

# NEWS FROM THE UNDERGRADUATE RESEARCH CENTER

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Congrats to our December graduates!

## Posters at the Capitol: Congrats to our MTSU Presenters

Posters at the Capitol is a prestigious annual event, during which select MTSU students present their STEM research to state legislatures at the state capitol alongside other participating Tennessee universities. The event will take place on Wednesday, February 15th, 2023.

The Posters at the Capitol event, sponsored by the Tennessee Board of Regents and the University of Tennessee system, and hosted by Middle Tennessee State University's Tennessee STEM Education Center, has two goals—to expose legislators to undergraduate researchers and to expose undergraduates to their legislators. The state of Tennessee is the beneficiary of this exciting effort.

In addition to presenting their research, students will have an opportunity to meet with legislators, network with students from across the State of Tennessee, tour the Capitol, and take a photo with Governor Lee.

We are so proud of our selected students, as they represent the best of undergraduate research in STEM at their institutions. Check out pages 2-5 to view our MTSU representatives, their abstracts, hometowns, and faculty mentors.

## URC'S MISSION

The Undergraduate Research Center's (URC) mission is to be the central hub for communication about undergraduate research grant programs and other related opportunities on and off campus, to distribute university funds for undergraduate research and creative projects, and to promote dissemination of results through travel grants and by offering opportunities for students to present their research findings.

## STUDENT ABSTRACTS: POSTERS AT THE CAPITOL 2023



**Faculty Mentor:**  
**Dr. Kevin Bicker**  
**Hometown: Carthage, TN**

**JANNA ABOU-RAHMA*****Mechanism of Action of Antifungal Peptoids***

Due to the rise of drug resistant strains of fungal pathogens such as *Cryptococcus neoformans* and *Candida albicans*, there has been a need to identify new antifungal agents. In comparison to naturally produced antifungal peptides, antifungal peptoids mainly differ in structure, which prevents protease recognition giving higher bioavailability. Previous studies have shown that peptoids are effective fungicides. RMG8-8 and RMG9-11, two peptoids recently discovered in the Bicker Lab, have proven to be effective antifungal agents against *C. neoformans* and *C. albicans*, respectively. Reported here will be studies to determine the mechanism of action and other vital therapeutic properties of RMG8-8 and RMG9-11 using various biochemical and microbiological assays. Preliminary results of critical micelle concentration testing indicate that RMG8-8 as well as RMG9-11 do not exist as micelles at their minimum inhibitory concentrations, but rather function unimolecularly. Using a parallel artificial membrane permeability assay, it was found that RMG8-8 is likely unable to penetrate the blood brain barrier. However, RMG9-11 demonstrated good permeability, indicating that it may be able to penetrate the blood brain barrier to treat dangerous neurological infections of fungi. Subsequently, assays will be conducted in order to further understand the mechanism of action of both peptoid compounds to address the rising concern of drug resistant strains of fungal pathogens.



**Faculty Mentor:**  
**Dr. Tiffany Rogers**  
**Hometown: Murfreesboro, TN**

**MARZEA AKTER*****Effect of acute oxytocin administration on social behavior in male and female mice***

Oxytocin is a neurotransmitter and hormone with a well-established role in prosocial behaviors in animals and humans. It is currently being tested in clinical trials for the treatment of social symptoms associated with autism spectrum disorders. However, the behavioral effects of oxytocin treatment have been variable with both prosocial (increased empathy) and antisocial (increased competitiveness) behaviors resulting in humans. Previous studies in our lab have shown increased anxiety-like behaviors in mice treated chronically with oxytocin (12 ug dose per day for 14 consecutive days, data unpublished). The current study aims to see the effect of acute oxytocin administration on social behavior in male and female mice to determine if the schedule of oxytocin administration affects behavioral outcomes. Adult C57BL/6J mice will be acutely pretreated with saline or oxytocin (12 ug) an hour before the behavior tests. Saline or oxytocin will be administered either intranasally (i.n., 12 ug in 12 uL, 6 uL per nostril) or intraperitoneally (i.p., 12 ug in 120uL). Mice will complete a battery of behavioral tests including the elevated plus maze (EPM), three-chamber sociability task (3C), and free dyadic social interaction (FDSI) after drug administration to determine changes in social behavior and anxiety-like behavior. Noldus EthoVision XT and human coders will code anxiety-like behaviors, social preference, and social novelty. I expect to find that acute oxytocin administration will increase sociability as measured by the 3C and FDSI tasks while avoiding increases in anxiety-like behaviors, as measured by the EPM task, associated with chronic administration.

