Botany Posters

Population genetics of cedar glade endemic *Dalea gattingeri* and seep endemic *Xyris tennesseensis*. **Nickolaus K. S. Willis* and Carol J. Baskauf**, Austin Peay State University, Clarksville, Tennessee.

The influence of dispersal strategies on seed germination tolerance ranges. **Ridma Bandara*, Jessamine Finch, Jeffrey L. Walck, Siti N. Hidayati, and Kayri Havens**. Middle Tennessee State University, Murfreesboro, Tennessee (RB, JW, SH), and Chicago Botanic Garden, Glencoe, Illinois (JF, KH).

Effects of turtle size and microhabitat preference on patterns of carapace algal growth and community structure at Reelfoot Lake. **Ashlea McCann* and Jennifer Greenwood**, University of

Optimization of germination techniques and notes on seedling development in the Federally listed endangered plant species *Physaria globosa* (Brassicaceae). **J. Heath Thacker*, Diamond R. Cullen*, Shawn Krosnick**, Tennessee Technological University, Cookeville, Tennessee.

New occurrence data for state and globally listed plant species in Tennessee's Blue Ridge Mountains, Ridge-and-Valley, and Sequatchie Valley ecoregions. **Travis T. Phillips, Shawn Krosnick**, Tennessee Technological University, Cookeville, Tennessee.

Preliminary studies of reproductive biology in *Passiflora incarnata* L. (*Passifloraceae*) in Middle Tennessee. **Toby Cooper*, Alexander Kenney*, Terry Tate*, and Shawn Krosnick**. Tennessee Tech University, Cookeville, Tennessee.

Reconstruction of Phylogenetic Relationship in *Antennaria* (*Asteraceae*) using Data from Hundreds of Loci. **Ramhari Thapa*, Jennifer R. Mandel and Randall J. Bayer**, The University of Memphis, Memphis, Tennessee.

Edge effects on the floristic components of Kilbride Nature Sanctuary, Rhea County, Tennessee. **Brett M. Longwith* and Allen Moore**, Tennessee Wesleyan College, Athens, Tennessee.

Cell and Molecular Biology Posters

The addictive effects of nicotine on *Caenorhabditis elegans*. **Jud Wisdom* and Robert Grammer**, Belmont University, Nashville, Tennessee.

Appetite-stimulating effects of herbal root, *Gentiana lutea*, on *Caenorhabditis elegans*. **Sarah E. Trippett* and Robert Grammer**, Belmont University, Nashville, Tennessee.

Aspartame, Saccharine, and Sucralose Decrease Longevity in *Caenorhabditis elegans*. **Emily K. Deas* and Robert Grammer**, Belmont University, Nashville, Tennessee.

Caenorhabditis elegans and their Habitats. **Jemeilise Guzman* and Robert Grammer**, Belmont University, Nashville Tennessee.

Chemotaxis assay of *C. elegans* to *Bacillus thuringiensis* 4A4 with and without nematocidal crystal proteins. **Angel Brothers* and Robert Grammer**, Belmont University, Nashville, Tennessee.

Determining *C. elegans* chemotaxis to cervical cancer and decanal to expand on the nematode scent detection test – a cancer screening system. **Parker H. Tumlin* and Robert Grammer**, Belmont University, Nashville, Tennessee.

The Effect of Caffeine Concentration and Time of Exposure on *C. elegans* Locomotion towards an Attractant. **Julisa Nunez* and Robert Grammer**, Belmont University, Nashville, Tennessee.

The effectiveness and precision of capillary assays for *Caenorhabditis elegans*. **Alyssa Tidwell*** and **Robert Grammer**, Belmont University, Nashville, Tennessee.

The effects of increasing dosages of -lipoic acid on the chemotaxis of *Caenorhabditis elegans* at adulthood. Ambrose E. Rice* and Robert Grammer, Belmont University, Nashville, Tennessee.

The Effect of Top2 Inhibition on the Expression of Axonal Guidance Genes in Zebrafish. **Mary Skrabut***, **Amanda D. Williams**, and **Bonny Millimaki**. Lipscomb University, Nashville, Tennessee.

Identification of protein interactions necessary for mitotic exit. **Vancy Zora***, **Eric Seronick***, **Fady Mousa-Ibrahim***, **Hanna Fogg***, **Zeynep Gromley**, and **Adam Gromley**, Lincoln Memorial University-DeBusk College of Osteopathic Medicine, Harrogate, Tennessee.

