



# BioUpdate

Department of Biology, Middle Tennessee State University

Spring 2020



Dennis Mullen

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## Message from the Interim Chair

Greetings:

First, let me apologize for the tardiness of this Spring 2020 edition of BioUpdate. It has been sitting in my computer since April and I let it slip through the cracks while I was working to help the department navigate the chaos of switching to remote instruction for the end of the spring semester and all of the summer semester. Now that fall semester is in full swing, I would like to take this moment to update you on the 2019-2020 academic year.

You probably noticed that I am not Lynn Boyd. Lynn stepped down in July of 2019 to take a position as Dean of Sciences and Mathematics at Arkansas State University and I stepped in as Interim Chair. During Lynn's seven years at MTSU she guided us through the transition to the new building, a period of massive growth and the development of three strong Ph.D. programs. Her impact on this department will be felt for many years to come.

Jessica Arbour joined our faculty in August 2019. Jessica studies the evolution of vertebrate form and function. Please read her short biography that appears later in this issue. Jessica's primary teaching duties are in Ichthyology and Biostatistics. We also searched last year for new faculty in Biological Education and Genetics/Physiology. Spoiler alert – we filled those positions and you will meet them in the Spring 2021 edition of BioUpdate.

It has been a productive year in the department. The Biology faculty and students published sixty-three peer reviewed manuscripts (a departmental record). In total there were forty-five student co-authorships on those manuscripts. Biology faculty won over \$1.2 million in extramurally funded competitive grants. Mary Farone's long record of productive research activity was recognized with the MTSU Career Achievement Award, Jason Jessen was named Outstanding Researcher in the College of Basic and Applied Sciences, John Dubois earned the Outstanding Honors Faculty Award and Kim Sadler earned the Outstanding Faculty award for the experiential Learning scholars Program.

I am proud of all that the Biology faculty and students accomplished this year.

Please enjoy learning more about the current state of the department and I promise that the spring 2021 edition of BioUpdate will actually be published in spring 2021.



# New Faculty

**Jessica Arbour** joined the Department of Biology in August 2019. She received her Ph.D. from the University of Toronto under Dr. Hernan Lopez-Fernandez and completed an NSERC postdoctoral fellowship at the University of Washington with Dr. Sharlene Santana. Her work focuses on the evolution of form and function in vertebrates, particularly freshwater fishes and bats. Arbour's research combines both traditional anatomical approaches like dissection and histology with modern 3D imaging like laser- and CT-



scanning to better understand how changes in biological form impact how organisms interact with their environments and other organisms. By combining morphological, ecological, behavioural and biogeographic data in a macroevolutionary framework, she investigates what factors constrain and enhance the diversification of different groups of animals. Arbour's work relies heavily on the open source programming language R,

and contributes to the development of statistical methods for studying biological shape and the evolution of traits. Tennessee is a biodiversity hotspot and home to some of the most diverse groups of freshwater fish in North America, which she hopes to develop into model systems for the evolution of traits and species.



# Biology Lab Updates

## From the lab of Jeffrey Walck

In May 2019, Jeff organized the 13<sup>th</sup> Annual Cedar Glade Research Roundtable held at Cedars of Lebanon State Park covering the ecological significance of intermittent waters in glades. Over summer 2019, Jeff hosted Dr. Szymon Jastrzębowski as a Visiting Scholar from the Polish Forest Research Institute (in picture). Together, they worked on a project concerning the responses of trees to climate change. In January 2020, Jeff contributed to a workshop sponsored by USGS, entitled “Assessing the Science Needs of Southeastern Grasslands Species of Conservation Concern.”

Siti Hidayati participated in a “Workshop to Enhance Collaboration Between US and Indonesia in Biodiversity and Conservation Research,” sponsored by NSF and held in Bogor, Indonesia during July. She was a guest lecturer in the “International Summer Course on Tropical Biodiversity and Sustainable Development” held at Universitas Gadjah Mada, and gave a talk at Universitas Sebelas Maret, in Indonesia.

This past year was very successful in the publication forefront with eight papers published. These papers represented collaborations with our own students as well as scientists from the Chicago Botanic Garden and from Australia, South Korea, Sri Lanka, Japan, and China.



# Biology Lab Updates

## From the lab of Donald Walker



Reed Alexander completed his first season of field work to characterize the structure of wetland microbial communities in West Tennessee and Kentucky. He is collaborating with a group from Tennessee Tech to understand nutrient cycling and microbial dynamics at wetland easement sites.



Olivia Bowers completed her field work characterizing darter (fish) egg clutch microbiomes in Copper Creek, VA. She successfully sampled and used high-throughput sequencing to characterize over 600 samples from healthy and diseased nests across a variety of habitat gradients.



Alejandro Grajal-Puche successfully defended his thesis entitled, 'Microbial assemblage dynamics within the America Alligator nesting ecosystem: A comparative approach across ecological scales'.



# Biology Lab Updates

## From the lab of Donald Walker



### Resulting publications from Walker Lab:

\*denotes MTSU graduate student

\*Grisnik, M., \*Bowers, O., Moore, A.J., Jones, B.F., Campbell, J.R., Walker, D.M. 2019. The cutaneous microbiota of bats has in vitro antifungal activity against the white nose pathogen. FEMS Microbiology Ecology. doi: 10.1093/femsec/fiz193

Walker, D.M., Hill, A.J., Albecker, M.A., McCoy, M.W., \*Grisnik, M., \*Romer, A., \*Grajales-Puche, A., Camp, C., Kelehear, C., Wooten, J., Rheubert, J., Graham, S.P. 2019. Variation in the Slimy Salamander (*Plethodon* spp.) Skin and Gut-Microbial Assemblages Is Explained by Geographic Distance and Host Affinity. Microbial Ecology. <https://doi.org/10.1007/s00248-019-01456-x>

# Biology Lab Updates

From the lab of Cindi Smith-Walters

## News about TAMP from the MTSU Center for Environmental Education



We are happy to report that the Tennessee Amphibian Monitoring Program (TAMP) was funded once again by the Tennessee Wildlife Resources Agency (TWRA). TAMP is a statewide program to monitor frog and toad species and is housed through the Middle Tennessee State University Biology Department and Center for Environmental Education (CEE).

### Why should we monitor these populations?

Amphibians, including frogs and toads, are known for beginning their lives in water and living as adults on land. This makes them particularly vulnerable to pollution in either habitat. Changes in land use, destructive human activities, and poor environmental quality can negatively affect survival or reproduction. In fact, there is documented evidence of the decline in amphibian populations. The abundance of frog and toad species are good indicators of larger habitat changes and ecosystem conditions. TWRA began monitoring in 2004 and through TAMP this effort continues.

### TAMP's biggest accomplishments this last year include the following:

A five hour TAMP workshop to train new 'frog-loggers' and provide information to the public was conducted last November at the University of Tennessee in Knoxville. A slide and sound presentation covering all 22 frog and toad species in the state was a highlight. Participants were quizzed on their knowledge. TAMP workshops are very popular and are repeatedly requested. UT Wildlife and Fisheries Science has also incorporated TAMP information and materials into their Summer Camp.

The TAMP website has been renovated. Novel apps and features, including an online quiz have been added. The new interactive TAMP route map was added and is one way to connect potential volunteers with TAMP routes. If you are interested in finding out where TAMP frog-loggers are running routes, check out the map. <http://www.leaps.ms/TAMP%20Test%20Home%20Page.htm>

TAMP has continued to work with the Tennessee Naturalist program (TNP) <https://tnnaturalist.org/> CEE Director Dr. Cindi Smith-Walters is a founding member of TNP and she and TAMP Director Bob English both conduct courses for various chapters. Working with TNP has resulted in new frog-loggers being added when they hear of TAMP and the opportunity to be a part of the program.

Some elusive species are found on some of the TAMP routes. The TAMP route for Como, Tennessee again had Crawfish Frogs observed and recorded. Because this species can be elusive, having an active frog-logger on this route is a advantage in consistent monitoring. With data to establish and

# Biology Lab Updates

## From the lab of Cindi Smith-Walters

confirm the area where this species occurs and assess its current status, TAMP is happy to report that it is likely to be added to the list of species in need of management by TWRA. Currently it is a species of greatest conservation need. Also, land acquisition is being evaluated in the area based on the calling records TAMP has submitted. We're not only proud of our volunteers but grateful for their dedication and hard work.