# STUDENT ABSTRACTS: POSTERS AT THE CAPITOL 2023



## HUNTER BRADY

### *Investigation of the Anti-viral Properties of Chlorine Dioxide Gas using the MS2 Bacteriophage*

Since the emergence of the SARS-CoV-2 virus, the etiological agent that causes COVID-19, the need to identify antiviral agents for disinfection purposes has dramatically increased. Chlorine dioxide gas has previously been identified as an antibacterial agent with strong oxidizing capabilities. The MS-2 bacteriophage has previously been identified as a suitable surrogate for the development and application of virucide decontamination methods by the Environmental Protection Agency. This study aimed to identify and assess the antiviral properties of chlorine dioxide gas and to identify optimum physical conditions for potential deployment in support of current antiviral disinfection needs. Using the MS-2 bacteriophage model system, preliminary studies used the double-layer agar plaque assay technique to evaluate the antiviral activity of chlorine dioxide gas. Results revealed up to a six-log (99.9999%) reduction of the MS-2 bacteriophage off of porous surfaces. These results suggest that chlorine dioxide gas is a suitable antiviral agent.

**Faculty Mentor:**  
**Dr. Anthony Newsome**  
**Hometown: Murfreesboro, TN**



## EMAA ELRAYAH

### *Development of Size-Discrete PLGA Nanoparticles for Uterine-Targeted Drug Delivery*

Preterm birth (PTB) is the leading cause of infant mortality, yet there are no effective treatments. Current tocolytics have poor specificity and readily cross the placental barrier, causing harm to both mother and fetus. Uterine-targeted nanoparticles have emerged as a potential drug-delivery system for the treatment of PTB. Poly(lactic-co-glycolic) acid (PLGA) is an FDA-approved biomaterial with the capacity for use in obstetric therapies. Due to the size-exclusivity of the placental barrier, the design of drug-encapsulated nanoparticles must consider particle size. Here we show the development of a procedure to formulate monodispersed PLGA nanoparticles with discrete size populations. Using an oil-in-water emulsion technique adapted from Haycock, et al (2020), we compared two different methods using either ethyl acetate (EtAc) or dichloromethane (DCM) as the organic phase. Furthermore, we tested different homogenization methods. We then developed a purification method using serial centrifugation to isolate discrete size ranges. The nanoparticles were analyzed for size and polydispersity via dynamic light scattering and verified via scanning electron microscopy. We found that the DCM formulation produced particles with a lower polydispersity index (PDI) than EtAc (0.20199 +/- 0.07 vs. 0.3037 +/- 0.03). We determined that homogenizing the emulsion at 45 seconds produced the most discrete size populations, with low PDIs (0.0813 +/- 0.0441). Here we show that we successfully employed a bench-top emulsion to create and isolate PLGA nanoparticles within specific size ranges. This approach holds strong potential for the development of a nanoparticle drug delivery system for PTB, for which novel therapies are desperately needed.

**Faculty Mentor:**  
**Dr. Jennifer Herington**  
**Hometown: Nashville, TN**



# STUDENT ABSTRACTS: POSTERS AT THE CAPITOL 2023



**Faculty Mentor:**  
**Dr. Rebecca Seipelt-Thiemann**  
**Hometown: Woodbury, TN**

## LACON PARTON

### *Antibiotic Resistance eDNA in the Stones River Watershed*

From the beginning of antibiotic use, antibiotic resistance with associated complications has been sweeping the nation. While bacteria can evolve antibiotic resistant genes by repeated exposures, they can also acquire existing genes encoding antibiotic resistance proteins by taking up environmental DNA fragments that originate from dead antibiotic-resistant bacteria present in the environment. Alternatively, bacterial viruses can carry antibiotic resistant genes which could transfer the resistance through infection. It is important to identify and track valid, local sources of antibiotic resistance genes in the environment as they represent not only presence of resistance, but a source of acquiring resistance. The purpose of this study is to track four  $\beta$ -lactamase antibiotic resistant gene alleles (Bla-1, Bla-TEM, Bla-SHV, and BlaCTX) in the Stones River Watershed and compare the prevalence to land uses that are known to utilize antibiotics such as hospitals, veterinary clinics, and urban/agricultural sites. Environmental DNA will be isolated from obtained soil samples. These soil samples will be further cleaned in preparation to perform polymerase chain reaction followed by agarose gel electrophoresis which will determine the presence of the variants of the  $\beta$ -lactamase antibiotic resistance genes. A comparison of antibiotic resistance gene allele presence/absence with land use will reveal if any particular land use should be prioritized in the local battle against antibiotic resistance bacteria.