The Impact of Mucuna pruriens Seed Extract on Melanogenesis. **Christina Hunter*** and **Amy L. Thompson**, Austin Peay State University, Clarksville, Tennessee.

Topoisomerase2 inhibition specifically effects axonal guidance in zebrafish. **Sara Stevers*** and **Bonny B. Millimaki**. Lipscomb University, Nashville, Tennessee.

Using CRISPR technology to disrupt cytokinesis. **Jae Son***, **Cameron Michael***, **Eric Seronick***, **Zeynep Gromley**, and **Adam Gromley**, Lincoln Memorial University DeBusk College of Osteopathic Medicine, Harrogate, Tennessee.

Caenorhabditis elegans response to hyperglycemic and hypoxic conditions post infection with *Staphylococcus aureus*. **Bryan Eoff*** and **Nick Ragsdale**, Belmont University, Nashville, Tennessee.

Circadian rhythm dependence of habituation in *C. elegans*. **Chase A. Mackey***, **Nick Ragsdale**, Belmont University, Nashville, Tennessee.

Investigation into the regulation of CST6 by p53 following cellular stress. **Jasmin Mohn***, **Robin Weyman***, and **Chris Barton**, Belmont University, Nashville, Tennessee.

A study of the role of p53 in the regulation of MARCKS expression. **Nelly Grigorian*** and **Christopher Barton**, Belmont University, Nashville, Tennessee.

Transcriptional regulation of RGS2 by p53 in colorectal cancer cells. **Vian E. Pulous*** and **Chris Barton**, Belmont University, Nashville, Tennessee.

Utilization of alpha-lipoic acid as an antioxidant in the presence of 6-PHDA. **Danielle Aument***, **Nick Ragsdale**, Belmont University, Nashville, Tennessee.

Deletion of Folate Biosynthesis Gene, ABZ1, Produces Transient Life-Span Extension in Budding Yeast. **Nausheen Qureshi*** and **Rebecca Seipelt-Thiemann**, Middle Tennessee State University, Murfreesboro, Tennessee.

Chemistry Posters

Studies of the composition of electronic cigarette emissions in vapor and particulate phases. **Kavya Kazipeta**, **Ngee-Sing Chong**, and **Beng Guat Ooi**. Middle Tennessee State University, Murfreesboro, Tennessee.

Analysis of Terpene Emissions from Cedar and Redbud. **Ashley Caldwell**, **Ngee S. Chong** and **Beng Guat Ooi**, Middle Tennessee State University, Murfreesboro, Tennessee.

Enzymatic characters of apoptosis signalregulating kinase I. **John M. Pleinis***, **David Qiu**, **Caleb B. Cantrell**, **Xuanzhi Zhan**. Department of Chemistry, Tennessee Technological University, Cookeville, Tennessee.

Comparison of the Emissions of Air Toxics from Biomass-Derived Fuel Additives for Diesel by GCMS and FTIR Spectrometry. **Shruthi Perna** and **Ngee Sing Chong**, Middle Tennessee State University, Murfreesboro, Tennessee.

Application of Chlorine dioxide for remediation of contaminants in different environmental media. **Sushma Appala***, **Samanwi Munangala**, **Z. Megan Chong**, **Beng Guat Ooi**, and **Ngee Sing Chong**, Middle Tennessee State University, Murfreesboro, Tennessee.

Analysis of nitroanilines isomers via Raman spectroscopy. **Yvonne Ejorh***, **William Ilsley**, and **Beng Guat Ooi**, Middle Tennessee State University, Murfreesboro, Tennessee.

Platonic Solids as Potential Structures for Small Carbon Clusters. **Arjun Tan**, **Razi Hassan**, **Vernessa Edwards**, and **Marius Schamschula**, Alabama A & M University, Normal, Alabama.

Archimedean Solids as Potential Structures for Carbon Clusters. **Arjun Tan, Vernessa Edwards, Marius Schamschula, and Razi Hassan**, Alabama A & M University, Normal, Alabama.