The TAMP CD continues to help spread the word. As in the past, new TAMP volunteers are given a copy of the TAMP CD. The CD is a joint venture of TWRA and the MTSU Public Service Committee and CEE and includes recordings of all frog and toad species in the State. In addition, there are hypothetical species, a section on similar-sounding species, and sound quizzes that help to keep the skills of the volunteers sharp. The CD is available to educators statewide, including TNP participants.

We are continuing to expand the TAMP database. As in previous years, all TAMP data is entered into the GIS-based TAMP records. This integrated database of 2004 to 2019 data will be updated at the end of this sampling season and will be used with GIS and incorporated into the Tennessee Wildlife Resources Agency's State Wildlife Action Plan (SWAP). The SWAP plan addresses the management of non-game species of greatest conservation need in the state, and we are happy to be part of this effort.

Frog-loggers are recruited, new routes are assigned. In addition to new volunteers for four TAMP routes, we have a new observer running a route never run before (Tracy City). It's always nice to pioneer a new route and gain baseline data there.

If you want more information about TAMP, how to become a TAMP volunteer, participate in a training or get information on the MTSU Center for Environmental Education contact us through Dr. Kim Sadler [kim.sadler@mtsu.edu](mailto:kim.sadler@mtsu.edu) or call 615-904-8283 and leave a message.

## News about TAMP from the MTSU Center for Environmental Education

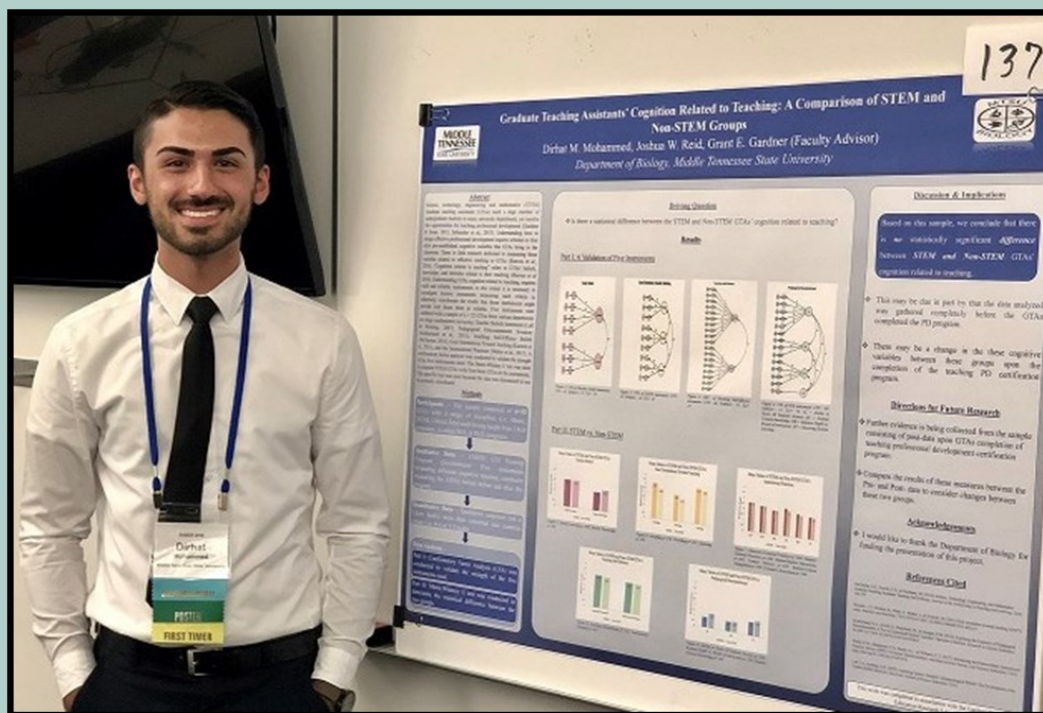
We are happy to report that the Tennessee Amphibian Monitoring Program (TAMP) was funded once again by the Tennessee Wildlife Resources Agency (TWRA). TAMP is a statewide program to monitor frog and toad species and is housed through the Middle Tennessee State University Biology Department and Center for Environmental Education (CEE).





# BIOLOGY STUDENT TRAVEL

**Biology Student Travel** was established to support students invited to present their research at local and national conferences.



**Dirhat Mohammed**

**SABER Conference, Minneapolis, MN**

**July 25-28, 2019**

From the keynote speaker to my presentation and everything in between, I did not cease to learn something new in the field of Biology Education Research. It was my first time at a Society for the Advancement of Biology Education conference so it was all very new to me; however, the take-home message was quite simple, no matter the direction of research you take with your work, by engaging in the roundtable discussions, talks, and poster presentations there was always something you could take away and potentially try with your work. Most importantly, staying up-to-date in the conversation of research and science is important; to know what is happening now and what people have found with their work. In the lab and while working on my project I read so many articles, and I had the opportunity to meet many of the people whose work I'd read. This was truly an experience I will remember always, and I hope to do again.



# BIOLOGY STUDENT TRAVEL

**Clinton R. Warren**

**Tennessee Herpetological Society Meeting , Gray, TN**

**September 26-27, 2019**

The Gray Fossil Museum is established on the site of a fossil excavating area which was discovered in May of 2000 during a highway project in Gray, Tennessee. The dig sites at the museum represent what is believed to have been a sinkhole from the Pliocene-epoch around 4.9 to 4.7 million years ago. The museum itself houses many of these collections for study by on-site researchers and students and also maintains exhibits and tours for the entertainment and teaching of the public. This was an exciting place for this year's annual TN Herpetological Society meeting to take place, in which individuals from around TN



gather to present a wide-variety of herpetological-related research being conducted across North America, with a focus on Tennessee. As a Middle Tennessee State University biology M.S. student who is pursuing a career in academia with goals of teaching and conducting research on the physiology and behavior of herpetofauna and other vertebrates, this was a valuable meeting for me to attend. Additionally, I was generously given the opportunity to present a poster on my undergraduate research involving the intrasexual behaviors of the non-native Mediterranean house gecko during the first day of the meeting. It was exciting to have the opportunity to present this past research to and learn from fellow herpetology students and TWRA officials.

The second day of the meeting offered another unique experience which was bound to grab the attention of anyone who ever had an interest in biology, geology, and/or paleontology. The Gray Fossil staff and researchers provided us all with an immersive tour through the site and their archives, revealing to us the processes they undertake to collect fossils, preserve and recreate them via modeling and 3D printers. My favorites in the collection were of course the vertebrates, which included the skeletal remains of various tapirs, alligators, frogs, short-faced bears, and others (even a nearly-completed Mastodon specimen!). I especially enjoyed a collection of snake vertebrae which are used by some students in their comparison studies on snake fossils found in cave sites around TN. The tour was a splendid addition to our TN Herp meeting. I am thankful to the MTSU Biology Department and to those who fund students in educational opportunities such as these.

# Full-Time Temporary and Adjunct Faculty Play Major Roles

The combination of increased enrollment and decreased funding creates a challenge when it comes to assigning instructors to the ever-growing number of course sections. This need is met primarily by full-time temporary and adjunct faculty. This academic year, the department has hired four full-time temporary and two adjunct faculty members.

These faculty are teaching Exploring Life, General Biology II, Human Anatomy and Physiology I and II, Ecology labs, Genetics and Biometry. Considering the expertise of each of these instructors, their students are obviously getting a great education. Their service to the department not only helps fill instructor roles, but, also helps fill in for research faculty who have received grants and/or contracts that include release time. A few of these instructors are using some of their out-of-class time to conduct their own research, often including graduate and undergraduate students. The department is forever grateful for their service.

