

# BioUpdate

Department of Biology, Middle Tennessee State

Spring 2018



Lynn Boyd

## Message from the Chair

This has been another great year for Biology at MTSU!

Fall enrollment numbers show that the Biology Department at MTSU continues to be a popular choice for undergraduate students. As of Fall 2017, we had 946 undergraduate majors in our department. This is an increase of 41 percent compared to four years ago! This shows that students really are looking for a quality education, not just a quick and easy degree. Biology students are fantastic. We are incredibly proud of our students, and they continue to amaze us every day.

The department has hired three new faculty members since the last edition of *BioUpdate*: Anna Grinath, Yangseung Jeong, and Don Walker. Short articles about each of them are featured in this issue.

We also hired a new Biology lab coordinator, Tina Carter. We are happy to have her as part of our Biology family, and she is doing a great job. Karen Lehocky has been our stockroom manager and microbiology lab manager for 17 years. She recently submitted her resignation and will be moving to Georgia this summer. We appreciate all of her service to our department, and she will be dearly missed.

Faculty and students in the department continue to do wonderful things. Last year they published 39 peer-reviewed papers and made 96 conference presentations. Seven extramural grant proposals from the department were funded. A total of 151 students were involved in research projects in laboratories and/or field projects in our department. It is rewarding to see our students engaged in biology, and we are even more excited to see where they go from here.

I encourage you to look through the pages of *BioUpdate* and learn about the many interesting things going on with our faculty, students, and alumni.

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# New Faculty

## Anna Grinath

Anna Grinath was born in Medfield, Massachusetts and received her bachelor's degree in Biology from Middlebury College in Vermont in 2007. Her M.S. and Ph.D. degrees are from Florida State University in 2012 and 2017, respectively. Grinath's biology thesis examined the filter-feeding ecology of coral reef sponges. Her science education dissertation in Curriculum and Instruction examined Ambitious Instruction in an undergraduate biology lab course. Grinath's research program explores the dichotomy between learning science in the classroom and doing scientific research. In the classroom, we often focus on what we already know in biology, whereas in research we focus on what we don't know in biology and how we are going to figure it out. That sense of "figuring out" is what makes science exciting for many people! If we infuse opportunities for "figuring out" into our classrooms, then learning science can involve a similar sense of excitement. Beyond fostering excitement, Grinath studies how engaging in "figuring out" (or participating in disciplinary practices) fosters durable understandings of both what we know in biology (conceptual understandings) and how we came to know it (epistemic understandings). Disciplinary practices include activities such as making observations, designing investigations, analyzing and interpreting data, constructing and critiquing arguments, and developing and revising explanatory models. Grinath's research specifically investigates how to foster scientifically-rich dialogue around disciplinary practices in the classroom and the learning that takes place within these interactions. To investigate these areas, her research program involves four focal areas: 1) designing biology learning experiences, (2) examining student learning, (3) examining instructor learning, and (4) designing instructor professional development.



Since coming to MTSU in August, Grinath has collaborated on two exciting new research projects. The first examines professional development (PD) for Biology teaching assistants (TAs). In collaboration with Math and Science Education (MSE) Ph.D. students Tina Carter, Angela Google, and Zhigang Jia, Grinath is describing the essential features of one specific PD program, examining case studies of how TAs engaged with the instructional supports embedded in the PD program, and then connecting the PD design and TA engagement to TA classroom instruction. Her second new project is in collaboration with Seth Jones (College of Education) and two MSE Ph.D. students, Josh Reid and Candice Quinn. This project examines how undergraduates make sense of data. Grinath and colleagues designed lessons to engage students in argumentation as they decided how to sample a population, measure variables in biologically meaningful ways, and make inferences from data. Grinath, Jones, and Kim Sadler were recently awarded Walker Library's Digital Seed Grant to continue this work using 3D printing technology to create models of coral reef sponges for the project "3D Biology: Making Claims in the Midst of Natural Variation." Look for findings in future *BioUpdates*!



# New Faculty

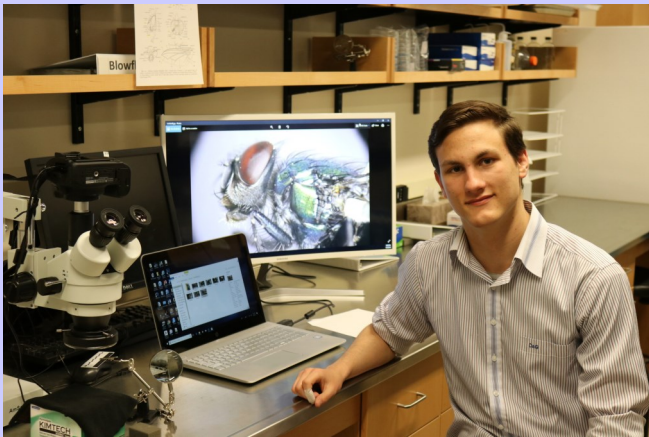
## Yangseung Jeong

A new outdoor decomposition facility for forensic experiments is being established on MTSU property off Manson Pike. This facility will provide students and faculty with various research and training opportunities to include search and recovery of remains and excavation of burials. This project won the 2018 Special Project Award.



Yangseung Jeong setting up fly traps at the Anthropological Research Facility at UT

Research to understand the relationship between the human decomposition rate and blowfly activity has begun in collaboration with the Forensic Anthropology Center of the University of Tennessee. Data collection at the Anthropological Research Facility (so-called "Body Farm") started in March 2018 and will continue until March 2019. Two undergraduate volunteers, Maryam Mohammed and Simon Pergande, joined the lab for the research. They will be conducting morphological and biomolecular identification of blowflies.



Simon Pergande working on the morphological identification of blowflies in the lab



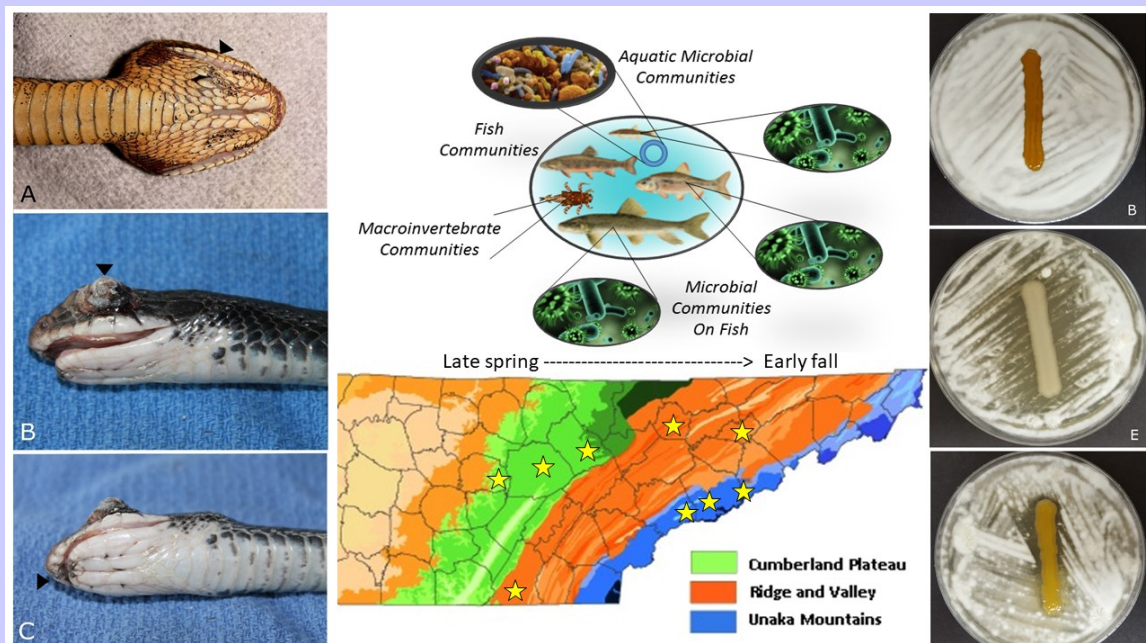
Maryam Mohammed working on the morphological identification of blowflies in the lab

# New Faculty

## Don Walker



Donald M. Walker is an assistant professor in the Department of Biology (toxicology and disease group) at MTSU. He received his Ph.D. from Rutgers University in 2012. Walker's research expertise lies in molecular evolution and ecology of microorganisms with an emphasis on pathogenic fungi. His lab group has concentrated on using metabarcoding and high-throughput sequencing to study host-microbiome-pathogen associations. Walker studies the synergistic to antagonistic interactions within these systems to understand disease outcome for wildlife species of conservation concern. The southeastern United States is a global hotspot for wildlife biodiversity and serves as a foundation for his field studies. Walker's lab group is interested in answering questions of theoretical importance about the hierarchical structuring and spatiotemporal patterns of the host microbiome. He plans to incorporate transcriptomics and shotgun metagenomics into his research program to gain a more thorough understanding of how ecological patterns can translate into functional processes in complex host-microbe-pathogen systems.





# There Goes Virginia!

Virginia McKnight was the secretary and face of the Department of Biology for over 25 years. Many of you will recall her beautiful smile and her kind acts. McKnight is now enjoying a well-deserved retirement. Of course, those of you who know her will know that retirement means that she is still working: tending her cows and horses, mowing grass, helping anybody who needs a hand. We are so thankful that she was part of our Biology family for so long. So much of this department is good because of her. There is no way to recount all of the wonderful things that McKnight did for our students, faculty, and staff. Below are some photos from the retirement party and a few quotes from people in the department who want to share their appreciation for her.

"Virginia was always a ray of sunshine in the Biology office, greeting us with her cheerful Southern drawl, "Hi there!" Long before we had the ease of looking things up quickly on the internet, if you needed to know something about business related to MTSU, you just asked Virginia because if she didn't know it, she would find out. If she couldn't find the answer, then one did not exist! Virginia was like a mother hen to us; since we were scattered in multiple buildings around campus, she kept us updated about each other, too."

"Virginia is so experienced and so smart; she anticipates my mistakes before I make them. She will be missed."

"She was the smiling face that greeted almost every current faculty member when we interviewed and were hired. She was the welcoming, kind face of the department that students saw first when they made their way to department offices whether on a campus visit or as a graduating senior. She set the tone of family and friendship that knitted everyone and everything together for faculty, students and co-workers. She cared for students, faculty, faculty's kids, their pets, and even George Murphy's pet squirrel. She remembered birthdays and never failed to ask about ailing family members. She also used her amazing knowledge and contacts throughout the University on a daily basis. She got students and faculty the help that they needed whether they were rude or nice; her patience with others' impatience is legendary. She even became a one-person office for a period of three months, literally doing the work of three-plus people. Her conscientiousness was and is unequalled. I don't know what the department would be without Virginia McKnight, and I am so glad that we don't have to know. Jimmy and Katie, thank you for sharing her with us for so many years. Virginia, take it a little easier and a little slower. We'll get by, and you definitely deserve some well-earned rest and fun."

"How could I have known that you'd ever say goodbye. I thought I would get one last country music reference in . . . for the good times. Time is precious, and Virginia made my time in Biology a lot nicer."



# Biology Lab Updates

## From the lab of Jeffrey Walck

Jeffrey Walck spent July 2017 as a visiting professor at Shanxi Normal University (Linfen, China) conducting research on the conservation of the endangered plant *Elaeagnus mollis*. While there, he also gave lectures to biology students and teachers. At the end of July, Walck traveled to the XIX International Botanical Congress (Shenzhen, China), where he presided over the Seeds and Climate Change symposium. In September, he was a keynote speaker at the 12th International Society for Seed Science Conference in California. By December, Walck was back in China where he and MTSU's Siti Nur Hidayati gave talks at Zhongkai University of Agriculture and Engineering in Guangzhou. Both had three publications this year—with the highlight being a new species of *Rafflesia* discovered by Hidayati and her co-authors in Indonesia. Walck's Ph.D. student, Thilina Fernando, graduated in August 2017, and Eric Limbird received his M.S. degree in December 2017.