Atmospheric Study of Pollutants near Texas Fracking Facilities for Natural Gas Production. **Prithviraj Sripathi*, Sara Wylie**, Vera Lourdes**, Sharon Wilson***, Bruce Baziell***, Deborah Thomas****, and Ngee Sing Chong***, Incorporation of Zn²⁺ in PbS quantum dots via cation exchange. **Wayne R. Tilluck*, Savannah Benjamin*, Clay Mings*, Alexander L. Morris*, Paul G. Van Patten**, Middle Tennessee State University, Murfreesboro, Tennessee

Investigation of the shape of Atropisomers using Dipolar couplings. **Emily E. Schiller* and William R. Carroll**, Tennessee Tech University, Cookeville, Tennessee.

Determination of the structure of Steroid and Saccharide molecules in solution using residual dipolar couplings (RDCs). **Faranak Mahmoudi*, William Carroll**, Tennessee Tech University, Cookeville, Tennessee.

Determining the structure of metal ligand complexes in solution by Nuclear Magnetic Resonance (NMR) spectroscopy using Residual Dipolar Couplings (RDCs), **Sailajah Gukathasan, William R Carroll**, Tennessee Technological University, Cookeville, Tennessee.

Synthesis of liquid crystalline photoluminescent biszwitterions of the [closo-B₁₂H₁₂]²⁻ cluster, **John C. Lasseter*, Pawel Tokarz, Jacek G. Pecyna, Piotr Kaszynski, and Andrienne C. Friedli**, Middle Tennessee State University.

Predictions of carbonyl reactivity and spectroscopic properties from a database of charge density descriptors using neural networks. **Kiran K Donthula, Preston J MacDougall**, Middle Tennessee State University, Murfreesboro, Tennessee.

Electrochemical detection of uric acid using a refluxed zinc oxide carbon nanotube composite. **Shawtik C. Das*, Mulugeta B. Wayu, Hussain S. Alshahrani, Raja R. Pandey, Charles C. Chusuei**, Middle Tennessee State University, Murfreesboro, Tennessee.

Towards the total synthesis of Hamigeromycin B. **James A. Jordan*, Alexander H. Cleveland, Michael S. Probasco, John W. Kirby, Jesse D. Carrick**, Tennessee Technological University, Cookeville, Tennessee.

Ecology and Environmental Science

A survey of wounding frequency among trees found in urban and forested environments. **Lee Rumble*, Melanie Heckman, and Drew Sieg**, Middle Tennessee State University, Murfreesboro, Tennessee (LR, DS), and Fernbank Science Center, Atlanta, Georgia (MH).

Coupling microalgae biomass production to wastewater treatment and biofuel feedstock production. **Omowunmi Fadeyi*, Ekundayov Adeleke and Kudjo Dzantor**, Tennessee State University, Nashville, Tennessee.

Effects of water hardness on bacterial attachment to fine sand. **Lara Jarnagin*, Sydney Youngman*, Megan Stallard*, Frank Bailey**, Middle Tennessee State University, Department of Biology, Murfreesboro, Tennessee.

Streamside salamanders as indicators of environmental stress: impacts of acid-rock drainage on headwater stream integrity. **Brittaney Hogan*, Calandrea Williams*, Tom Byl, De'Etra Young, and William Sutton**, Tennessee State University, Nashville, Tennessee (BH, CW, TB, DY, WS), USGS Tennessee Water Science Center, Nashville, Tennessee (TB).

Endangered species, dam locations and 303 d list in Tennessee. **Justin Tyler Medley* and Dr. Peter Li**, Tennessee Technological University, Cookeville, Tennessee.

Presence of fecal indicator bacteria at distance and depth at a freshwater recreational area **Megan A. Stallard*, Lara Jarnagin, Jordan Jatko, and Frank C. Bailey**, Middle Tennessee State University, Murfreesboro, Tennessee.

The effects of temperature on an exotic zooplankton species. **Melissa Pompilius*, and Robert Fischer**, Middle Tennessee State University, Murfreesboro, Tennessee.

Bat activity at an urban pond. **William C. Ellis*, Morgan Gray*, Alicia Rinks*, Adrienne Smith*, and Nancy Buschhaus**, University of Tennessee at Martin, Martin, Tennessee.