## ***Full-Time Temporary Faculty***

**Dr. Danielle Brown**, B.S., 2001, Cornell University; M.S., 2006 and Ph.D., 2011, University of California—Davis. Teaching: General Biology II lecture and Anatomy and Physiology I and II labs

**Dr. Cole Easson**, B.S., 2008, University of Mississippi; Ph.D., 2013, University of Mississippi. Teaching: Genetics lecture and Biometry labs

**Dr. Carol Freund Talyor**, B.S., 1988, Carnegie Mellon University; Ph.D., 1994, Johns Hopkins University. Teaching: Genetics lecture and labs

**Dr. Siti Hidayati**, B.S., 1986, University of Gadjah Mada; M.S. 1993; Ph.D., 2000, University of Kentucky. Teaching: Exploring Life lecture and Ecology labs

**Dr. Alicja Lanfear**, B.S., 2006, Cumberland University; M.S., 2008, MTSU; Ph.D., 2012, University of Tennessee - Knoxville. Teaching: Anatomy and Physiology I and II labs

**Dr. Amy Massengill**, B.S., 1993, Stetson University; D.V.M., 1997, University of Florida. Teaching: Anatomy and Physiology I lecture, Anatomy and Physiology II labs, and Comparative Anatomy of the Vertebrates labs



# Full-Time Temporary and Adjunct Faculty Cont.

## Adjunct Faculty

**Ms. Emily Gain**, B.S., Biology, 2012, UT Chattanooga; M.S., Biology, 2018, Middle Tennessee State University. Teaching: General Biology Labs

**Dr. Karen Maynard**, B.S., Biology and B.S., General Psychology, 2006, Martin Methodist College; M.S., Biotechnology, 2009, Middle Tennessee State University; Ph.D., Molecular Biosciences, 2014, Middle Tennessee State University. Teaching: Anatomy and Physiology I and II labs

**Dr. Moses Prabu**, B.S., 1991; M.S., 1993, The American College; Ph.D., 1998 Indian Institute of Science. Teaching: Radiation Biology

## Department Graphic Shirts and More

The department is selling shirts, backpacks, insulated lunch bags, coffee mugs, lanyards, and stadium cups that sport the department graphic. The T-shirts come in short-sleeve or long-sleeve with the Biology logo front and center or on the upper-left front. Several faculty and students have been spotted wearing the shirts. The coffee mugs are white with the graphic in blue on both sides (visible whether you are right- or left-handed). The stadium cups are 16-ounce blue plastic with a white MTSU Biology graphic. The key lanyards are blue ribbed-polyester cord with a white MTSU Biology graphic. Come by and check out the merchandise in SCI 2044. You might even want to add your own personal flair by custom-ordering a T-shirt with your favorite color combination.

T-shirts	Short-Sleeve:	\$14	Insulated lunch bag:	\$8
	Long-Sleeve:	\$18	Drawstring backpack:	\$6
Sweatshirts	Crew Neck:	\$25	Key Lanyards:	\$3
	Pull-over hoodie:	\$30	Coffee Mugs:	\$5
	Stadium Cups:	\$1		

All items can be purchased (cash only) in the department office (SCI 2044)

or by email at [Biology@mtsu.edu](mailto:Biology@mtsu.edu).

Purchases are not tax-deductible.



# 2019-20 Graduate Teaching Assistants

For the 2019-2020 academic year, the department is providing support to 24 M.S.-level and 19 Ph.D.-level graduate students who serve as graduate teaching assistants (GTAs). Fourteen of these students have received undergraduate degrees from colleges and universities other than MTSU. Eleven hold baccalaureate degrees in subjects other than biology (agriculture, aquatic and fisheries science, biochemistry, biotechnology, chemistry, computer science, environmental science, microbiology, and psychology.) Five of these assistants have received baccalaureate or master's degrees from universities outside the United States. All have the requisite training in biology to serve as departmental teaching assistants. Without these GTAs, the department would be unable to offer the many sections of the non-majors biology course (BIOL 1030) and the majors freshman courses (BIOL 1110/1120), along with some sophomore and junior laboratories. The department is very pleased to have them.

## M.S. Biology Graduate Teaching Assistants

**Atia Ahmed**, B.S., Biochemistry, 2019, Middle Tennessee State University  
**Olivia Bowers**, B.S., Biology, 2019, Tennessee Technological University  
**Chelsea Campbell**, B.S., Biology, 2017, Middle Tennessee State University  
**Kelly Ann Gross**, B.S., Biochemistry/Psychology, 2017, Middle Tennessee State University  
**Neal Halper**, B.S. Chemistry, 2019, Middle Tennessee State University  
**Austin Hargrove**, B.S., Science, 2018, Middle Tennessee State University  
**Kristen Hedgepath**, B.S., Biology, 2019, Middle Tennessee State University  
**Samuel Johnson**, B.S., Biology, 2018, Middle Tennessee State University  
**Steven Joseph**, B.S., Biology, 2017, Middle Tennessee State University  
**Sarah Khan**, B.S. Biology, 2019, Middle Tennessee State University  
**Daniel Knorp**, B.S., Biology, 2019, Middle Tennessee State University  
**Revathi Kuruganti**, B.Tech., Biotechnology, 2009, Osmania University  
**James Mendez**, B.S., Biology, 2018, Middle Tennessee State University  
**Deborah Nwadiobie**, B.S., Microbiology, 2016, University of Benin  
**Crisia Yasmin Reyes Recinos**, B.S., Biology, 2017, Middle Tennessee State University  
**J. Ashton Reece**, B.S., Biology, 2019, Middle Tennessee State University  
**Forest Rice**, B.S., Biology, 2016, Middle Tennessee State University  
**Alexander Romer**, B.S., Aquatic and Fisheries Science, 2018, State University of New York  
**Serenah Smith**, B.S., Biology/Computer Science, 2017, Middle Tennessee State University  
**Stephen Tansie**, B.S., Agriculture, 2005, University of Cape Coast  
**Alexander Tate**, B.S., Biology, 2017, Middle Tennessee State University  
**Essete Tsahai**, B.S., Biology, 2019, Middle Tennessee State University  
**Clinton Warren**, B.S., Biology, 2019, Middle Tennessee State University  
**Kirsten Welch**, B.S., Biology, 2019, Middle Tennessee State University





# 2019-20 Graduate Teaching Assistants

## Ph.D. GRADUATE TEACHING ASSISTANTS



**Brock Arivett**, B.S., Biology, 2005; M.S., Biology, 2014, Middle Tennessee State University

**Jonathan Logan Bowling**, B.S., Biology, 2013, Middle Tennessee State University

**Daniel Bryant**, B.S., Biology, 2014, Middle Tennessee State University

**Kevin Cavey**, B.S., Biology, 2018, Middle Tennessee State University

**Pratima Chapagain**, B.S., Microbiology, 2009; M.S., Microbiology, 2012, Tribuwan University Nepal

**Brock Couch**, B.S., Biology, 2015, Missouri Western State College; M.S., Biology, 2018, University of Maryland

**Nicole Gammons**, B.S., Biology, 2018, Middle Tennessee State University

**Angela Google**, B.S., Biology, 2007; M.Ed., Environmental Science, 2010, University of Tennessee-Chattanooga

**Zachary Grimes**, B.S., Biology, 2015, M.S., Biology, 2017, Middle Tennessee State University

**Matthew Grisnik**, B.S., Biology, 2014, University of Findlay; M.S., Biology, 2016, Marshall University

**Lisa Hanson**, B.S., General Studies, 2006, Southwest Adventist University; M.S., Education, 2012, Touro College; M.S., Biology, 2017, Texas State University

**Ashlin Harris**, B.S., Biology, 2016, Middle Tennessee State University

**Olena James**, B.S., Biology, 2009, Tennessee State University; M.S., Biology, 2013, Tennessee State University

**Zhigang Jia**, B.S., Biological Sciences, 2010, Jilin University, M.S., Biological Education, 2015, Northeast Normal University

**Roderick Moore**, B.S., Biochemistry, 2017, Middle Tennessee State University

**Dianna Prince**, B.S., Biology, 2013; M.S., Professional Science, 2014, Middle Tennessee State University

**Joshua Reid**, B.S., Biology, 2014, Athens State University

**Sara Salisbury**, B.S., Environmental Science, 2012, Allegheny College; M.S., Biology, 2018, Texas State University

**Csilla K. Szepe**, B.S., Biology, 2018, Middle Tennessee State University

# Theses and Dissertations Completed 2019-2020

## Master's Theses

### Summer 2019

**Evers, Josh M.**, 2019. "Characterizing the proteasomal subunit RPN-6.2 in *C. elegans*"  
(Lynn Boyd, committee chair)

**Grajal-Puche, Alejandro**, 2019. "Microbial Assemblage Dynamics within the American Alligator Nesting Ecosystem: A Comparative Approach Across Ecological Scales"  
(Donald Walker, committee chair)

**Tucker, Jamila S.**, 2019. "A New Quorum Sensing Molecule in *C. neoformans*, Gibberelic Acid, Increases Melanization in the Presence of Testosterone"  
(Erin McClelland, committee chair)