## Ocean View

Following long-time professor Bob McGhee's retirement several years ago, Steve Howard has assumed responsibility for teaching our course in Invertebrate Zoology. During the spring semester of 2018, Howard was assisted by undergraduate Biology students Brooke Fitzwater and Jeremy Smith. Fitzwater helped organize the invertebrate collection and assisted with various aspects of the lab, while Smith spent most of his time setting up and maintaining our new 165-gallon saltwater tank. Among the tank's inhabitants are several species of soft and hard corals, sea urchins, brittle stars, hermit and porcelain crabs, shrimp, gastropods, polychaete worms, and a reclusive octopus named Larry. The tank is an excellent teaching resource, allowing students to view living examples of the organisms studied in class. We expect the tank to become even more beautiful as time passes, as the stunningly-colored corals are beginning to flourish. Feel free to stop by and have a look next time you visit campus!

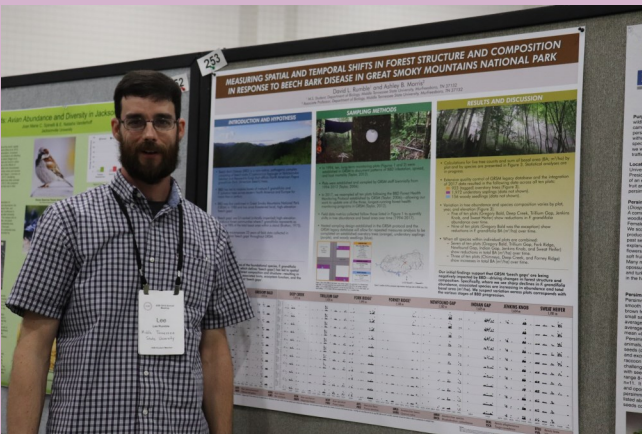




## From the lab of Ashley Morris

The Ashley Morris lab is focused on questions related to the ecology and evolution of plants. We have several active projects at this time.

**Jesse Harris** (M.S. student)—assessing plastome variation within American sweetgum for utility in phylogeographic inference. Harris is analyzing variation in the chloroplast genome (plastome) to determine how much information is needed to better understand the biogeographic history of a long-lived tree species like American sweetgum. He is planning to defend his master's thesis in Fall 2018. Harris was recently accepted to Ph.D. programs at the University of Florida, University of North Carolina, and the University of Colorado. He will be joining the Stacey Smith's at UC in Boulder later this year.



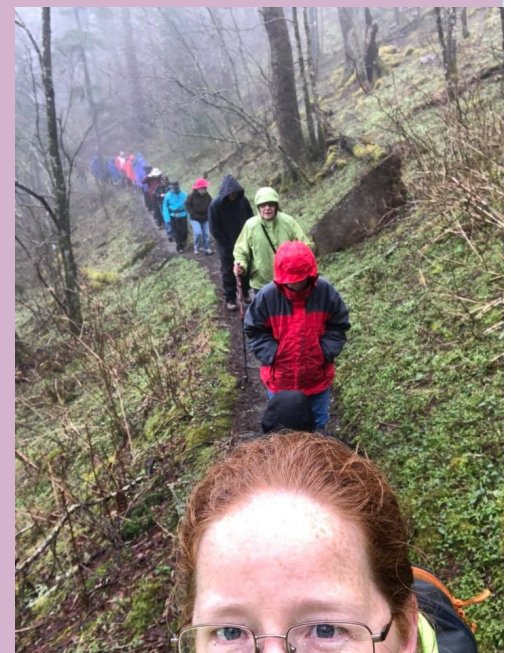
**Lee Rumble** (M.S. student)—documenting long-term changes in beech forest structure in Great Smoky Mountains National Park. He is building on a 20+-year dataset from GRSM to infer the impacts of beech bark disease on beech forests in the park. Rumble presented a poster on his research at the Association of South-eastern Biologists annual meeting in Myrtle Beach, South Carolina (March 28–31, 2018), where he was awarded the Botanical Society of America's Southeastern Section Student Poster Award and the Southern Appalachian Botanical Society's Student Poster Presentation Award. He is planning to defend his master's thesis in Fall 2018.

**Bleu Jackson** (M.S. student)—investigating clonal structure and reproductive ecology of a clonal dune herb. Jackson was recently accepted into the MTSU Ph.D. program in Molecular Biosciences, and she will officially transition to that program this fall. In collaboration with Jon Evans (University of the South—Sewanee), her research is focused on largeleaf pennywort, which is found in the dunes and swales of the Atlantic and Gulf Coasts of North America. Jackson is particularly interested in reproductive strategies of plants, and her work will include field, greenhouse, and genetic studies.

**Gary Noel** (M.S. student)—reconstructing genetic structure throughout the range of the federally endangered leafy prairie clover. Noel recently joined our lab and is just getting started with this work. He is continuing efforts of our lab group to document genetic structure within and among populations of this rare plant.

**Jonathan Cannon** (undergraduate Honors student)—combining genetic and demographic data to provide insight into the reproductive ecology of the federally endangered pyne's ground plum. We are working in collaboration with Matthew Albrecht (Missouri Botanical Garden) on this project. Our goal is to inform management decisions in this rare species.

In other news, Morris is currently serving as president of the Association of Southeastern Biologists, as well as being an associate editor for *Systematic Botany*, the journal of the American Society of Plant Taxonomists. She recently served as a hike leader at the 68th Annual Spring Wildflower Pilgrimage in Great Smoky Mountains National Park (April 24–28, 2018), where she co-led hikes to Indian Gap, Kanati Fork, and at the Chimneys Picnic Area, as well as co-led a citizen science experience involving digitization of museum collections.



## Kim Sadler

The year has gone quickly. Here are a few of the highlights from this past year.

### Former Students

**Rachel Lytle** (M.S., 2015) received the National Association of Biology Teachers Outstanding New Biology Teacher Achievement Award. Lytle has completed her fourth year teaching biology in Williamson County Schools.

**Patrick Phoebus** (Ph.D., 2017) developed a digital walking tour of the campus arboretum. Using the QR code found on the tree label directs you to information about that tree. There are three different walking "tours" to explore. His work, "Meeting the Giants in our Midst: Developing an Interactive Online Arboretum Guide to Promote Ecological Literacy," has been accepted for publication in the *American Biology Teacher*.



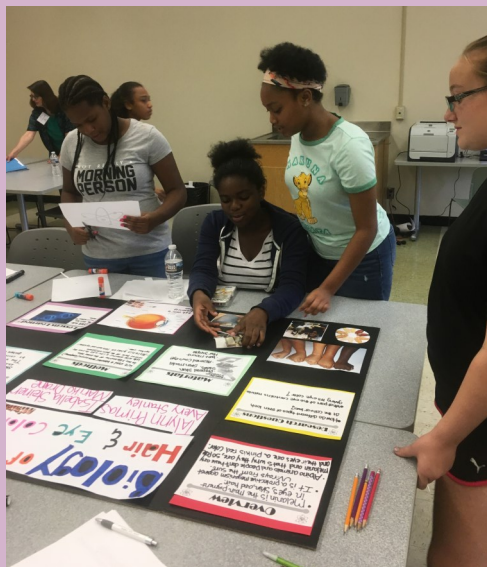
### Outreach Activities

**SUMS:** Danielle Brown and I developed a daylong workshop in June 2017 for middle school girls attending SUMS (STEM for Under-represented Middle School Girls) summer camp. The girls explored the biology of hair, eye, and skin color through multiple activities that included UV sensitive beads, microscopic examination of skin, a video/discussion about melanin development, dissection of an eye, and a genetics activity that investigated a simplified model of multiple alleles that code for what is represented as a single trait. Whew! We did a lot in one day but the girls had a great time. The week concluded with student teams creating a poster about things they learned at camp; this was showcased to their family and friends.



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**EXL:** The BIOL 1030 EXL (Experiential Learning) classes have continued to make an impact through several projects this past year. My Honors class in the fall worked half a day at Oaklands wetlands removing invasive species and retrieving trash from the stream via kayak. My large class section in the spring worked more than 115 hours at Stones River Battlefield, removing primarily Chinese privet and bush honeysuckle in the area adjacent to the Visitors Center. The weather did not cooperate for one group of students so we ended up at Walker Library in the computer lab digitizing herbarium labels. Through the *Notes From Nature* website, students transcribed more than 2,400 herbarium labels! This team completed one expedition on Tennessee Invasive Plants, worked on John Small's Florida collection, and began a second Tennessee Invasive Plants expedition. Surprisingly, in all work events, students reported a high level of satisfaction with their volunteer effort.





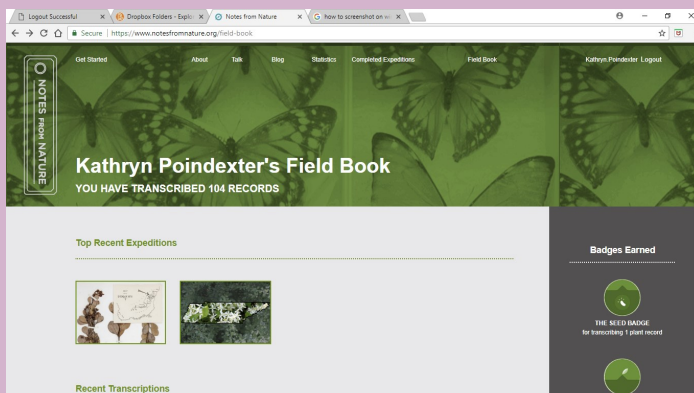
## Kim Sadler (continued)

**MONARCH GARDEN:** A very small MTSU public service grant written by myself and Cindi Smith-Walters provided the "seed money" to establish the butterfly garden. Zach Hull (B.S., 2015), Larry Sizemore (retired MTSU greenhouse manager), and I designed and planted the garden. Jason Young (assistant director of Campus Planning) and the MTSU grounds department were instrumental in clearing the sod, tilling, and bringing in topsoil to establish the garden. My BIOL 3000 classes have planted, weeded, and mulched the garden the past two years. Several species have begun to naturalize, but others were lost because of the wet-cold-warm-cold 2017–18 winter. Plans are under way to include a cedar glade plant conservation garden adjacent to the butterfly garden. The Monarch Way Station is located in the corner of the courtyard at the Science Building. Please come enjoy the garden!



Female monarch in butterfly garden

**OTHER:** I currently serve as president of the Tennessee Association of Biology Teachers. We are in our second year as an organization dedicated to supporting teachers of life science in Tennessee. Please contact me if you would like more information about how to join or become involved. Our third annual meeting (2019) will be held in April at Baylor High School in Chattanooga. Please check [tnabt.org](http://tnabt.org) for more information.



Sample of digital herbarium record

## Mary and Anthony Farone Family news

**Family:** Grace graduated from MTSU, is completing an internship in Dietetics at Vanderbilt University, and is engaged to be married in August. Cate completed her first year at MTSU in Political Science as a Buchanan Scholar. Danny will be entering the 11th grade at Father Ryan and is completing his Eagle Scout project this summer. Nicky will be going into 7th grade at St. Rose and is taking accordion lessons.

### Ph.D. students:

**Erin Hyo Park**, Molecular Biosciences (MOBI) Ph.D: Lead Flow Cytometry Analyst, PathGroup Inc., Nashville

**Eric Vick**, NSF GK-12 Fellow, MOBI Ph.D: M.D., UT Health Science Center, M.D.; Residency at Cincinnati VA Hospital

**Caleb Sutton**, MOBI Ph.D.: Vanderbilt Postdoctoral Fellow

**Yohannes Mehari**, MOBI Ph.D.: Auburn Postdoctoral Fellow



### M.S. students:

**Jamie Ellis**, M.S.: Senior Scientist, Genhunter Corp., Nashville

**Chad Brooks**, M.S.: Ph.D., Oklahoma U.; Assoc. Provost for Research/Dean of College of Graduate Studies, Austin Peay

**Jeff Fisher**, M.S.: Senior Project Manager, Pharmacyclics, an AbbVie Company, Atlanta

**Jeffrey Lindquist**, M.S.: Physician's Assistant, Nashville

**Witold Skolasinski**, M.S.: Ph.D., University of Warsaw

**Spence Dowlen**, M.S.: Instructor of Biology, Columbia State Community College

**Nila Gillani**, M.S.: Research Assistant, Vanderbilt University

**Heather Hensley**, M.S.: Quality Control Analyst III, Wright Medical Inc.

**Colleen Roden**, M.S.: Senior Project Manager, Orthospace Ltd., Nashville

**Joshua Youseff**, M.S.: Laboratory Supervisor, Aegis Analytical Laboratories

### Undergrads:

**Sean O'Donnell**: Ph.D., Miami (Ohio) University; Senior Scientist, Eli Lilly, Indianapolis

**Nick Chim**: Ph.D., Vanderbilt; Postdoctoral, UCLA; Research Faculty, UC-Irvine

**Mindy Miller**: Ph.D., Microbiology, University of Tennessee; Postdoctoral, University of North Carolina

**Bart Bryant**: Ph.D., Kansas State University; Research Faculty, KSU

**Mark Dezalia**: Ph.D., Emory University; Health Information Systems Team Lead, Office of the U.S. Global AIDS Coordinator and Health Diplomacy, Department of State, Washington, D.C.