The relationship of salamander size structure and bat activity in the Kimball Creek watershed in western Colorado. **Adrienne Smith*, Russell Milam*, Nancy Buschhaus, Cy Mott, and Howard Whiteman**, University of Tennessee at Martin, Martin, Tennessee (AS, RM, NB), Valdosta State University, Valdosta, Georgia (CM),

Murray State University, Murray, Kentucky (HW), and the High Lonesome Ranch, DeBeque, Colorado (HW).

The relationship of salamander size structure and bat activity in the Land Between the Lakes watershed in western Kentucky. **Russell Milam***, **Adrienne Smith***, **Nancy Buschhaus**, **Cy Mott**, **Robin Baker***, and **Howard Whiteman**, *University of Tennessee at Martin, Martin, Tennessee (RM, AS, NB), Valdosta State University, Valdosta, Georgia (CM), and Murray State University, Murray, Kentucky (RB, HW).*

The correlation of bat activity with insect abundance and habitat at the Reelfoot Lake Environmental Field Station site near Buck Basin of Reelfoot Lake. **Ian Nevills***, **Kevin Pitz**, **Jack Grubaugh**, and **Nancy Buschhaus**, *University of Tennessee at Martin, Martin, Tennessee.*

Exposure to ammonia-based cleaner impacts Dictyos- telium discoideum phototaxis and fruiting body produc- tion. **Caitlin E. Golding*** and **Adam W. Rollins**, *Lincoln Memorial University, Harrogate, Tennessee.*

Distribution and density of the rock-boring urchin (Echinometra lucunter lucunter) along the northeast- ern coast of Trinidad, West Indies. **Bradley Crye*** and **Stanton G. Belford**, *Martin Methodist College, Pulaski, Tennessee.*

Determining the presence and survival of human fec- al bacteria in Murfreesboro storm drains. **Sydney N. Youngman***, **Lara Jarnigan***, **Jordan Jako***, **Megan Stallard***, and **Frank Bailey**, *Middle Tennessee State University, Murfreesboro, Tennessee.*

Measuring and predicting short-term movement of banded sculpin *Cottus carolinae* in a second-order, upland stream in Middle-Tennessee. **William G. Wells***, **Thomas C. Johnson***, **Amy E. Gebhard***, **Robert T. R. Paine***, **Lu- cas A. Hix***, **Heather N. Ferrell***, **Andrea N. Engle***, and **Joshuah S.**

The relationship between exotic earthworms, exotic plants, and soil and leaf litter invertebrate abundance and diversity. **Sara Haney*** and **Darlene Panvini**, *Bel- mont University, Nashville, Tennessee.*

Differences in leaf pack decomposition rate between invasive exotic and native species in a temperate deciduous forest. **Lindsay Millward*** and **Darlene Panvini**, *Belmont University, Nashville, Tennessee.*

Abundance of earthworms relative to leaf litter mass and exotic plant coverage. **Laura Horton*** and **Darlene Panvini**, *Belmont University, Nashville, Tennessee.*

Comparisons of water quality and macroinvertebrate diversity in Richland Creek (Nashville, TN) – an urban stream undergoing riparian restoration. **Alexandria Jeffers*** and **Darlene Panvini**, *Belmont University, Nashville, Tennessee.*

Biomass and diversity of earthworms is affected by pres- ence of exotic shrubs. **Ayda Porkar- Rezaeieh*** and **Dar- lene Panvini**, *Belmont University, Nashville, Tennessee*

Decomposition of *Acer saccharum* and *Lonicera maackii* leaf litter in a first order stream. **Katlin Stodard*** and **Dar- lene Panvini**, *Belmont University, Nashville, Tennessee.*

Biodiversity of macroinvertebrates in a first order spring- fed stream on the Belle Forest Cave property, *Bellevue TN.* **Walter Burn*** and **Darlene Panvini**, *Belmont Uni- versity, Nashville, Tennessee.*

Engineering and Engineering Technology Posters

Comparison of the effectiveness of various filters on audio signals. **Nicole Kirch*** and **Na Zhu**, *Austin Peay State University, Clarksville, Tennessee*

Ladder logic toolbox of functions for motor controls. **Brett Adkins***, **Joshua Greer***, **Richard Foreman***, **Ryan Kelley***, **Nathan Simpkins***, **Leslie McGuffey***, and **Khalid H. Tantawi**, *Middle Tennessee State Univer- sity, Murfreesboro, Tennessee (BA, JG, RF, RK, NS, LM) and Motlow State Community College, Smyrna, Tennes- see (KT).*