### Fall 2019

**Tate, Alexander D.**, 2019. "A Divergence Time Analysis of Butterflies in the Paradigm of the Pleistocene Refugia Hypothesis"  
(Brian Miller, committee chair)

### Spring 2020

**Riley, Wesley A.**, 2020. "Use of a live cell microscopy approach to compare the response of the PINK1:Parkin mitophagy pathway to different mitochondrial depolarizing agents"  
(David E. Nelson, committee chair)

## Doctoral Dissertations

### Summer 2019

**Ali, Ali R.**, 2019. "Genome-Wide Analyses of Genes Affecting Growth, Muscle Accretion and Fillet Quality Traits in Rainbow Trout"  
(Mohamed Salem, committee chair)

**Ghosh, Rajarshi**, 2019. "Plant Polysaccharides as Potential Bioactive Therapeutics: Novel Approaches Towards Production, Structural Characterization, Immunomodulation and Quality Control"  
(Anthony Farone, committee chair)



# Theses and Dissertations Completed 2019-2020

## Doctoral Dissertations

### Fall 2019

**Hani, Fatmah M.**, 2019. "Examining the relationship between molecular chaperones and proteases in maintaining protein homeostasis using a collection of nonfunctional missense mutants"

(Elliot Altman, committee chair)

### Spring 2020

**Alsaif, Ghetta A.**, 2020. "A study of how two potential anticancer agents affect the major cancer hallmarks apoptosis and metastasis"

(Elliot Altman, committee chair)

**Beaubien, Gale B.**, 2020. "Mercury dynamics in southern Appalachian mountain aquatic and riparian food webs"

(Ryan Otter, committee chair)

**Bowling, Jonathan L.**, 2020. "Filtering of Transient and Low-Level Mitochondrial Damage Signals by the PINK1:Parkin Mitophagy Pathway"

(David E. Nelson, committee chair)

**Prince, Dianna J.**, 2020. "DORSAL CONVERGENCE OF GASTRULA CELLS REQUIRES A VANGL2 AND ADHESION-PROTEIN DEPENDENT CHANGE IN PROTRUSIVE ACTIVITY"

(Jason Jessen, committee chair)

## BioUpdate

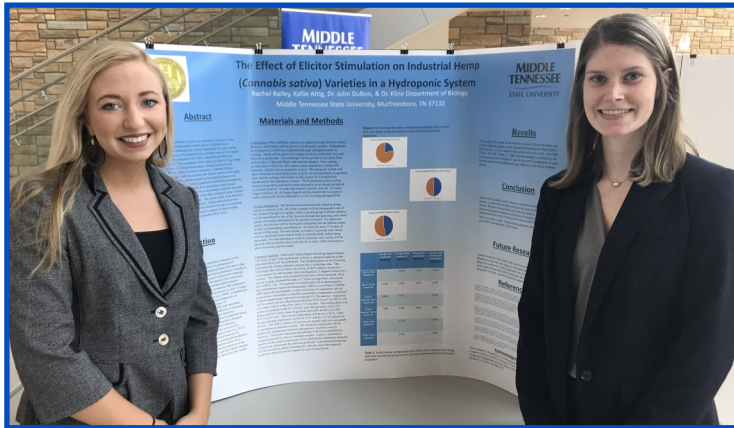
Dennis Mullen, interim department chair ([Dennis.Mullen@mtsu.edu](mailto:Dennis.Mullen@mtsu.edu))

Produced by MTSU Department of Biology

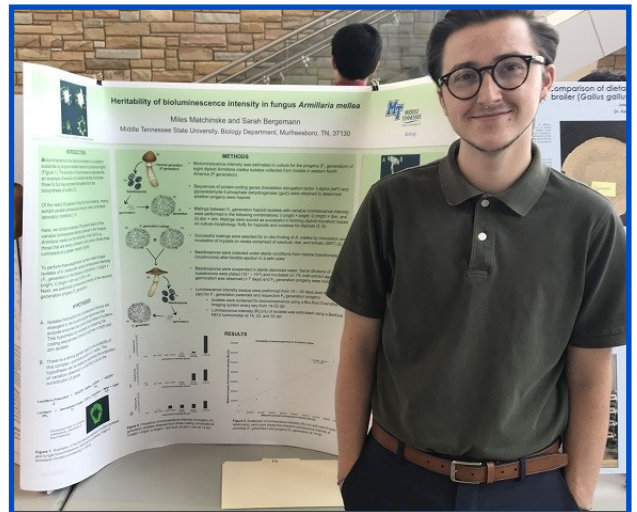
#1020-92946 / Middle Tennessee State University does not discriminate against students, employees, or applicants for admission or employment on the basis of race, color, religion, creed, national origin, sex, sexual orientation, gender identity/ expression, disability, age, status as a protected veteran, genetic information, or any other legally protected class with respect to all employment, programs, and activities sponsored by MTSU. The Assistant to the President for Institutional Equity and Compliance has been designated to handle inquiries regarding the non-discrimination policies and can be reached at Cope Administration Building 116, 1301 East Main Street, Murfreesboro, TN 37132; [Marian.Wilson@mtsu.edu](mailto:Marian.Wilson@mtsu.edu); or 615-898-2185. The MTSU policy on non-discrimination can be found at [mtsu.edu/iec](http://mtsu.edu/iec).

# MTSU Summer Research Celebration 2019

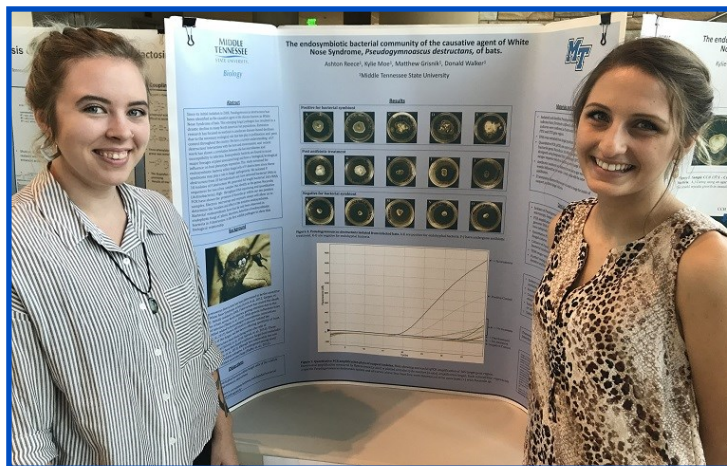
The Summer Research Celebration is a poster session that showcases research and creative activity being conducted by students at MTSU. We invite students interested in research to check out the student posters, ask questions, meet faculty mentors, and learn about upcoming research opportunities. On July 26th, 2019, 18 students mentored by Biology faculty presented posters.



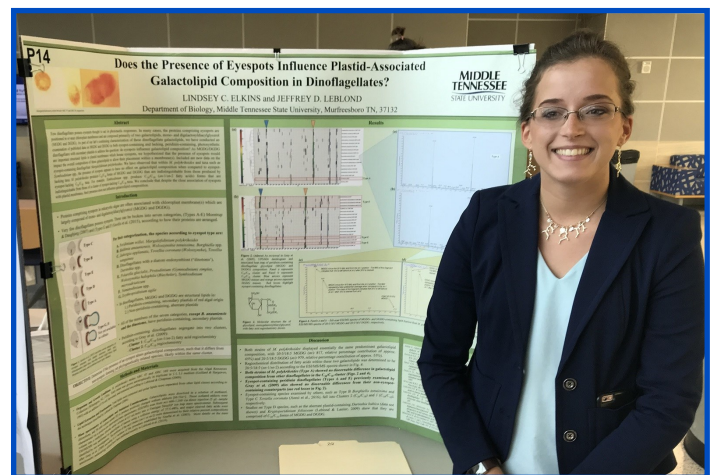
**Rachel Bailey**, Biology, **Kallie Attig**, Forensic Science, Paul Kline, Chemistry and John DuBois, Biology (faculty sponsors); "The Effect of Elicitor Stimulation on Industrial Hemp"



**Miles D. Matchinske**, Biology; Sarah E. Bergemann (faculty sponsor), Biology; "Heritability of Bioluminescence Intensity in Fungus *Armillaria mellea*"



**J. Ashton Reece**, Biology; **Kylie Bowe**, Biochem; **Matt Grisnik**, MOBI; Donald Walker (faculty sponsor), Biology; "The Endosymbiotic Bacterial Community of the Causative Agent of White Nose Syndrome, (*Pseudogymnosascus destructans*) of Bats"