**Kim Myers**: Ph.D., Harvard Medical School; Senior Manager, Deloitte Consulting, Washington, D.C.

**Christina Scheel**: Ph.D., Emory University; Research Scientist, Centers for Disease Control

**Nathan Bryant**: Ph.D., University of Florida; Scientific Literature Analyst, Alkermes Pharmaceuticals; Inc., Boston

**Jennifer Watson**: Nurse Practitioner, Alvin C. York VA Hospital

**Jacob Acton**: M.D., Anesthesiology, UT Health Science Center; Assistant Professor, UNC Healthcare

**Todd Edwards**: Ph.D., Vanderbilt University; Associate Professor, Vanderbilt University

**Joe Christison**: Ph.D., U. of Oregon; Intellectual Property and Licensing Manager, Oregon State University



## Farone Family news (continued)

### Undergrads (continued):

**Anton Mitsky:** Ph.D., Microbiology, University of Tennessee

**Amanda Wagner:** M.D., American U. of the Caribbean; OB/GYN, Paducah, Kentucky

**Jarret Foust:** UT Health Science Center Dental School; Dentist, Pittsburgh

**Alisha Lawrence Harbin:** D.V.M., University of Tennessee

**Allison Cummings:** Ph.D., University of Alabama–Birmingham; Centers for Disease Control

### NSF GK–12 Fellows:

**Alison Carey Webb:** Ph.D., Utah State University

**Patrick Cusaac:** Ph.D., Postdoctoral Fellow, Oklahoma State University

**Tiffany Saul:** M.S., MTSU; Ph.D., UTK; Asst. Prof., MTSU Forensics Institute for Research and Ed.

**Chasity Suttle Bagsby:** M.S., MTSU; Chemistry Teacher, Hume-Fogg Academic Magnet HS, Nashville

**Nick Chamberlain:** MOBI Ph.D., MTSU; Postdoctoral Fellow, NIH, Rocky Mountain Laboratory

**Ashley Elliot Cole:** MOBI Ph.D., MTSU; STEM Coordinator, Fort Payne, Alabama

**Katherine Sampuda:** MOBI Ph.D., MTSU; Postdoctoral, University of North Carolina

**Eric Vick:** MOBI Ph.D., MTSU; M.D., UT Health Science Center; Residency at Cincinnati VA

**Christopher Davis:** MOBI Ph.D, MTSU

**Patrick Havlik:** M.S., MTSU; Ph.D. Program, University of North Carolina

**Andrew Trivette:** M.S., MTSU; Ph.D. Program, North Carolina State

**Jacob Sanders:** M.S., MTSU; Ph.D Program, University of Tennessee

**Rachel Lytle:** MS, MTSU; Biology Teacher, Brentwood High School

**Lacy Danikas Chick:** M.S., MTSU; Ph.D., Univ. of Tennessee; Postdoctoral, Case Western Reserve

**Abby Drumwright Newby:** M.S., MTSU; Chemistry/Biology Teacher, JPII HS, Hendersonville

**Sergiy Ustynov:** M.S., MTSU; Senior Scientist, Aegis, Nashville

**Jerrod Shipman:** M.S., MTSU; Biology Instructor, Vol State Community College, Gallatin, Tennessee



GK–12 Fellows at the Marine Research Station in Chile



GK–12 Team at a Biotech Firm in Chile

## From Mohamed (Moh) Salem's Lab

Our lab group studies the physiological processes associated with different traits in rainbow trout, a non-model species. These traits include muscle growth, fillet quality, and disease resistance, all important for commercial aquaculture. For our research, we specialize in next-generation high-throughput sequencing technology and the latest genomics tools. So far, our lab has produced many publications, including a recent paper on an SNP chip which we developed with a grant from the U.S. Department of Agriculture.

The Mohamed (Moh) Salem lab encourages students to use the high-throughput genomics and bioinformatics approaches, as well as wet lab validation for their research output. This ultimately helps students develop skills in many reliable genomics/bioinformatics methods. The problems we tackle are multidisciplinary and require applying the most recent biological findings, the next-generation lab techniques, and the latest computational and statistical tools.

The methods used by our lab are diverse, and so are our students. Salem has served as a research advisor both for undergraduate Biology students and for graduate students in the Biology M.S., Molecular Biology (MOBI) Ph.D., and Computational Science (COMS) Ph.D. programs. Since our members have different skills and specialties, we can assist each other and tackle complex projects together.

We currently have four students in our lab:

**Ali Ali** is currently working with antisense lncRNA. He plans to graduate in 2019 from the MOBI program.

**Pratima Chapagain** is a MOBI second-year student who leads a study on the rainbow trout microbiome. Her team expects to find differences between the microbiota in fast- and slow-growing rainbow trout.

**Ashlin Harris**, a second-year COMS student, studies allele-specific expression, searching for parental epigenetic effects on growth traits in rainbow trout.

**Waala Shalaan**, a visiting scholar, is working on long non-coding RNAs in tilapia, another important aquacultural species.



We still work closely with two recent graduates from our lab:

**Bam D Paneru** (MOBI Ph.D. student) successfully defended his thesis in 2017 and has worked as a post-doctoral at the University of Pennsylvania.

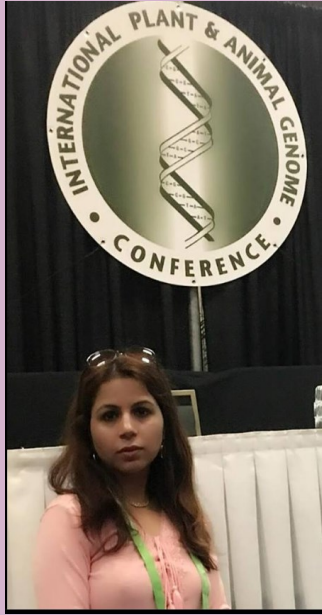
**Rafet Al-Tobasei** (COMS Ph.D. Student) successfully defended his thesis in 2017 and recently worked as a post-doctoral at the University of Alabama–Birmingham.



To share our innovative research ideas with other research groups (and to learn some new ones!), we attend the annual International Plant and Animal Genome Conference, which most recently convened in San Diego in January of this year. It is the largest agricultural genomics meeting in the world, where we can meet over 3,000 leading scientists and researchers from various institutions, including funding agencies and universities all over the world. Attendees give presentations related to different genomics approaches for improving plant and animal traits. In particular, aquaculture companies organize a grand reception where the experts from aquaculture industries can cooperate and share their thoughts.



## From Salem's Lab (continued)



**Pratima**



**Ali Ali**

Last year, **Ali Ali** and **Bam Paneru** gave talks about genome-wide identification and differential expression of antisense long non-coding RNAs and microRNAs.

This year, **Pratima Chapagain** spoke about small RNA-mediated interaction between rainbow trout and the pathogen *Flavobacterium Psychrophilum*, and **Rafet Al-Tobasei** spoke about GWAS analysis of SNPs associated with different phe-notypic traits.



**Ali, Chapagain, Salem, and Al-Tobasei**



**Shalaan**

## Studying in the Neotropics

Recently Vince Cobb and Sarah Bergemann in the Biology Department have offered a study abroad course for Biology majors. The course is BIOL 4330 (Tropical Biology in Costa Rica) and focuses on the ecology, conservation, and natural history of organisms in tropical Costa Rica. During the May term of both 2016 and 2017, 10 students received pre-trip lectures on background information of tropical ecology followed by 11 days in country.



***Collared aracari at La Selva***

The first half of the class was spent at the internationally-recognized La Selva Biological Station. La Selva is 1,536 hectares of a lowland tropical rainforest receiving about 4 meters of rain per year (compared to the 1.5 meters of rain in Tennessee per year). Students get a real taste of life in the tropics for it is hot and humid, and there is no air conditioning. The most obvious thing students notice is the incredible diversity of life. Plant diversity is overwhelming at 5,000+ species (700 of them trees), but so are the species of birds (467), ants (450), and moths (5000). With 61 km of trails available, students and faculty have ample opportunity to observe organisms and discuss their ecological roles,

during day and night hikes. There is no need for students to bring an alarm clock because howler monkeys are so loud at daybreak that everyone is awake.

After La Selva, we head to the Pacific Coast. Students leave the mainland at



***Green iguana at La Selva***

Playa Herradura on a morning hour-long water taxi ride to the Nicoya Peninsula. At the small Bohemian-like beach town of Montezuma, students get a taste of beach life and the dry tropical forest.



***Baby mantled howler monkey in Montezuma***



***American crocodiles at Tarcoles River***



***Making observations at La Selva Biological Station***

There are local hikes to experience the first national park of Costa Rica (Cabo Blanco) and a refuge for sea turtles. Students also get to explore marine life in tidal pools and by scuba diving and snorkeling at the nearby Tortuga Islands. Many of our students experience scuba (and another country!) for the first time and see such animals as octopi, white-tipped reef sharks, scorpion fishes, brittle stars, and purple tunicates.



## Studying in the Neotropics (continued)

For the summer of 2019, we anticipate a few changes to the course. Students will now spend 16 days in country and conduct a research project at the University of Georgia in a montane cloud forest near Monteverde. Here students will conduct a week-long field experiment on leaf-cutter ants that cultivate a fungus garden. We still will spend several days at La Selva Biological Station so students can experience both high- and low-elevation tropical forests and explore topics such as diversity, conservation, and natural history. We hope that students will find some relief from the heat at this high elevation.



*Green basilisk at Arenal Observatory Lodge*



*White-faced capuchin at Curu Wildlife Refuge*



*At Montezuma Beach in 2016*



*On a trail at La Selva Biological Station in 2017*

# 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 the MTSU Biology graphic. Come 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:	\$12	Insulated lunch bag	\$8.
	Long-sleeve:	\$16	Drawstring backpack	\$5
Polo shirts	Short-sleeve:	\$25	Key lanyards	\$2
	Long-sleeve:	\$28.	Coffee mugs	\$3
	Pull-over hoodie:	\$28	Stadium cups	\$1
	(printed like T-shirts)			

All items can be purchased (cash only) in the department office SCI 2044 or by email from Becky Elrod ([Rebecca.Elrod@mtsu.edu](mailto:Rebecca.Elrod@mtsu.edu)).

Purchases are not tax-deductible.





# 2017–18 Graduate Teaching Assistants

For the 2017–18 academic year, the department provided support to 28 M.S.-level and 20 Ph.D.-level graduate students who serve as graduate teaching assistants (GTAs). Twenty-two of these students have received undergraduate degrees from colleges and universities other than MTSU. Twelve hold baccalaureate degrees in subjects other than biology (biochemistry, biotechnology, botany, chemistry, environmental science, microbiology, plant and soil science, psychology). Six of these assistants have received bachelor's or master's degrees from universities outside the U.S. 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.