Ladder logic toolbox for AC motor starting. **Jason Pavlik***, **Dallas Trahan***, **Nicholas Pazych***, **Joshua Graham***, **Daniel Kiviniemi***, **Zackary Hunter***, and **Khalid H. Tantawi**, *Middle Tennessee State Univer- sity, Murfreesboro, Tennessee (JP, DT, NP, JG, DK, ZH) and Motlow State Community College, Smyrna, Tennes- see (KT).*

Perovskite layer optimization of planar solar cells. **Christopher P. McDonald***, **Riza Bardhan**, **Eric Tal- bert**, and **J. Allyn Smith**, *Austin Peay State University, Clarksville, Tennessee (CPM, JAS), and Vanderbilt University, Nashville, TN (RB, ET).*

Data analysis by FFT and STFT on various time domain signals, **Dinupama R W Arachchige*** and **Na Zhu**, *Austin Peay State University, Clarksville, Tennessee.*

Geology and Geography Poster

Inferred Paleozoic reactivation of Precambrian basement faults within the Nashville dome, central Tennessee.

Mark Abolins, Shaunna Young*, Joe Camacho*, Mark Trexler*, Alex Ward*, Amber Han*, Jonathan Flores*, and Matthew Cooley*, Middle Tennessee State University, Murfreesboro, Tennessee (MA and JF), Radford University, Radford, Virginia (SY), IslandWood, Bainbridge Island, Washington (JC), University of Memphis, Memphis, Tennessee (MT, AW, and MC), and California State University, Fullerton, California (AH)

Mapping the extent of the Cook Canyon tuff in the southern Black Mountains and Cerbat Mountains of Arizona via Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) imagery. **Briana D. Vidal*, Sarah E. Perry*, Cullen L. Schedland*, and Nicholas P. Lang**, Middle Tennessee State University, Murfreesboro, Tennessee, Vassar College, Poughkeepsie, New York, Lafayette College, Easton, Pennsylvania, and Mercyhurst University, Erie, Pennsylvania.

Assessing groundwater geochemistry and flow-path using GIS in a karst aquifer. **Hung-Wai Ho*, Danelle Solomon*** Tennessee State University, Nashville, Tennessee.

Radon Gas Present in Karst Areas. **Conner L Piras* and Dr. Peter Li**. Earth Sciences, Tennessee Technological University, Cookeville, Tennessee.

Quantifying the influence of population diversity to the converging ability of evolutionary algorithms: study case of image classification. **Evan J. Snapp* and Henrique Momm**, Middle Tennessee State University, Murfreesboro, Tennessee.

Health and Medical Science Posters

Assessment of Traditional Chinese Medicine Herbal Extract's Potential to Inhibit Herpes Simplex Virus Type 1. **Trang Huynh* and Stephen M. Wright**, Middle Tennessee State University, Murfreesboro, Tennessee.

The effects of electronic cigarette (ECIG)-generated aerosol and conventional cigarette smoke on the mucociliary transport velocity (MTV) using the bullfrog palate paradigm. **Dominic L. Palazzolo, Emily A. Ely* and Robert A. Johnson**, Lincoln Memorial University-DeBusk College of Osteopathic Medicine, Harrogate, Tennessee.

Functional Gait Recovery After Underwater Treadmill Training for Spinal Cord Injured Individual: a Case Study. **James D Dolbow*, Sandra L. Stevens, Timothy Jones, Michael Wieting, David R. Dolbow**, Middle Tennessee State University, Murfreesboro, Tennessee (-JD,SS). Lincoln Memorial University, Harrogate, Tennessee (JD, MW). Tennessee State University, Nashville, Tennessee (TJ). University of Southern Mississippi, Hattiesburg, Mississippi (DD).

An Initial Examination of the Ability of Panax ginseng to Inhibit Herpes Simplex Virus Type 1. **Andrew T. Gustin* and Stephen M. Wright**, Middle Tennessee State University Murfreesboro, Tennessee.

Effect of p53 status on S100A13 expression in response to oxidative stress. **Jeffrey E. King* and Chris Barton, Ph. D**, Belmont University, Nashville, Tennessee.

p53 mediated regulation of CCNH in response to paclitaxel-induced mitotic stress. **Taeler Dahm*, Morgan B. Turner*, and Chris Barton**, Belmont University, Nashville, Tennessee.