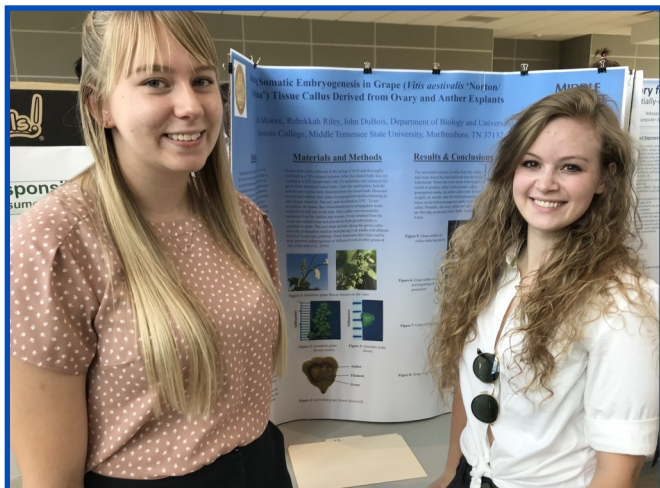


**Lindsey Elkins**, Biology; Jeff Leblond (faculty sponsor), Biology; "Does the Presence of Eyespots Influence Plastid-Associated Galactolipid Composition in Dinoflagellates?"

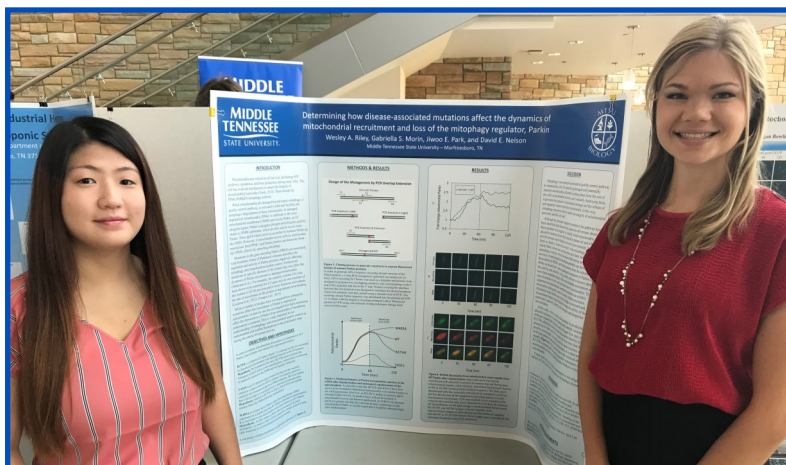




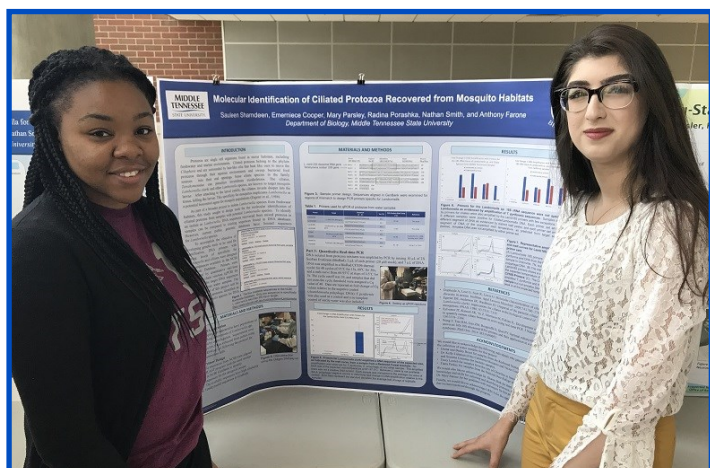
# MTSU Summer Research Celebration 2019



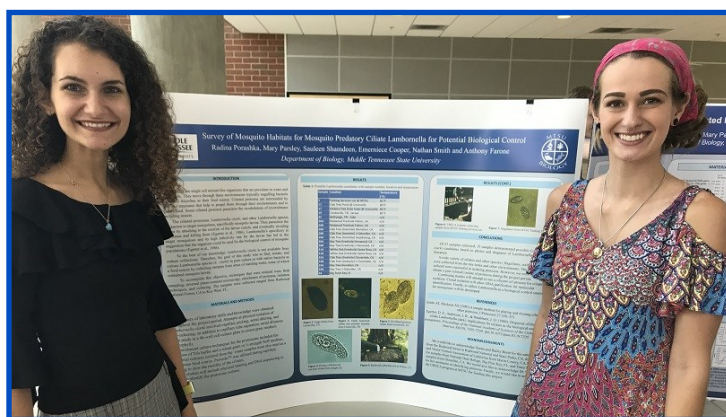
**Sara A. Moore**, Biology; **Rebekkah M. Riley**, Biology; John DuBois (faculty sponsor), Biology; "Somatic Embryogenesis from Stamen and Ovary Callus Tissues in *Vitis aestivalis* 'Norton/Cynthiana'"



**Wesley A. Riley**, Biology; **Gabriella S. Morin**, Biology; **Jiwoo Park**, Biology; David E. Nelson (faculty sponsor), Biology; "Determining How Disease-associated Mutations Affect the Dynamics of Mitochondrial Recruitment and Loss of the Mitophagy Regulator, Parkin"



**Emerniece Cooper**, Biology; **Sauleen Shamdeen**, Biochem; Anthony Farone, Mary B. Farone, Sharon Berk (faculty sponsors), Biology; "Molecular Identification of Protozoa Recovered from Mosquito Habitats"



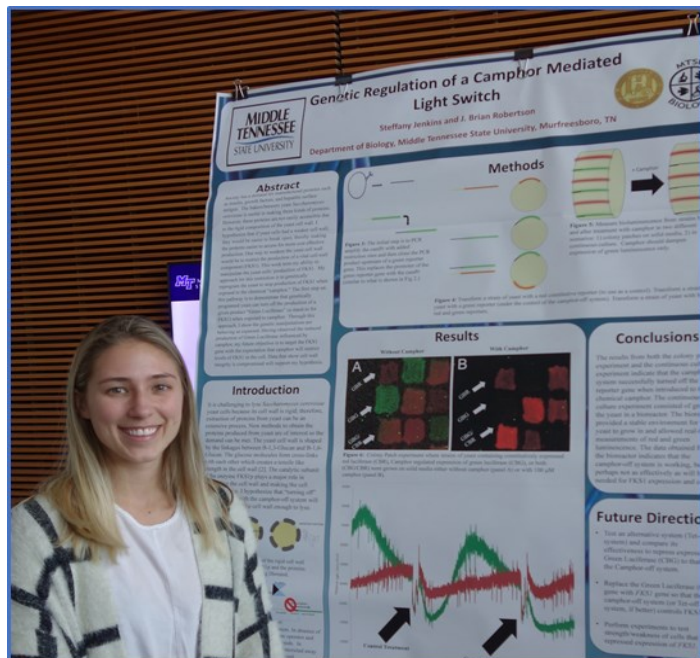
**Radina Porashka**, Biology; **Mary Parsley**, Allied Health; **Emerniece Cooper**, Biology; **Sauleen Shamdeen**, Biochem; **Nathan Smith**, Biochem; Anthony Farone (faculty sponsor), Biology; "Survey of Mosquito Habitats for Mosquito Predatory Ciliate *Lambornella* for Potential Biological Control"