## MASTER'S GRADUATE TEACHING ASSISTANTS

**Jennifer Bennetti-Longhini**, B.S., Biology, 2013, Middle Tennessee State University

**Chelsea Campbell**, B.S., Biology, 2017, Middle Tennessee State University

**Dibyendu Dutta**, B.S., Botany, 1999, U. of Calcutta; M.S., Botany, 2001, University of North Bengal; Ph.D., 2011, Texas Woman's University

**Donald Evans**, B.S., Biochemistry, 2016, Austin Peay State University

**Josh Evers**, B.S., Biology, 2015, University of Tennessee–Chattanooga

**Emily Gain**, B.S., Biology, 2012 University of Tennessee–Chattanooga

**Lauren Hanberry**, B.S., Biology, 2015, Middle Tennessee State University

**Jesse Harris**, B.S., Biology, 2016, University of Tennessee–Chattanooga

**Brady Inman**, B.S., Biology, 2016, Middle Tennessee State University

**Elizabeth Bleu Jackson**, B.S., Biology, 2017, Tennessee Technological University

**Steven Joseph**, B.S., Biology, 2017, Middle Tennessee State University

**Bryce Kerr**, B.S., Biology, 2015, Appalachian State University

**Shelby Lowrie**, B.S., Biology, 2017, Middle Tennessee State University

**K. Louise McCallie**, B.S., Biology, 2015, Lehigh University

**Mitch Merryman**, B.S., Biology, 2015, Middle Tennessee State University

**Mikiyas Nega**, B.S., Biochemistry, 2017, Middle Tennessee State University

**Gary Noel**, B.S., Biology, 2017, Belmont University

**Connor Olson**, B.S., Biology, 2015, Middle Tennessee State University

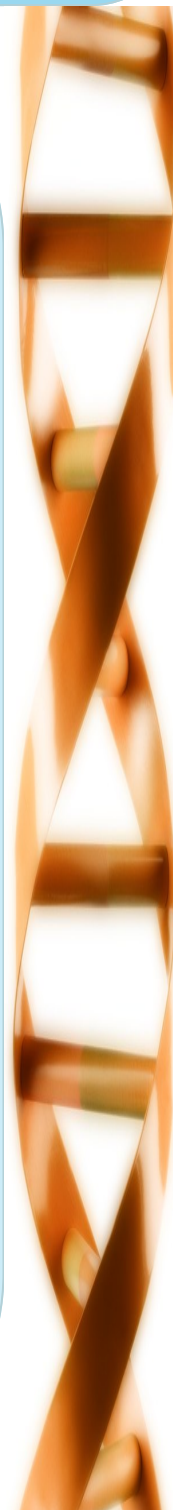
**Anna Parnell**, B.S., Biology, 2017, Middle Tennessee State University

**Yasmin Recinos**, B.S., Biology, 2017, Middle Tennessee State University

**Forest Rice**, B.S., Biology, 2016, Middle Tennessee State University

**Wesley Riley**, B.S., Biology/Chemistry, 2017, Middle Tennessee State University

**D. Lee Rumble**, B.S., Plant and Soil Science, 2016, Middle Tennessee State University



# 2017–18 Graduate Teaching Assistants

## MASTER'S GRADUATE TEACHING ASSISTANTS (cont.)

**Kelly Ann Saine**, B.S., Biochemistry/Psychology, 2017, Middle Tennessee State University

**Linda Sircy**, B.S., Biology, 2013, University of Tennessee–Chattanooga

**Mary Catherine Skolfield**, B.S., Biochemistry, 2016, Faulkner University

**Alexander Tate**, B.S., Biology, 2017, Middle Tennessee State University

**Jamila Tucker**, B.S., Biology, 2016 University of Tennessee, Chattanooga

## Ph.D. GRADUATE TEACHING ASSISTANTS

**Ali Ali**, B.S., 2003, and M.S., 2010, Benha University

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

**Gale Beaubien**, B.S., Biology, 2014, Middle Tennessee State University

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

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

**Penny Carroll**, B.S., Biology, 2013, Middle Tennessee State University

**Tina Carter**, B.S., Biology, and M.S., Biology, Middle Tennessee State University

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

**Jacob Crigler**, B.S., Biology, 2008, University of Tennessee

**Matthew Fuller**, B.S., Biology, 2015, Middle Tennessee State University

**Rajarshi Ghosh**, B.S.T., Biotechnology, 2011, West Bengal Univ.; M.S., Biology, 2014, Univ. of West Florida

**Angela Google**, B.S., Biology, 2007, and M.E.D., Environmental Science, 2010, UT–Chattanooga

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

**Tiffany Guess**, B.S., Biology, 2004, Middle Tennessee State University

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

**Yhigang Jia**, B.S., Biological Sciences, 2010, Jilin Univ.; M.S., Biological Ed., 2015, Northeast Normal Univ.

**Destaaem Kidane**, B.S., Biology, 2009, and M.S., Biology, 2012, Georgia College and State University

**Paola Molina**, M.S., Biology, 2012, Middle Tennessee State University

**Velta Napoleon-Fanis**, B.S., Biology, 2005, Andrews University; M.S., Biology, 2013, University of Nebraska

**Melissa Pompilius**, B.S., Chemistry, 1998, Northern Arizona University; M.S., Biochemistry, 2001, UNLV

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

**Aarthi Subramani**, B.T., Biotechnology, 2016, Anna University, India





# Theses and Dissertations Completed 2017–18

## Masters Theses

### Spring 2017

Identification of Tumor Necrosis Factor- $\alpha$  Inhibitors from Traditionally Used Medicinal Plants

**Meagan Elizabeth Garrison**; major advisor, Anthony Farone

Population Genetics of the Rare Cedar Glade Endemic *Astragalus Bibullatus* (Fabaceae) Using Nuclear Microsatellites

**Kevin Trostel**; major advisor, Ashley Morris

### Summer 2017

Developing a Model of AFP Transcriptional Regulation by Afr2, a Gene Implicated in Liver Cancer

**Zachary Grimes**; major advisor, Rebecca Seipelt-Thiemann

Lab and Field Study of Glycogen, Percent Tissue, and Tissue Density of *Quadrula metanevra*

**Amber Hills**; major advisor, Ryan Otter

Designing and Demonstrating the Use of a Bioluminescent Genetic Tool Set in *Scheffersomyces stipitis*

**Walter David Reichard**; major advisor, J. Brian Robertson

### Fall 2017

Sex Estimation Utilizing Dimensions from the Occipital Bone, Atlas, and Axis

**Erin Nicole Floyd**; major advisor, Brian Miller

Freeze-Thaw Effects on the Biology of Seeds and Seedlings from Exotic and Native Plants

**Eric James Limbird**; major advisor, Jeffrey Walck

Comparative Bioluminescence Dynamics of Single Spore Isolates of the Naturally Bioluminescent Fungus *Armillaria Mellea* (Agaricales, Physalacriaceae)

**Virginia Poole**; major advisor, Sarah Bergemann

### Spring 2018

Assessing the Relationship between Flowering Time and Fitness in *Leavenworthia Stylosa*

**Caitlin Banaszak**; major advisor, Christopher Herlihy

Analysis of Clinical and Passaged Strains of *Cryptococcus* Reveals Alternative Splicing in Virulence Genes

**Mitch Merryman**; major advisor, Rebecca Seipelt-Thiemann

# Theses and Dissertations Completed 2017–18

## Spring 2018 (continued)

A Comparative Study of Stress Physiology in the Common Watersnake (*Nerodia sipedon*), the Diamondback Watersnake (*Nerodia Rhombifer*), and the Queen Snake (*Regina septemvittata*)

**Katherine Louise McCallie**; major advisor, Matthew Klukowski

Elemental Composition of Enamel in the Teeth of Adult Marbled Salamanders, *Ambystoma opacum*, from Middle Tennessee

**Hunter Morrow**; major advisor, Brian Miller

Susceptibility of Appalachian Mountain Streams to Non-Point Source Contamination

**Connor Olson**; major advisor, Ryan Otter

Investigating the Impact of Intracellular *Cryptococcus neoformans* Infection on Macrophage Polarization and Gene Expression Using Transcriptome Profiling and Biochemical Analysis

**Linda Sircy**; major advisor, David E. Nelson

Characterizing the Roles of RtaI and ProI in *Cryptococcus neoformans*

**Emily Smith**; major advisor, Erin McClelland

## Doctoral Dissertations

### Spring 2017

Genome Annotation and Role of Non-Coding RNAs in Disease Resistance, Growth, and Muscle Quality Traits in Rainbow Trout

**Bam Dev Paneru**; major advisor, Mohamed Salem

The Effects of the Cis- and Trans-Gnetin H Isolated from *Paeonia suffruticosa* and a Synthetic Aurone, (Z)-2-((5-(Hydroxylmethyl) Furan-2-yl) Methylene) Benzofuran-3(2H)-ONE On NF- $\kappa$ B and Mark Pathways in LPS-Stimulated Macrophages

**Hyo Sim Park**; major advisor, Anthony Farone

Stress Induced Nuclear Granules form within the Nucleus in Response to Environmental Stress in *C. elegans*

**Katherine Marie Sampuda**; major advisor, Lynn Boyd

Natural Product Isolation and Synthetic Library Approaches to the Discovery of Novel Compounds to Treat Chagas Disease and African Sleeping Sickness

**Jeannie Moore Stubblefield**; major advisor, Anthony Newsome

A Modern Approach to Traditional Medicine: Screening and Biofilm Formation and Mechanism of Action in *Candida albicans*

**Caleb Sutton**; major advisor, Mary Farone



# Theses and Dissertations Completed 2017–18

## Doctoral Dissertations (cont.)

### Summer 2017

Using a Collection of Nonfunctional Missense Mutants in the  $\beta$ -galactosidase and Catechol 2,3-Dioxygenase Enzymes to Better Understand the Complexity of Protein Folding

**Ashley Elliott Cole**; major advisor, Elliot Altman

Evolutionary Maintenance of Geographic Variation for Flower Color in *Leavenworthia stylosa*

**Mahaguruge Thilina R. Fernando**; major advisor, Jeffrey Walck

### Fall 2017

The Multifunctional Cell Membrane: A Mechanistic Study of Acid Sphingomyelinase Regulation and the Host Cell Infection Process of an Intranuclear Bacterium

**Nicholas Chamberlain**; major advisor, Rebecca Seipelt-Thiemann

### Spring 2018

A Study of Anticancer Agents Derived from Plants Utilized in Traditional Chinese Medicine (TCM)

**Nadin Almosnid**; major advisor, Elliot Altman

Improving Biological Detoxification of Furfural and Acetate in Lignocellulosic Hydrolysates using Metabolic Engineering

**Jacob Crigler**; major advisor, Elliot Altman

Development and Characterization of a Salt-Tolerant Luciferase to Investigate Genetic Regulation in *Haloferax volcanii*

**Chris Davis**; major advisor, J. Brian Robertson

## BioUpdate

Lynn Boyd, Department Chair ([Lynn.Boyd@mtsu.edu](mailto:Lynn.Boyd@mtsu.edu))

Produced by MTSU

Department of Biology

0518-6002 / 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 against any other legally protected class with respect to all employment, programs, and activities. The following person has been designated to handle inquiries related to nondiscrimination policies for MTSU: Assistant to the President for Institutional Equity and Compliance. For additional information about these policies and the procedures for resolution, please contact Marian V. Wilson, assistant to the president and Title IX Coordinator, Institutional Equity and Compliance, Middle Tennessee State University, Cope Administration Building 116, 1301 East Main Street, Murfreesboro, TN 37132; [Marian.Wilson@mtsu.edu](mailto:Marian.Wilson@mtsu.edu); or call (615) 898-2185. MTSU's policy on nondiscrimination can be found at <http://www.mtsu.edu/titleix/>.

# Scholars Week Highlights Faculty and Student Research

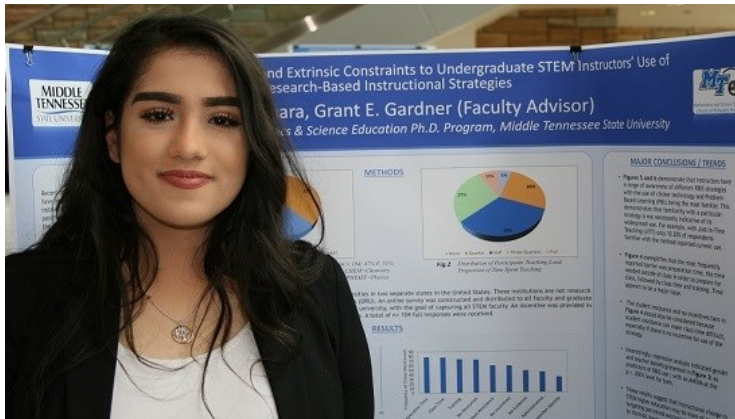
Middle Tennessee State University held its annual Scholars Week March 19-23, 2018. The department presented 41 posters. Authors of these posters included 17 faculty members, 19 graduate students, and 31 undergraduate students. Awards were given to the top three posters presented by graduate students and undergraduate students from each college. Five posters from the Department of Biology took home awards. In the undergraduate division, the poster by Gina Bishara tied for second place, and the poster by Xoe Thacker, Kayla Thomas and Shannon Smith tied for third place. The poster by Connor Olson, Gale Beaubien, Jaylen Sims and Andrew Todd tied for second place with the poster from Gale Beaubien and Connor Olson in the graduate student division. The poster by Mary Catherine Skolfield, Wesley Riley, and J. Logan Bowling tied for third place in the graduate student division. Biology posters accounted for five of the 10 awards given to the College of Basic and Applied Sciences.