Transcription factor p53 and its regulation of pro-apoptotic gene Bnip3L during heat shock. **Eeleyah Singh Tanwar*, Chris Barton**, Belmont University, Nashville, Tennessee.

Regional food pantries: Operating hours may be a barrier to food access. **Terra L. Smith**. The University of Memphis, Memphis, Tennessee.

History of Science No poster presentations

Math and Computer Science No poster presentations.

Microbiology Posters

MHCI presentation may be dependent upon the immunoproteasome in murine macrophages, but not murine dendritic cells. **Margaret Wheless*, K. Ali Keith*, and Amanda D. Williams**. Lipscomb University, Nashville, Tennessee.

Inhibition of Cryptococcus neoformans by aurone X. **Yusra Mohammed*, Danielle Araujo*, and Erin McClelland**, Middle Tennessee State University, Murfreesboro, Tennessee.

Molecular Epidemiology and Gene Transfer of Erythromycin Resistance in a *Streptococcus pyogenes* Isolate. **Karleigh Richard*** and **Stephen M. Wright**, Middle Tennessee State University, Murfreesboro, Tennessee.

Examining the relationship between proteases and chaperones in maintaining protein homeostasis. **Karly Danhausen***, **Fatima Hani***, **Ashley Elliott Cole***, and **Elliot Altman**, Middle Tennessee State University, Murfreesboro, Tennessee.

Physics Posters

Investigation of Reddening in Fields of the SMASH Survey. **Elizabeth A. Juelfs*** and **Knut Olsen** Austin Peay State University, Clarksville, Tennessee and the National Optical Astronomical Observatory, Tucson, AZ.

Science and Math Teaching Posters

ADVANCEing women in Science, Technology, Engineering, and Mathematics (STEM) careers at Middle Tennessee State University. **Brad Bartel**, **Wandi Ding**, **Jackie Eller**, **Judith Iriarte-Gross**, **Karen Petersen**, **Michael Hein**, **Gretchen Webber**, and **Denielle Meyerink***, Middle Tennessee State University, Murfreesboro, Tennessee.

Rockin' Raider Robots are increasing middle school girls' interests in STEM. **Jessica Earls***, **Lena Anderkin***, and **Dr. Judith Iriarte-Gross**, Middle Tennessee State University, Murfreesboro, Tennessee.

Moving active learning from college to high school classrooms: A case for Process Oriented Guided Inquiry Learning and Peer Instruction. **Jennifer Parrish***, **Tom Cheatham**, **Grant Gardner**, **Leigh McNeil**, Middle Tennessee State University, Murfreesboro, Tennessee.

It's easy being green: Budget-friendly safety-conscious chemistry labs for the science classroom of today. **Maria D. Garrett**, Belmont University, Nashville, Tennessee.

Expanding Our Horizons with EYH. **Khampio Owens***, **Temi Thomas***, **Sierra Shipley***, Middle Tennessee State University, Murfreesboro, Tennessee.

Green Girls: Renewable energy activities for science and civil engagement. **Caleb Hough***, **Penny Howard**, **Judith Iriarte-Gross**, **Angela Gilley**, **Samantha Brown**, Middle Tennessee State University, Murfreesboro, Tennessee (CH, PH, JIG), TN-SCORE, University of Tennessee, Knoxville, Tennessee (AG, SB).

Zoology Posters

Do ruby throated hummingbirds demonstrate a color Bias when selecting a feeding source? **William Kuenzinger*** and **Joaquín Goyret**, The University of Tennessee at Martin, Martin, Tennessee.

Cytochrome--B sequence variation in pocket gophers (*Thomomys* sp.) in California. **Brittany M. Pope**, **Nicolas Perez-Munoz***, **Kiambra Abram**, **LaAndrea Echols**, **Meghan Fernald**, **Jacqueline Hughes**, **V. Arlisa Miles**, **Juliann L. Waits**, **Roger Baldwin**, and **Michael L. Kennedy**, The University of Memphis, Memphis, Tennessee (BMP, MLK), Southwest Tennessee Community College, Memphis, Tennessee (NPM, KA, LE, MF, JH, VAM, JLW), and The University of California - Davis, Davis, California (RB).

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