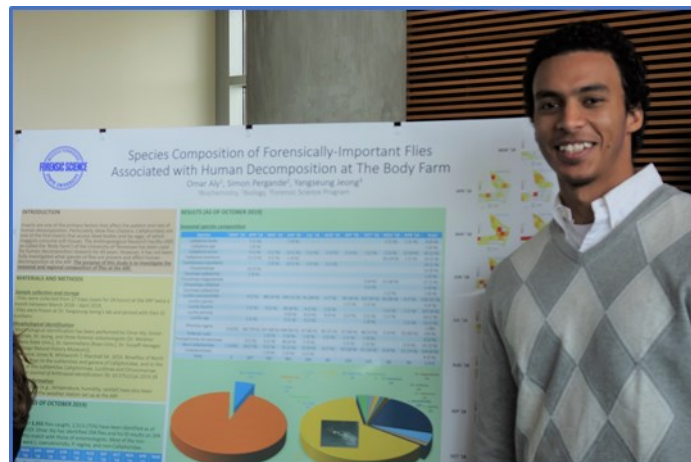


# MTSU Fall 2019 Undergraduate Research Open House

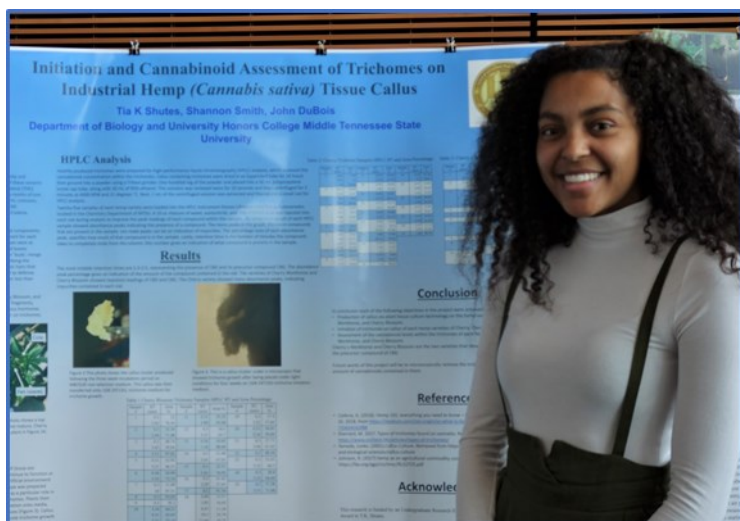
The Office of Research and Sponsored Programs and the Undergraduate Research Center hosted its second annual Open House showcasing poster presentations by recent Undergraduate Research Experience and Creative Activity (URECA) recipients. Attendees had an opportunity to talk one-on-one with student researchers and learn about their experiences in mentored research. On November 15th, 2019, 18 students mentored by Biology faculty presented posters.



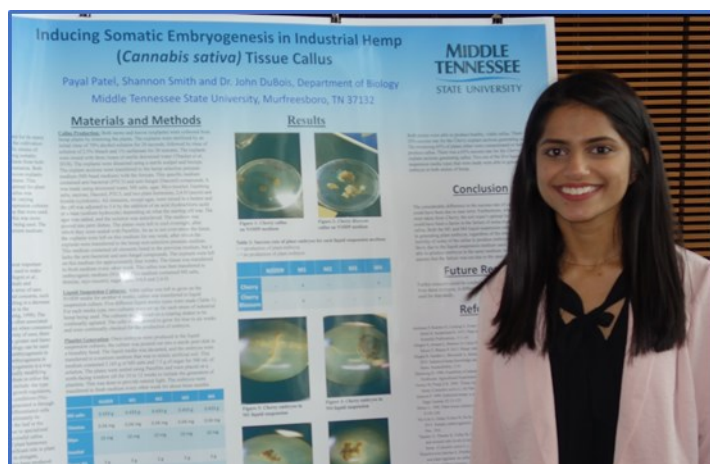
**Steffany Jenkins**, Biology; Brian Robertson (faculty sponsor), Biology; “Genetic Regulation of a Camphor Mediated Light Switch”



**Omar Aly**, Biochem, **Simon Pergande**, Biology, Yangseung Jeong (faculty sponsor), Biology; “Species Composition of Forensically-Important Flies Associated with Human Decomposition at the Body Farm”



**Tia K. Shutes**, Biology; **Shannon Smith**, MOBI; John DuBois (faculty sponsor), Biology; “Initiation and Cannabinoid Assessment of Trichomes on Industrial Hemp (*Cannabis sativa*) Tissue Callus”



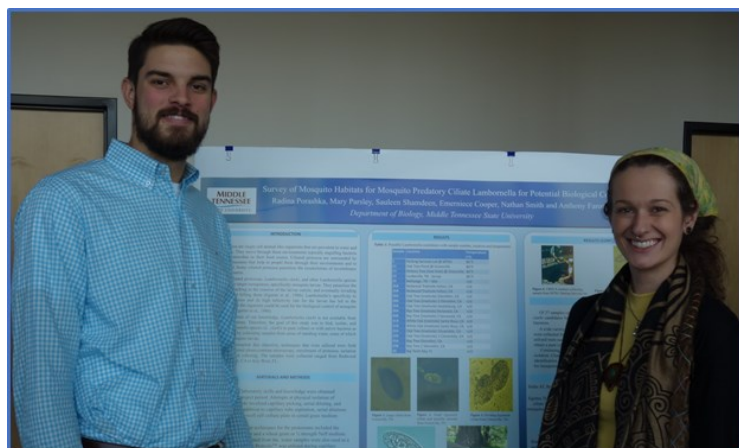
**Payal Patel**, Biology; **Shannon Smith**, MOBI; John DuBois (faculty sponsor), Biology; “Inducing Somatic Embryogenesis in Industrial Hemp (*Cannabis sativa*) Tissue Callus”

**Ashton Reece**, Biology, **Kylie Bowe**, Biochem, **Matthew Grisnick**, MOBI; Donald Walker (faculty sponsor), Biology; “The Endosymbiotic Bacterial Community of the Causative Agent of White Nose Syndrome, (*Pseudogymnoascus destructans*) of Bats”

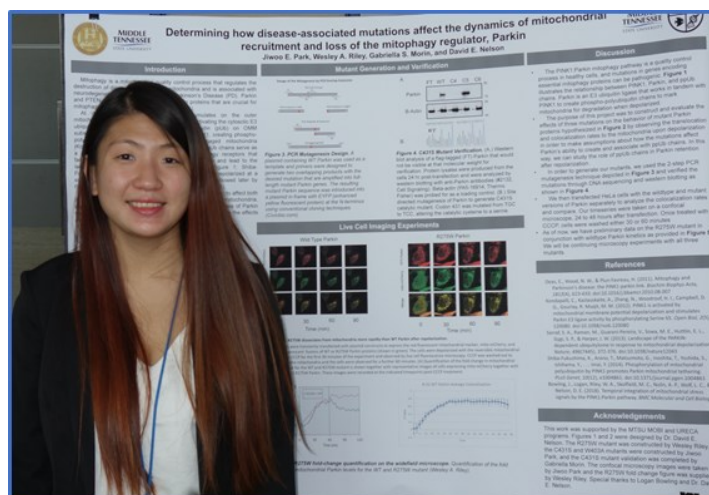
**Lindsey Elkins**, Biology; Jeff Leblond (faculty sponsor), Biology; “Does the Presence of Eyespots Influence Plastid-Associated Galactolipid Composition in Dinoflagellates”

**Rachel Bailey**, Biology; **Kallie Attig**, FRSC; John DuBois-Biology and Paul Kline-Chemistry (faculty sponsors); “The Effect of Elicitor Stimulation on Industrial Hemp”

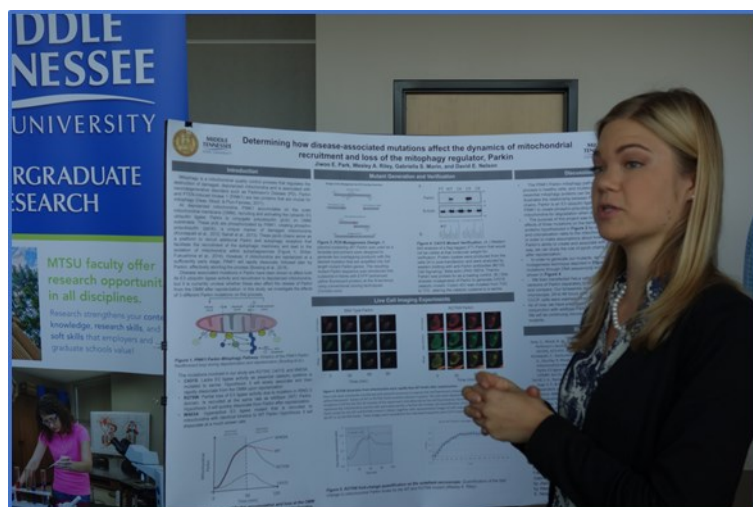
# MTSU Fall 2019 Undergraduate Research Open House



**Radina Porashka, Mary Parsley, Sauleen Shamdeen, Emerniece Cooper, Nathan Smith;** Anthony Farone (faculty sponsor), Biology; "Survey of Mosquito Habitats for Mosquito Predatory Ciliate Lamornella for Potential Biological Control"