Faculty members involved in mentoring these students deserve credit for their time, effort, and expertise in these research projects. Many people from across campus saw the quality of research being conducted in the department. Congratulations to all authors for a job well done!

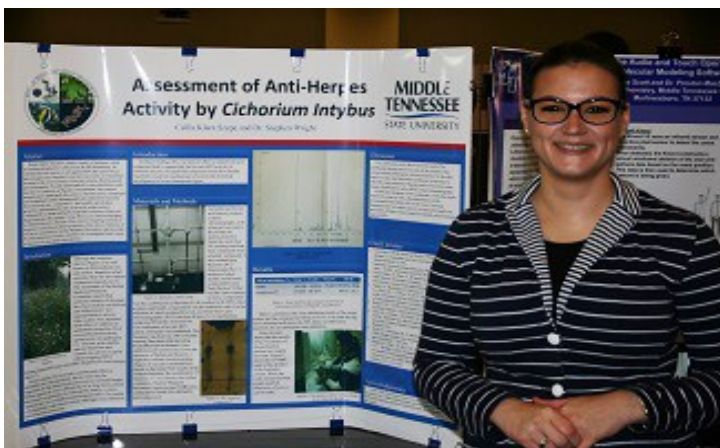
To see the entire Scholars Week program and abstracts from all posters and presentations, visit [mtsu.edu/research/scholarsWeek](http://mtsu.edu/research/scholarsWeek). Posters from the Department of Biology are shown below.



**Gina Bishara**, undergraduate student, Biology, with **Grant Gardner**, faculty sponsor, Biology, presented *The Relationship of Intrinsic and Extrinsic Constraints to Undergraduate STEM Instructors' Use of Research-Based Instructional Strategies*.



**Csilla Klara Szepe**, undergraduate student, Biology, with **Stephen Wright**, faculty sponsor, Biology, presented *Assessment of Anti-Herpes Activity by Cichorium Intybus*.

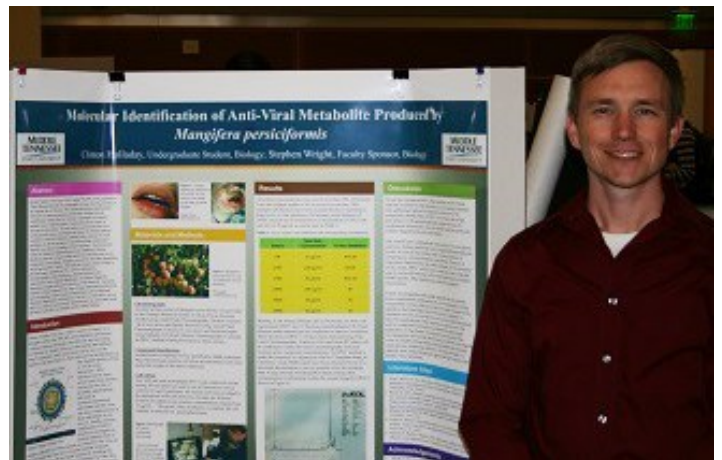


**Brooke Fitzwater**, undergraduate student, Biology, with **Dennis Mullen**, faculty sponsor, Biology, presented *Visual Catalog of the Fishes of the Stones River in Middle Tennessee*.



**Brooke Fitzwater**, undergraduate student, Biology, with **Dennis Mullen**, faculty sponsor, Biology, presented *Effects of Predation Risk on Habitat Selection by Two Cryptobenthic Blennies (*Helcogrammoides* spp.) in a Central Chilean Coastal Ecosystem*.

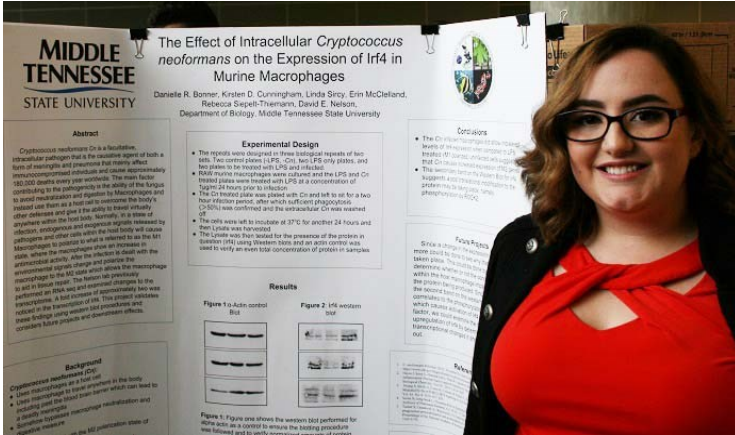
**Clinton Holladay**, undergraduate student, Biology, with **Stephen Wright**, faculty sponsor, Biology, presented *Molecular Identification of Anti-Viral Metabolite Produced by *Mangifera persiciformis**.



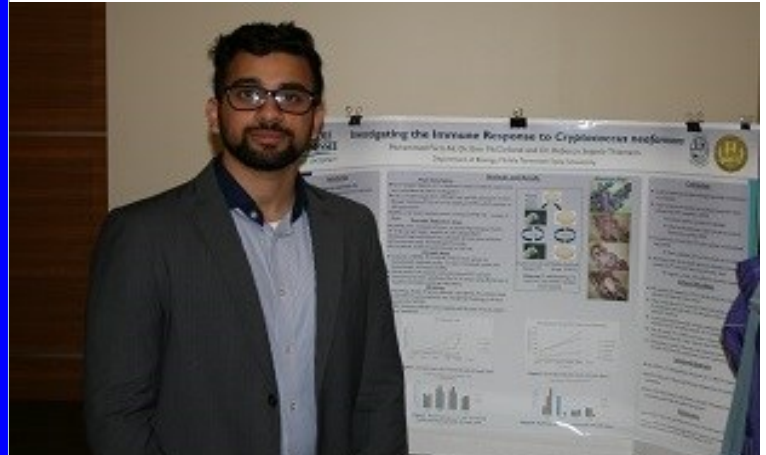


# Scholars Week Highlights Faculty and Student Research

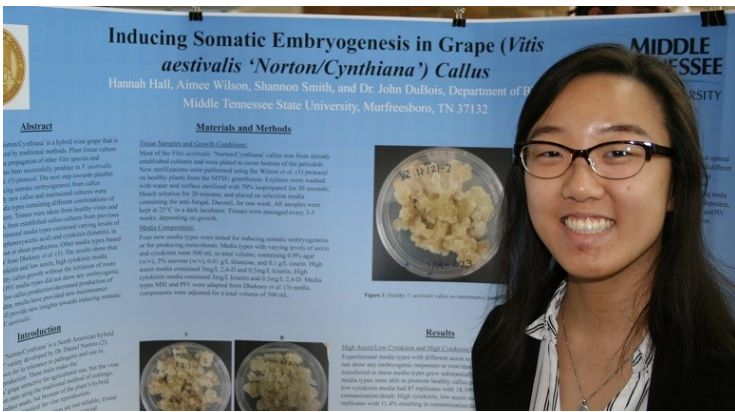
**Danielle R. Bonner**, undergraduate student, Biology; **Kirsten D. Cunningham**, undergraduate student, Biology; **Linda Sircy**, graduate student, Biology; **Erin McClelland**, Faculty, Biology; and **Rebecca Seipelt-Thiemann**, Faculty, Biology, with **David Nelson**, faculty sponsor, Biology, presented *The Effect of Intracellular Cryptococcus neoformans on the Expression of Irf4 in Murine Macrophages*.



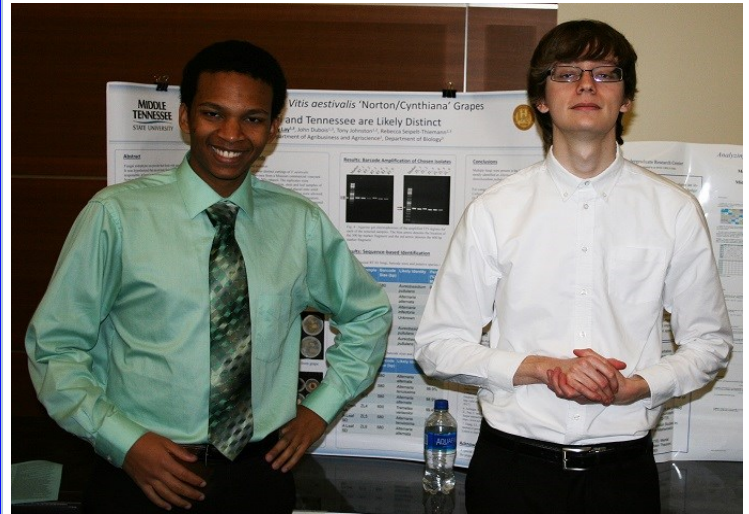
**Muhammad Fariz Ali**, Undergraduate student, Biology, with **Rebecca Seipelt-Thiemann**, faculty sponsor, Biology, presented *Investigating the Immune Response to Cryptococcus neoformans*.



**Hannah Hall**, undergraduate student, Biology; **Aimee Wilson**, undergraduate student, Biology; and **Shannon Smith**, graduate student, Biology, with **John Dubois**, faculty sponsor, Biology, presented *Inducing Somatic Embryogenesis in Grape (Vitis aestivalis 'Norton/Cynthiana') Callus*.



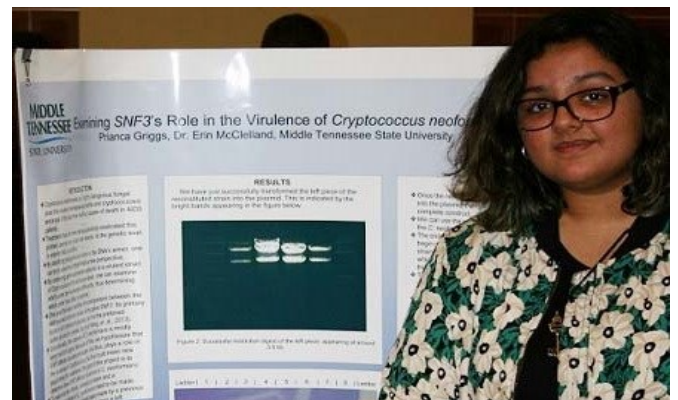
**Ross Thomas**, undergraduate student, Biology, and **Zachary Lay**, undergraduate student, Biology, with **Rebecca Seipelt-Thiemann**, faculty sponsor, Biology, presented *Fungal Endophytes in Vitis aestivalis 'Norton/Cynthiana' Grapes of Missouri and Tennessee Are Likely Distinct*.



**Ashley Gambrell**, undergraduate student, Biology, with **Stephen Wright**, faculty sponsor, Biology, presented *Efficacy of HPLIA Cell Culture as a Host for Influenza A Viruses*.



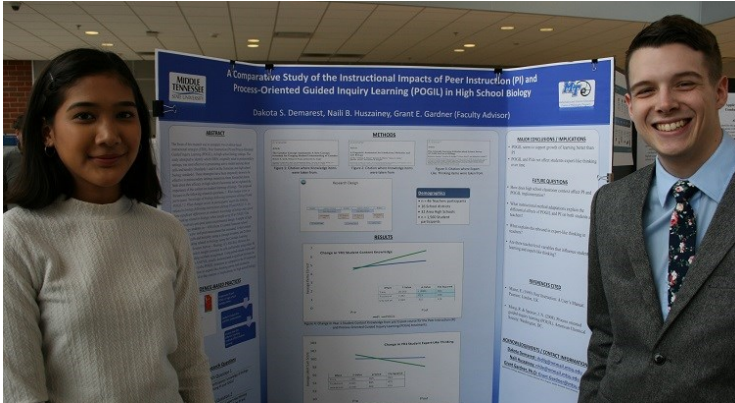
**Prianca Griggs**, undergraduate student, Biology, with **Erin McClelland**, faculty sponsor, Biology, presented *Examining SNF3's Role in the Virulence of Cryptococcus neoformans*.



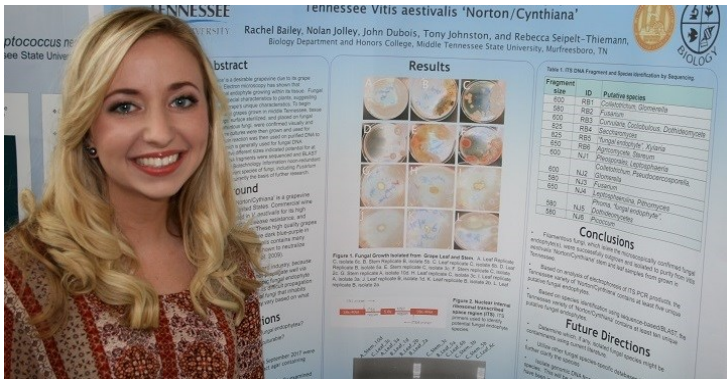


# Scholars Week Highlights Faculty and Student Research

**Dakota Demarest**, undergraduate student, Biology, and **Naili Huszainey**, undergraduate student, Biology, with **Grant Gardner**, faculty sponsor, Biology, presented *A Comparative Study of the Impacts of Two Active Learning Methods in High School Biology*.



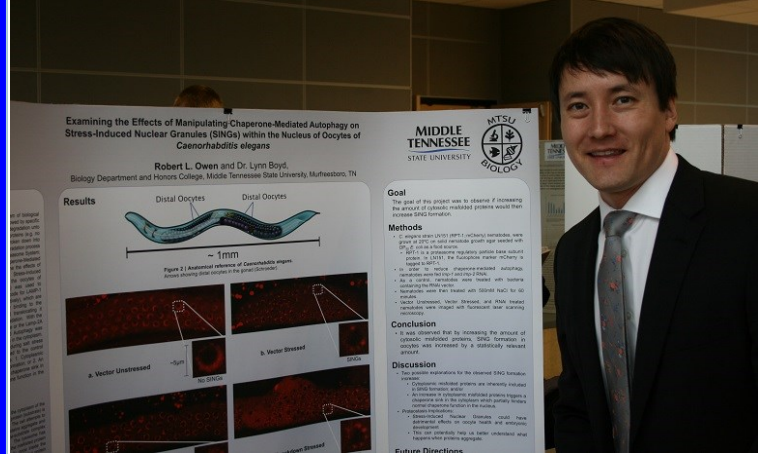
**Rachel Bailey**, undergraduate student, Biology; **Nolan Jolley**, undergraduate student, Agribusiness and Agriscience; **John Dubois**, faculty, Biology; and **Tony Johnston**, Faculty, Agribusiness and Agriscience **Rebecca Seipelt-Thiemann**, with faculty sponsor, Biology, presented *Identification of Fungal Endophytes in Vitis aestivalis 'Norton/Cynthiana' Grapes of Middle Tennessee*.



**Emily Brackett**, undergraduate student, Biology, with **Frank Bailey**, faculty sponsor, Biology, presented *Thanatomicrobiome Activity in Drug Overdose Cases*.



**Robert Owen**, undergraduate student, Biology, and **Sara Moore**, undergraduate student, Biology, with **Rebecca Seipelt-Thiemann**, faculty sponsor, Biology, presented *RPN-6.2: A Protein Required for Proteasome Assembly, May Be Regulated via Alternative Promoter Usage as Well as Alternative Splicing in Nematodes During Salt Stress*.

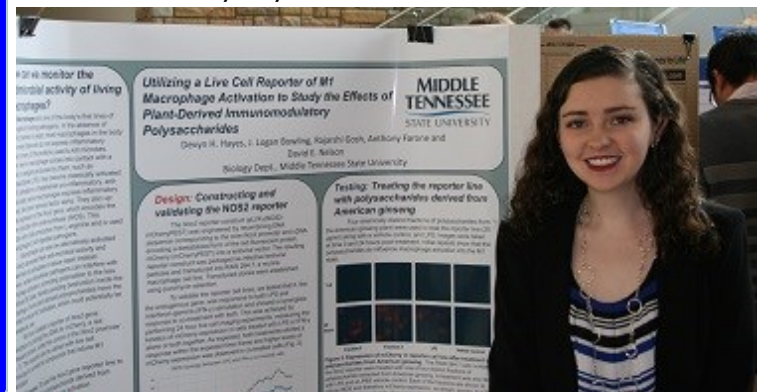


**Robert Owen**, undergraduate student, Biology, with **Lynn Boyd**, faculty sponsor, Biology, presented *Examining the Effects of Manipulating Chaperone-Mediated Autophagy on Stress Induced Nuclear Granules ("SINGs") within the Nucleus of Oocytes of Caenorhabditis elegans*.

**Miranda Lane**, undergraduate student, Biology, with **Erin McClelland**, faculty sponsor, Biology, presented *The Therapeutic Potential of Azaaureones for the Pathogenic Yeast Cryptococcus neoformans*.

**Andrew Swehla**, undergraduate student, Biology, with **Mary Farone**, faculty sponsor, Biology, presented *Infectivity of Novel Intracellular Bacteria for Eukaryotic Cells*.

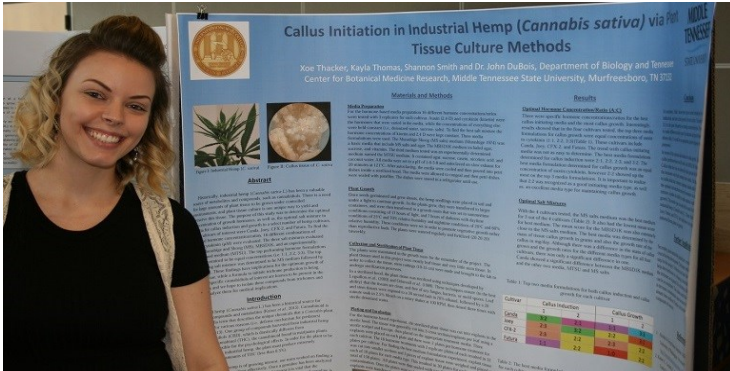
**Devyn Hayes**, undergraduate student, Biology; **J. Logan Bowling**, graduate student, Biology; **Rajarshi Gosh**, graduate student, Biology; and **Anthony Farone**, faculty, Biology, with **David Nelson**, faculty sponsor, Biology, presented *Utilizing a Live Cell Reporter of M1 Macrophage Activation to Study the Effects of Plant-Derived Immunomodulatory Polysaccharides*.



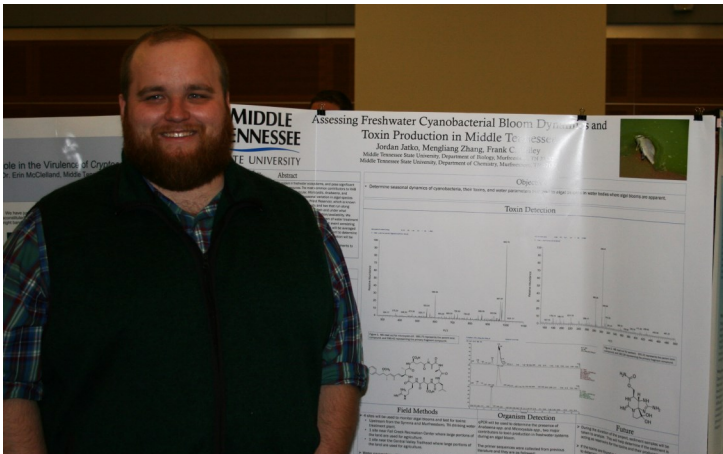


# Scholars Week Highlights Faculty and Student Research

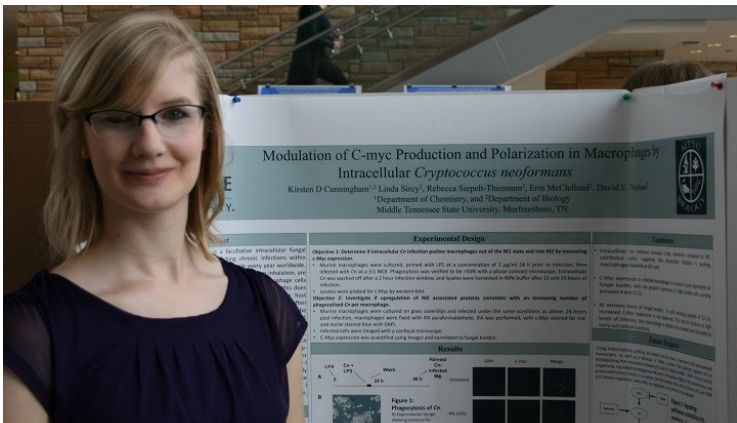
**Xoe Thacker**, undergraduate student, Biology; **Kayla Thomas**, undergraduate student, Biology; and **Shannon Smith**, graduate student, Biology, with **John DuBois**, faculty sponsor, Biology, presented *Callus Initiation in Cannabis Sativa via Plant Tissue Culture Methods*.



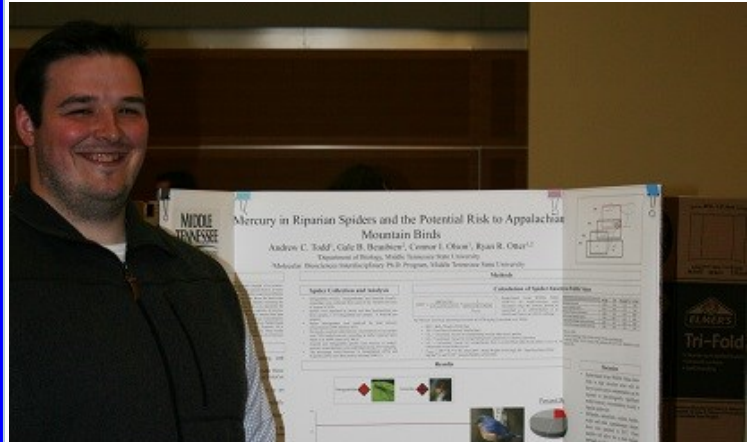
**Jordan Jatko**, undergraduate student, Biology, with **Frank Bailey**, faculty sponsor, Biology, presented *Assessing Freshwater Cyanobacterial Bloom Dynamics and Toxin Production in a Lentic Ecosystem*.



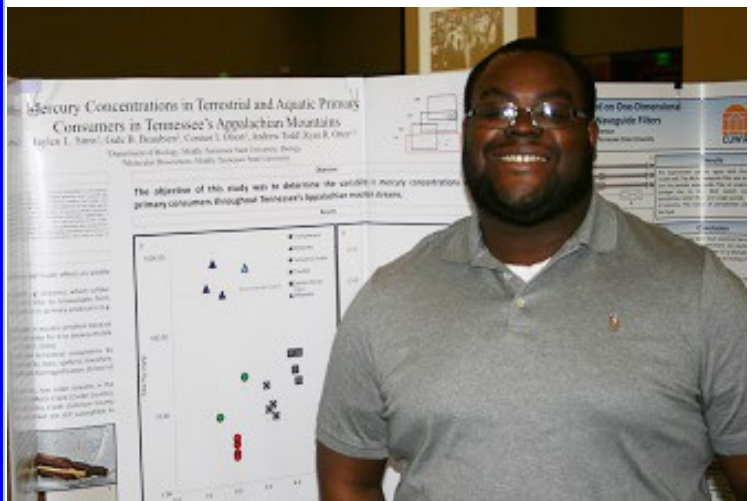
**Kirsten Cunningham**, undergraduate student, Biology; **Linda Sircy**, graduate student, Biology; **Rebecca Seipelt-Thiemann**, faculty, Biology; and **Erin McClelland**, faculty, Biology, with **David Nelson**, faculty sponsor, Biology, presented *Intracellular Cryptococcus neoformans Infection Up-regulates the M2 Polarization Marker c-Myc in Host Macrophages*.



**Andrew Todd**, undergraduate student, Biology; **Gale Beaubien**, graduate student, Biology; and **Connor Olson**, graduate student, Biology, with **Ryan Otter**, faculty sponsor, Biology, presented *Mercury in Riparian Spiders and the Potential Risk to Appalachian Mountain Birds*.