**Wesley A. Riley, Gabriella S. Morin, Jiwoo E. Park,** Biology; David E. Nelson (faculty sponsor), Biology; "Determining How Disease-associated Mutations Affect the Dynamics of Mitochondrial Recruitment and Loss of the Mitophagy Regulator, Parkin"



**Jiwoo E. Park, Jonathan L. Bowling,** Biology; David E. Nelson (faculty sponsor), Biology; "Producing a Blue Fluorescent Mitochondrial Marker for Live Cell Imaging of Mitochondrial Dynamics"

**Wesley A. Riley, Gabriella S. Morin, Jiwoo E. Park,** Biology; David E. Nelson (faculty sponsor), Biology; "Determining How Disease-associated Mutations Affect the Dynamics of Mitochondrial Recruitment and Loss of the Mitophagy Regulator, Parkin"

**Sara A. Moore, Rebekkah M. Riley,** John DuBois (faculty sponsor), Biology; "Somatic Embryogenesis from Stamen and Ovary Callus Tissues in Vitis aestivalis 'Norton/Cynthiana'"

**Miles D. Matchinske,** Sarah Bergemann (faculty sponsor), Biology; "Heritability of Bioluminescence Intensity in Fungus Armillaria mellea"





# Scholars Week Highlights Faculty and Student Research

## Scholars Week University-Wide Poster Exposition—Spring 2020

**Scholars Week** is a weeklong tradition during which MTSU's academic colleges celebrate scholarship, research and creative activity through a variety of events and activities. While the on-campus events had to be canceled due to COVID-19, the Poster and Creative Activity Exposition was moved online. Visit <https://www.mtsu.edu/scholarsweek/posters/index.php> to view the posters and creative submissions.

### Undergraduate 1st Place Winner!

**Author:** Neroosh Mossa (Undergraduate) **Faculty Mentor:** Rebecca Seipelt-Thiemann, Department of Biology; "Effects of Caffeine on the Stress-Regulated Gene, HSF-1, in *Caenorhabditis elegans*"

**Author(s):** Helana Yacoub (Undergraduate), Rezhin Ahmad (Undergraduate), Zachary Grimes (PhD) **Faculty Mentor:** Rebecca Seipelt-Thiemann, Department of Biology; "Caffeine Affects Alternative Splicing of the Nematode WNT Pathway Gene, APR-1"

**Author:** Aisha A Nour (Undergraduate) **Faculty Mentor:** Cole Easson, Department of Biology; "Effects of Green Tea on Expression of DAF-16 Gene in *Caenorhabditis elegans*"

**Author:** Madonna Ghobrial (Undergraduate) **Faculty Mentor:** Rebecca L. Seipelt-Thiemann, Department of Biology; "Structural Genome Annotation using Transcriptome Data for Two Eukaryotic Species"

**Author(s):** Pratima Chapagain (PhD), Ali Ali (PhD) **Faculty Mentor:** Mary Farone, Department of Biology; "RNA-Seq of Bacterial Outer membrane vesicles and whole transcriptome identify sRNAs targeting immune relevant genes in rainbow trout susceptible or resistant to *Flavobacterium psychrophilum*"

### Undergraduate 2nd Place Winner!

**Author(s):** Gabriella S. Morin (Undergraduate), Jiwoo E. Park (Undergraduate), Wesley A. Riley (Masters) **Faculty Mentor:** David E. Nelson, Department of Biology; "Determining how disease-associated mutations affect the dynamics of mitochondrial recruitment and loss of the mitophagy regulator, Parkin"

**Author:** Marina Elkommos-Zakhary (Undergraduate) **Faculty Mentor:** Rebecca Seipelt-Thiemann, Ashlin Powell Harris, Department of Biology; "Effects of Cold Stress on Alternative Splicing of a Gene Implicated in Nematode Longevity, EGL-9"

**Author(s):** Radina Porashka (Undergraduate), Mary Parsley (Undergraduate), Sauleen Shamdeen (Undergraduate), Nathan Smith (Undergraduate), Emerniece Cooper (Undergraduate) **Faculty Mentor:** Anthony Farone, Department of Biology; "Survey of Mosquito Habitats for Mosquito Predatory Ciliate *Lambornella* for Potential Biological Control"

**Author(s):** Deng Aguto (Undergraduate), Omar Aly (Undergraduate) **Faculty Mentor:** Rebecca L. Seipelt-Thiemann, Department of Biology; "UV-Exposure Induces Alternative Splicing of BRC-1 RNA in Nematodes"



**SCHOLARS  
WEEK 2020**



# Scholars Week Highlights Faculty and Student Research

## Scholars Week University-Wide Poster Exposition—Spring 2020

**Author:** Dirhat Mahdi Mohammed (Undergraduate)  
**Faculty Mentor:** Grant E. Gardner, Department of Biology “A Comparison of STEM and Non-STEM Graduate Teaching Assistants’ Cognition Related to Teaching”

**Author:** Daiche Fatima Issa (Undergraduate)  
**Faculty Mentor:** Rebecca L. Seipelt-Thiemann, Department of Biology; “Investigative Research on The Effects of Hydrogen Peroxide on Splicing Mechanisms”

**Author(s):** Haley Parks (Undergraduate), Hope Brown (Undergraduate), Kylie Curtis (Undergraduate)  
**Faculty Mentor:** Carol Freund, Department of Biology; “CRISPR-based Knock-in of BCAT-deficient *Cryptococcus neoformans*”

**Author:** Daviesha Carter (Undergraduate) **Faculty Mentor:** Rebecca L. Seipelt-Thiemann, Department of Biology; “Evidence-Based Genome Annotation for Degradative Enzymes in fungal pathogen, *Cryptococcus neoformans*”

**Author(s):** Damon Stinson (Undergraduate), Micah Chapman (Undergraduate) **Faculty Mentor:** Cole Easson, Department of Biology; “Examining morphological and genetic diversity of freshwater sponges in Tennessee”

**Author:** Mathysyn Fields (Undergraduate)  
**Faculty Mentor:** Rebecca L. Seipelt-Thiemann, Department of Biology; “Treatment with Endogenous Cannabinoid, Arachidonyl Ethanolamide, Alters Expression of Nematode Cannabinoid Receptor Gene NPR-19”

**Author(s):** Prianca Griggs (Undergraduate), Aarthi Subramani (Ph.D. candidate) **Faculty Mentor:** David E. Nelson, Department of Biology; “Examining the Effect of Intracellular *C. neoformans* on the Transcriptome of Classically and Alternatively Activated Macrophages”

**Author:** Scarlett M Benitez (Undergraduate)  
**Faculty Mentor:** Rebecca L. Seipelt-Thiemann, Department of Biology; “Alternative Splicing of Splicing Regulator Protein, Polypyrimidine Tract Binding Protein I”

**Author:** Alaa Mohammed (Undergraduate)  
**Faculty Mentor:** Rebecca Seipelt-Thiemann, Department of Biology; “Evidence-based Annotation Revision to Genes Involved in the Virulence Factor Melanin Production in Fungal Pathogen, *Cryptococcus neoformans*”

**Author:** Jewel Larkins (Undergraduate)  
**Faculty Mentor:** Stephen Wright, Department of Biology “Investigating the Effects of *Bacillus* Endophytes on Plant Growth”

**Author:** Zhigang Jia (Ph.D.) **Faculty Mentor:** Grant E. Gardner, Department of Biology “International Teaching Assistants’ Development of Cultural Competence: A Critical Literature Synthesis”

**Author:** Morgan Hill (Undergraduate)  
**Faculty Mentor:** Rebecca L. Seipelt-Thiemann, Department of Biology; “SLO-1 Gene Expression is Regulated by Ethanol Exposure in *C. elegans*”



**SCHOLARS  
WEEK 2020**

# Scholars Week Highlights Faculty and Student Research

## Scholars Week University-Wide Poster Exposition—Spring 2020

**Author(s):** Anika Chowdhury (Undergraduate), Mar-  
zea Akter (Undergraduate) **Faculty Mentor:** Rebecca  
Seipelt-Thiemann, Department of Biology; “Improving  
Accuracy for Genes Involved in Phosphorus Use Effi-  
ciency in Corn”

**Author:** Niah Frantzen (Undergraduate) **Faculty  
Mentor:** Rebecca L. Seipelt-Thiemann, Department of  
Biology; “Investigating the Transcriptome-Level Re-  
sponse of Differentially-Polarized Macrophages to  
\*Cryptococcus neoformans\* Infection”

**Author:** Savannah Lawwell (Undergraduate) **Faculty  
Mentor:** John DuBois, Department of Biology;  
“Producing Pollen, Pollination, and Assessment of Seed  
Yields and Cannabinoid Levels in Industrial Hemp  
(Cannabis sativa)”

**Author:** Anna Yuhas (Undergraduate) **Faculty Men-  
tor:** Rebecca L. Seipelt-Thiemann, Department of Biol-  
ogy; “STRUCTURAL ANNOTATION OF CORN IN-  
FLORESCENCE GENE MADS-box 1”

**Author:** Faith Rump (Undergraduate) **Faculty Men-  
tor:** Rebecca Seipelt-Thiemann, Department of Biolo-  
gy; “Exploration of Possible Alternative Splicing in the  
Caenorhabditis elegans Gene PMK-3 through Treat-  
ment with an Anti-Inflammatory”

**Author:** Chase Burton (Undergraduate) **Faculty  
Mentor:** Rebecca L. Seipelt-Thiemann, Department of  
Biology; “Improving Gene Model Accuracy for Genes  
Involved in Capsule Formation of Fungal Pathogen  
Cryptococcus neoformans”

**Author:** Rija Asim (Undergraduate) **Faculty Mentor:**  
Rebecca L. Seipelt-Thiemann, Department of Biology;  
“Revision of genes in the nitrogen use efficiency path-  
way of Zea mays for agricultural sustainability”

**Author:** Sarah Soliman (Undergraduate) **Faculty Men-  
tor:** Rebecca L. Seipelt-Thiemann, De-  
partment of Biology; “The Effect of an Acute Nicotine  
Exposure on ACR-16 Gene of C. elegans”



## SCHOLARS WEEK 2020

### Let us hear from you . . .

*BioUpdate* wants to feature the accomplishments of alumni, and we encourage you to update us!

Send us your name, MTSU degree/year, and an update of your professional/career activities, awards, accomplishments.  
You may also include any personal news of interest that you would like to share with our readers.

Please include an email address so we can contact you if we need additional information.

Send contact information and updates to

Biology Department, MTSU Box 60, Murfreesboro, TN 37132

Email: [biology@mtsu.edu](mailto:biology@mtsu.edu)



# 2020 Biology Scholarship Recipients

Each year the Biology faculty is honored to be able to work with outstanding students who excel in the classroom, conduct independent research, attend courses at field stations, present papers at scientific meetings, and perform exceptionally well on national standardized tests. To help defray the costs of these activities and to recognize these students, the department is pleased to offer a number of scholarships. Although these scholarships include monetary awards, their intention is to recognize students for efforts above and beyond the expected. The Biology faculty congratulates every student recipient.

**Kurt E. Blum Botany Research Scholarship:**

Awarded to a biology major of sophomore or above standing with and interest in botany.

*Chelsea Rolle*

*Faith Rumpp*

**William H. Butler Jr. Graduate Research Scholarship:**

Awarded to provide support for expenses associated with thesis research.

*Neal Halper*

**Cynthia Chappell First Year Award for Summer Research:**

Awarded to support research efforts.

*Deborah Nwadijie*

**George Davis Scholarship:**

Awarded to a non-traditional biology major of sophomore standing or above.

*Elizabeth Berryhill*

**Elliott Dawson/BioVentures Biotechnology**

**Scholarship:** Awarded to a biology major who has taken or is currently enrolled in biotechnology.

*Emily Oppmann*

**Kevin Driver Memorial Biology Scholarship:**

Awarded to support research efforts.

*Anika Chowdhury*

*Sydney S. Robbins*

**John D. DuBois Scholarship:**

Awarded to an undergraduate or graduate student to provide travel support for paper presentations at scientific meetings.

*Olivia Bowers*

**Mary C. Dunn Graduate Scholarship:**

Awarded to support research efforts.

*J. Ashton Reece*

*Alexander Romer*

*Clinton Warren*

**J.L. Fletcher Graduate Scholarship:**

Awarded to a beginning biology graduate student.

*J. Ashton Reece*

*Neal Halper*

*Jeremy Smith*

*Serenah Smith*

**Thomas Hemmerly Graduate Research Scholarship:**

Awarded to provide support for expenses associated with thesis research.

*Olivia Bowers*

**Freeman P. Jordan Jr. Scholarship:**

Awarded to a biology major in support of research.

*Catheryn Bolick*

*Sierra Cruz*

*Savannah Lawwell*

**Padgett Kelly Research Scholarship:**

Awarded to support summer studies of field research in ecology or conservation biology.

*Natalie Foster*

**Jim Kemp Biology Scholarship:**

Awarded to a biology major or minor who is also minoring in secondary education.

*Morgan D. Gutierrez*

**Mitchell Magid Memorial Work Scholarship:**

Awarded to support research efforts.

*Damon Stinson*

**Charles McGhee Scholarship:**

Awarded to a biology major of junior standing seeking licensure to teach science.

*Travis Lawson*

**Brian Miller Scholarship:**

Awarded to support research of second year graduate students conducting field studies on herpetology or biospeleology in Tennessee.

*Clinton Warren*



# 2020 Biology Scholarship Recipients

**Dennis Mullen Scholarship:** Awarded to graduate students engaged in research in vertebrate biology or aquatic ecology.

**Clinton Warren**

**George Murphy Scholarship:** Awarded to support research efforts.

**Hannah Lunnemann**

**J. Gerald Parchment Biological Field Station**

**Scholarship:** Awarded to a biology major of sophomore or above standing for summer study or academic year research.

**Emma Phipps**

**Jeremy Smith**

**John A. Patten Scholarship:** Awarded to a biology major of sophomore or above (including graduate) standing for research support or summer study.

**Marzea Akter**

**Whitlei Geen**

**Molly Gilliland**

**Maris Goodwin**

**Garbriella Morin**

**Kal Okello**

**Olivia Bowers**

**J. Ashton Reece**

**Jeremy Smith**

**Mary de los Reyes Biology Scholarship:** Awarded to support research efforts.

**Jack Maxwell**

**Wayne Rosing Biology Scholarship:** Awarded to a biology major of junior standing with a botany emphasis or a minor in secondary education.

**Dirhat Mohammed**

**Eugene F. Strobel Scholarship:** Awarded to a biology major of junior standing who plans a teaching career at the secondary or college level.

**Dylan Favazza**

**Sarah H. Swain Undergraduate Research Scholarship:** Awarded to purchase supplies or support travel associated with research projects.

**Shelby Cox**

**Natalie Foster**

**Hannah Lunnemann**

**Damon Stinson**

**Marion R. Wells Graduate Research Scholarship:** Awarded to provide support for thesis research conducted during summer months.

**J. Ashton Reece**

**Alexander Romer**

**C.W. Wiser Medical/Allied Health Award and Scholarship:** Awarded to a graduating student who will continue studies in the medical sciences at a school of medical technology or other allied health field.

**Vy Wu**

**Stephen M. Wright Research Scholarship:** Awarded to a graduate or undergraduate student associated with research in microbiology or biotechnology.

**Alaa F. Mohammed**

**Jiwoo Park**

**John M. Zamora Graduate Research Scholarship:**

Awarded to purchase supplies or support travel associated with research projects.

**Serenah Smith**

## Incoming Freshman Scholarships 2019-20

**Patrick J. Doyle Freshman Scholarship:** Awarded annually to an incoming freshman biology major.

**Christina L. Cournoyer**

**Travis R. Lawson**

**Molly Gilliland**

**Ellis Rucker Freshman Scholarship:** Awarded annually to an incoming freshman biology major.

**Travis R. Lawson**

## Outstanding Scholarships

**Clay M. Chandler Outstanding Freshman Biology Award and Scholarship:** Awarded to a biology major of freshman standing based on academic performance.

**Rana Naeim Sharubem**

**Ralph E. Sharp Outstanding Sophomore Award and Scholarship:** Awarded to a biology major of sophomore standing based on academic performance.

**Carmen Botros**

**Molly Gilliland**

**Philip M. Mathis Outstanding Junior Award and Scholarship:** Awarded to a biology major of junior standing based on academic performance.

**Catheryn Bolick**

**Steffany M. Jenkins**

**Peter I. Karl Outstanding Senior Award:** Awarded to a biology major of senior standing based on academic performance.

**George Schroeder**