**Jaylen Sims**, undergraduate student, Chemistry; **Gale Beaubien**, graduate student, Biology; **Connor Olson**, graduate student, Biology; and **Andrew Todd**, undergraduate student, Biology, with **Ryan Otter**, faculty sponsor, Biology, presented *Mercury Concentrations in Terrestrial and Aquatic Primary Consumers in Tennessee's Appalachian Mountains*.



**Ifeanyi Onuh**, undergraduate student, Biology; **Sarah Mikhail**, undergraduate student, Biology; **Jarred Millard**, undergraduate student, Biology; **Marisa Rust**, undergraduate student, Biology; with **Danielle Brown**, faculty sponsor, Biology, presented *Does the Use of a 'Sonic Net' Disturb the European Starling (Sturnus vulgaris) and Deter Them from the Murfreesboro Airport?*

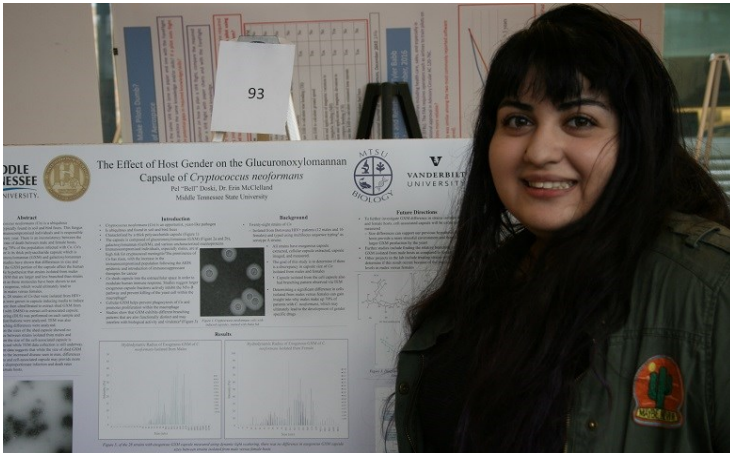
**Shelby Lowrie**, graduate student, Biology; **Hanna Houle**, visiting scholar, Biology; and **Christian Devine**, undergraduate student, Biology, with **Jeff Leblond**, faculty sponsor, Biology, presented *Effect of Light Photoperiod on Lipids of the Harmful Marine Dinoflagellate, Karenia brevis*.



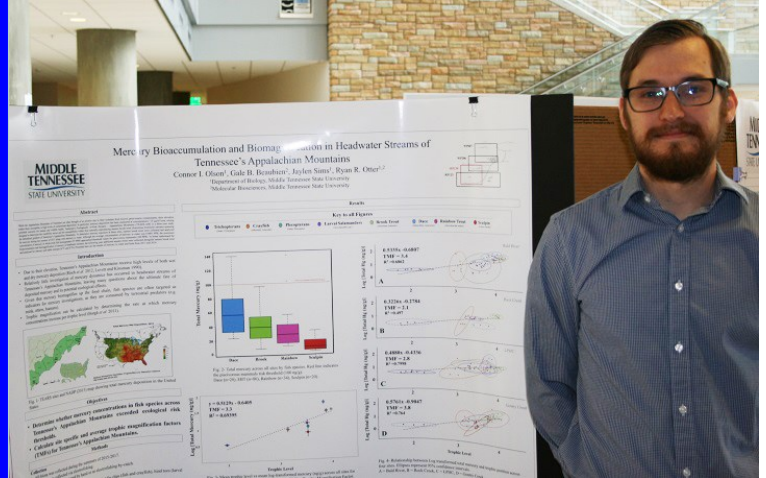
# Scholars Week Highlights Faculty and Student Research

\*\*\*\*\*  
**Pel Doski** is a 2018 recipient of the Fulbright Award to teach English in South Korea.  
 \*\*\*\*\*

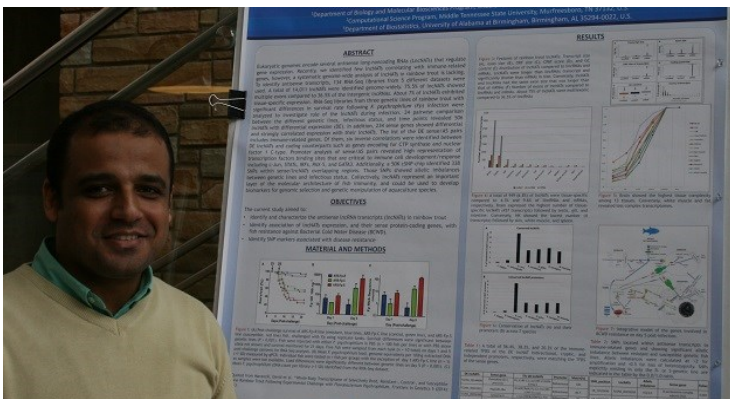
**Pel Doski**, undergraduate student, Biology, with **Erin McClelland**, faculty sponsor, Biology, presented *How Host Gender Affects the Polysaccharide Capsule of Cryptococcus neoformans*.



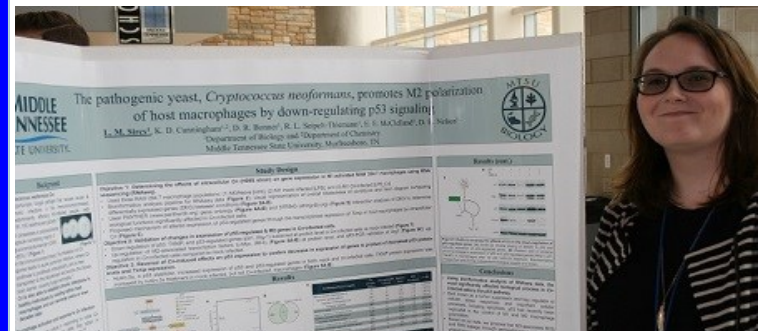
**Connor Olson**, graduate student, Biology; **Gale Beaubien**, graduate student, Biology; **Jaylen Sims**, undergraduate student, Chemistry; and **Andrew Todd**, undergraduate student, Biology, with **Ryan Otter**, faculty sponsor, Biology, presented *Mercury Dynamics in Headwater Streams of Tennessee's Appalachian Mountains*.



**Ali Ali**, graduate student, Biology, and **Rafet Al-Tobasei**, postdoctoral fellow, Computational Science, with **Mohamed Salem**, faculty sponsor, Biology, presented *Genome-Wide Identification of Antisense lncRNAs and their Expression and Genetic Polymorphism Associated with Susceptibility to Flavobacterium psychrophilum in Rainbow Trout*.



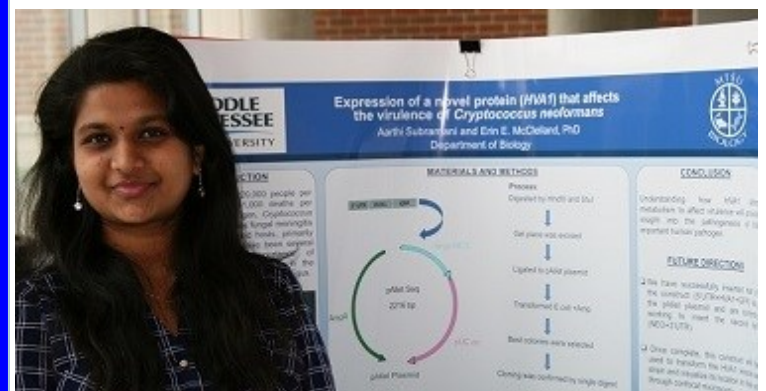
**Linda Sircy**, graduate student, Biology; **Kirsten Cunningham**, undergraduate student, Biology; **Rebecca Seipelt-Thiemann**, faculty, Biology; and **Erin McClelland**, faculty, Biology, with **David Nelson**, faculty sponsor, Biology, presented *The Pathogenic Yeast, Cryptococcus neoformans, Promotes M2 Polarization of Host Macrophages by Down-regulating p53 Signaling*.



**Ali Ali**, graduate student, Biology, and **Rafet Al Tobasei**, postdoctoral fellow, Computational Science, with **Mohamed Salem**, faculty sponsor, Biology, presented *Development of a 50K Transcribed Gene SNP Chip Identifies Major QTL Affecting Growth And Muscle Yield In Rainbow Trout Through GWAS Analysis*.

**Matthew Fuller**, graduate student, Molecular Biosciences, and **Anthony Farone**, faculty, Biology, with **Elliot Altman**, faculty sponsor, Biology, presented *Development of a Protein-Based Assay for Discovering Potential Immune Complex (IC) Inhibitors*.

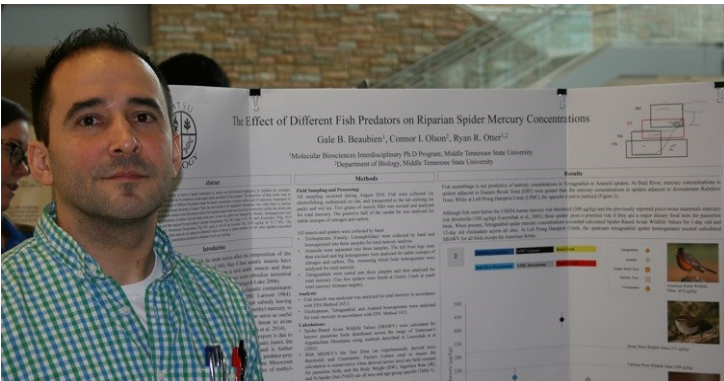
**Aarthi Subramani**, graduate student, Molecular Biosciences, with **Erin McClelland**, faculty sponsor, Molecular Biosciences, presented *Expression of a Novel Protein(HVA1) that Affects the Virulence of Cryptococcus neoformans*.





# Scholars Week Highlights Faculty and Student Research

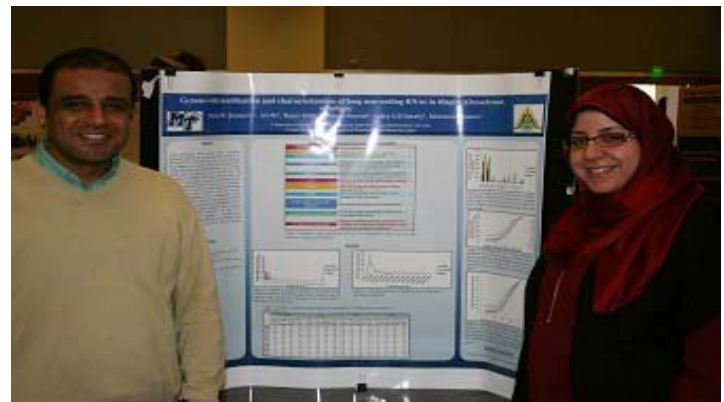
**Gale Beaubien**, graduate student, Biology, and **Connor Olson**, graduate student, Biology, with **Ryan Otter**, faculty sponsor, Biology, presented *The Effect of Different Fish Predators on Riparian Spider Mercury Concentrations*.



**Mitch Merryman**, graduate student, Biology, with **Rebecca Seipelt-Thiemann**, faculty sponsor, Biology, presented *Analysis of Clinical and Passaged Strains of Cryptococcus neoformans Reveals Alternative Splicing in Virulence Genes*.



**Walaa Shaalan**, Visiting scholar, Biology; **Ali Ali**, Grad student, Biology; **Nassr Allah Abd El-Hameid**, Non-MTSU faculty collaborator, Biology; **Sabry El-Serafy**, Non-MTSU faculty collaborator, Biology; **Mohamed Salem**, Staff, Biology presented *Genome-wide Identification and Characterization of Long Non-Coding RNAs in Tilapia (Oreochromis niloticus)*.



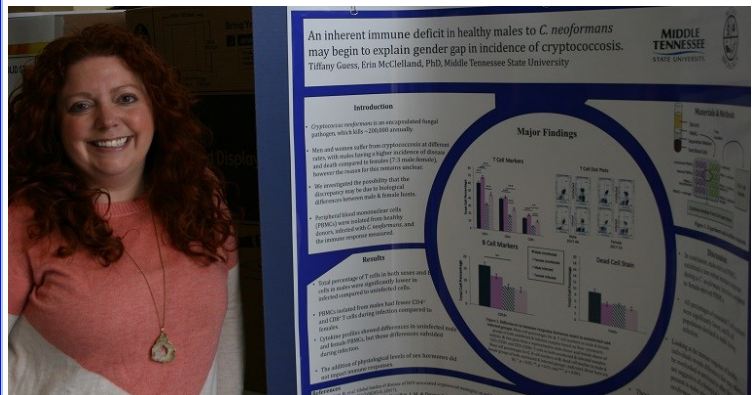
**Shannon Smith**, graduate student, Molecular Biosciences; **John DuBois**, faculty, Biology; and **Nathan Phillips**, faculty, Agribusiness and Agriscience, with **John DuBois**, faculty sponsor, Biology, presented *Wild-Simulated Production Guide for Ginseng Farmers in Tennessee*.



**Zachary Grimes**, graduate student, Mathematics and Science Education; **Joshua W. Reid**, graduate student, Mathematics and Science Education; and **Nancy K. Boury**, Ph.D., with **Rebecca Seipelt-Thiemann**, faculty sponsor, Biology, presented *Misconceptions of Mutations and Pedigree Analysis Reveal Lack of Depth in and Reliance on Misplaced Intuition on Understanding*.



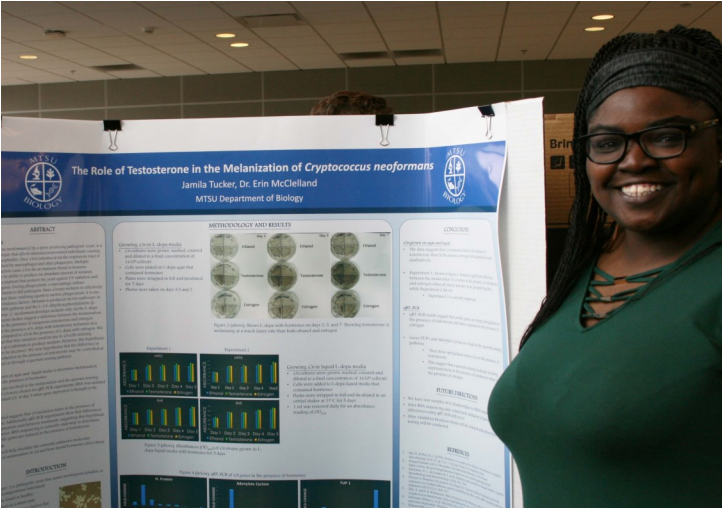
**Tiffany Guess**, graduate student, Biology, with **Erin McClelland**, faculty sponsor, Biology, presented *Differences in the Male and Female Immune Response to Cryptococcus neoformans Infections*.



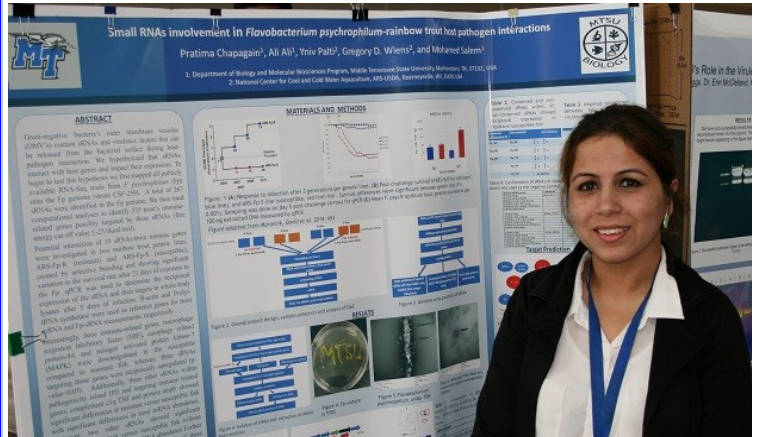


# Scholars Week Highlights Faculty and Student Research

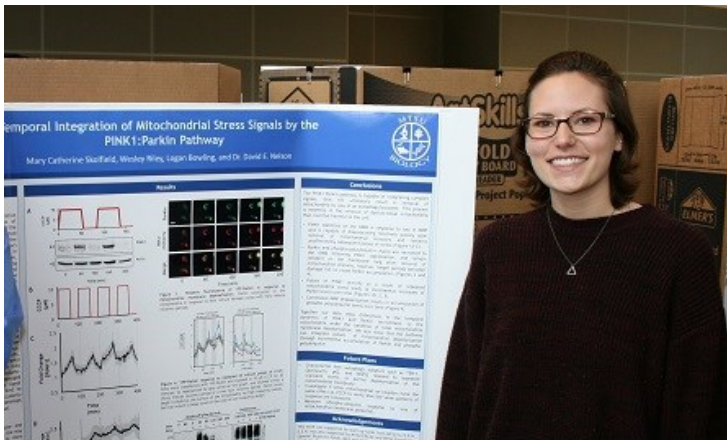
**Jamila Tucker**, graduate student, Biology, with **Erin McClelland**, faculty sponsor, Biology, presented *The Role of Testosterone in the Melanization of *Cryptococcus neoformans**.



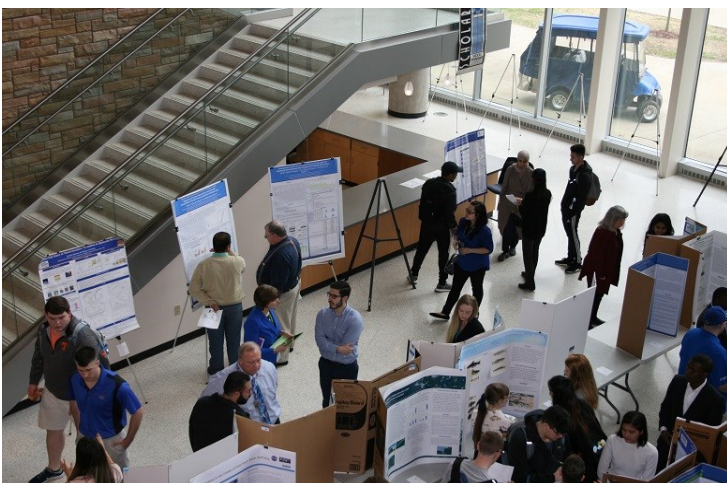
**Pratima Chapagain**, grad student, Molecular Biosciences; **Ali Ali**, grad student, Molecular Biosciences; **Yniv Palti**, government agency collaborator, USDA; and **Gregory Weins**, government agency collaborator, NCCWA, with **Mohamed Salem**, faculty sponsor, Molecular Biosciences, presented *Small RNAs Involvement in *Flavobacterium psychrophilum*-Rainbow Trout Host Pathogen Interactions*.



**Mary Catherine Skolfield**, graduate student, Biology; **Wesley Riley**, graduate student, Biology; and **Logan Bowling**, graduate student, with **David Nelson**, faculty sponsor, Biology, presented *Temporal Integration of Mitochondrial Stress Signals by the PINK1:Parkin Pathway*.



**Zhigang Jia**, grad student, Mathematics and Science Education; **Angela Google**, grad student, Mathematics and Science Education; and **Tina Carter**, grad student, Biology, with **Anna Grinath**, faculty sponsor, Biology, presented *Supporting Biology Lab Instructors to Engage Students in Disciplinary Talk through Professional Development and Curriculum Materials*.





## In Memoriam



Dr. Patrick James Doyle was born on Oct. 20, 1937, in Sioux Falls, S.D., the oldest of six children born to John and Madeline Doyle. He died Oct. 8, 2017, at Saint Thomas Rutherford Hospital after a short illness.

Dr. Doyle joined the Biology Department in 1966 and retired in 2002. He received many honors during his teaching career, including the MTSU Outstanding Teacher Award, MTSU Outstanding Public Service Award, and Tennessee Lifetime Achievement Award. He initiated the recycling program at MTSU in 1972 and with the proceeds established numerous scholarships. Countless students have benefited from the scholarships, which fund student travel, research, participation in summer field station programs, and meritorious achievement in the classroom. The recycling program was recognized twice at the national level. In 1999, it earned a Daily Points of Light Award, and in 2000, President Bill Clinton presented a President's Service Award to Dr. Doyle at the White House. Dr. Doyle had served as a trustee of the MTSU Foundation and had been honored as an MTSU Distinguished Alumni.

Dr. Doyle was always known as a student-centered professor. He took an active interest in his students and worked very hard to help them succeed. He has left an impact on thousands of students and others across the state of Tennessee, especially those in K–12 education. Interactions with students—“lots and lots of outstanding students”—and working with an extraordinary group of colleagues was his reply when asked about some of his best memories of his time in the department.

Pat, as he was known, enjoyed spending time with his family, playing racquetball and bridge, ballroom dancing, doing yard work, making Christmas ornaments, and traveling, having visited all 50 states, over 60 countries, and six continents.



# 2018 Biology Department Scholarship Winners

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 meet-ings, and perform exceptionally well on national standard-ized tests. To help defray the costs of these activities and to recognize these students, the department is please 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 in support of graduate research in botany.  
**D. Lee Rumble**

**William H. Butler, Jr. Graduate Research Scholarship:** To provide support for expenses associated with thesis research.  
**Wesley Riley**

**Cynthia Chappell First-Year Award for Summer Research:** Awarded to support research efforts.  
**Jamila Tucker**

**John D. DuBois Scholarship:** Awarded to an undergraduate or graduate student to provide travel for paper presentations at scientific meetings.  
**Josh Evers**

**Mary C. Dunn Graduate Scholarship:** Awarded to support research efforts.  
**Anna Parnell                      Forest Rice**  
**David Lee Rumble                Mary Catherine Skolfield**

**J.L. Fletcher Graduate Scholarship:** Awarded to a beginning Biology graduate student.  
**Jamila Tucker**

**Thomas Hemmerly Grad. Research Scholarship:** Awarded to provide support of expenses associated with thesis research.  
**Wesley Riley**

**Freeman P. Jordan Jr. Scholarship:** Awarded to a Biology major in support of research.  
**Devyn Hayes                      Jasmin Laurel**

**James R. Kemp Scholarship:** Awarded to a Biology major minoring in Secondary Education.  
**Miles Matchinske**

**Charles McGhee Scholarship:** Awarded to a Biology major of junior standing seeking licensure in secondary education.  
**Miles Matchinske**

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

**Wayne Rosing Biology Scholarship:** Awarded to a Biology major of junior standing with a Botany emphasis or a minor in Secondary Education.  
**Miles Matchinske**

**David Sanborn Ecology Scholarship:** Awarded to an outstanding junior who has shown an interest in the area of field biology.  
**Natalie Schroth                      Jessica Reece**

**Eugene F. Strobel Scholarship:** Awarded to a Biology major of junior standing who plans a teaching career at the secondary or college level.  
**Josh Evers                              Mary Catherine Skolfield**  
**Jamila Tucker**

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

**Marion R. Wells Graduate Research Scholarship:** To provide support for thesis research during summer.  
**Wesley Riley**

**Stephen M. Wright Research Scholarship:** Awarded to support any aspect associated with undergraduate research in microbiology or biotechnology.  
**Prianca Griggs**

**John M. Zamora Graduate Research Scholarship:** Awarded to purchase supplies or support travel associated with research projects.  
**Jamila Tucker**



# 2018 Biology Department Scholarship Winners

## Outstanding Student Awards

**Clay M. Chandler Outstanding Freshman Biology Award and Scholarship:** Awarded annually to an outstanding student in general biology classes.

**Kwinci Britt**                      **Emerniece Cooper**

**Elliott Dawson/BioVentures Biotechnology Scholarship:** Awarded to a Biology major of junior standing or above who has taken or is currently enrolled in Biotechnology.

**Heather Quintanilla**              **Oreoluwa Olakunle**

**Peter I. Karl Outstanding Senior Award:**

Awarded to the outstanding senior.

**Kirsten Cunningham**

**Philip M. Mathis Outstanding Junior Award and Scholarship:** Awarded annually to a Biology major of junior standing.

**Rachel Bailey**

**Ralph E. Sharp Outstanding Sophomore Award and Scholarship:** Awarded annually to a Biology major of sophomore standing.

**Emily Oppmann**

**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.

**Kyra Boots**                      **Peter Ghattas**



## 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

Fax: 615-898-5093

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