**Faculty Mentor:**  
**Dr. April Weissmiller**  
**Hometown: Antioch, TN**

## JESSE SCOBEE

### *Investigating the Significance of the N-MYC-WDR5 Interaction in Pediatric Neuroblastoma*

Neuroblastoma (NB) is the most common solid-tumor pediatric cancer, and high-risk cases associated with N-MYC amplification show a 50% 5-year survival rate. N-MYC is an oncoprotein transcription factor that causes the transformation of a healthy cell into a tumor cell, and thus functional inhibition of N-MYC is a sought-after therapeutic goal. Recently, the chromatin regulator WDR5 was discovered as an important MYC co-factor that can modulate MYC target gene expression, and evidence in N-MYC amplified NB cell lines shows extensive co-localization of N-MYC and WDR5 at genes involved in multiple important biological functions. These data suggest that the N-MYC-WDR5 interaction may control a variety of important N-MYC related functions, however a clear analysis focused on any single function individually is currently lacking. Thus, this study was designed to determine if blocking the N-MYC-WDR5 interaction alters expression of genes linked to apoptosis, a well-studied function of N-MYC. Using multiple engineered NB cell lines, we performed mRNA analysis of pro- and anti-apoptotic gene expression. Interestingly, results of this study reveal that blocking the N-MYC-WDR5 interaction does not cause overt changes in apoptotic gene expression, suggesting that blocking the N-MYC-WDR5 interaction may not be sufficient to induce apoptosis. However, future studies using different cell lines or alternative methods may be useful to confirm these results. Given the extent of N-MYC and WDR5 co-binding at genes involved in essential biological processes, future investigation is warranted to deduce the totality of cellular consequences that occur when WDR5 cannot bind N-MYC in these deadly malignancies.



# STUDENT ABSTRACTS: POSTERS AT THE CAPITOL 2023



## LINDSEY TRAN

### *Creation of electro-magnetic assisted "Star-like" formation from cancer cells using a laser trap*

Cancer is the second leading cause of death among humans worldwide. Although radiation therapy has been the most effective course of treatment for cancer patients, it still has harmful and long-lasting damages on their bodies, ruining their quality of life. The initial purpose of this study was to minimize radiation damage caused from cancer treatment by finding the minimal amount of ionization required to eliminate a single BT20 breast cancer cell, using laser-trapping (LT) technology. However, amid experimentation, the discovery of two scientific phenomena was made and given the titles "Dark-space" formation and "Star-like" formation. Both phenomena have shown the ability to rapidly absorb and conserve energy. With the world's continuing advancements in technology, these two discoveries can be used as an approach to improve microchip technology and solar energy harvesting. Thus, the purpose of this research was expanded and separated into 3 phases: Single ionization, "Dark-space" formation, and "Star like" formation. A 3:1 mixture solution of BT20 cancer cells and magnetic beads was poured onto a depression slide and placed onto the laser trap. For over 4 years, the same depression slide has been used to conduct measurements for each phase. In the single ionization phase, magnetic beads were used to minimize the amount of ionization required to eliminate a singular BT20 cell. It was found that the interaction between the laser's radiation energy and the magnetic beads' electromagnetism accelerated the rate of ionization. Thus, a significant reduction of approximately 83% was observed in the ionization period with the addition of the magnetic beads. Further on to Phase 2, a "Dark-space" forms once the mixture interacts with the laser trap and acts as an energy storage capacitor that rapidly expands as the increasing amount of radiation energy is absorbed. This expansion causes all surrounding matter to accelerate towards the dark region, yet it is never able to penetrate the space. Upon explosion, the energy of "Dark-space" causes the surrounding matter to form into a plasma, acting as a sea of positive and negative charges. Leading into Phase 3, a "Star-like" illumination forms once the plasma interacts with the laser trap. This interaction causes an emission of intense blackbody radiation that grows and becomes more robust as more energy is absorbed. Overall, applications of this study can provide improvements in cancer treatment, microchip technology, and solar energy harvesting.

**Faculty Mentor:**  
**Dr. Daniel Erenso**  
**Hometown: Antioch, TN**

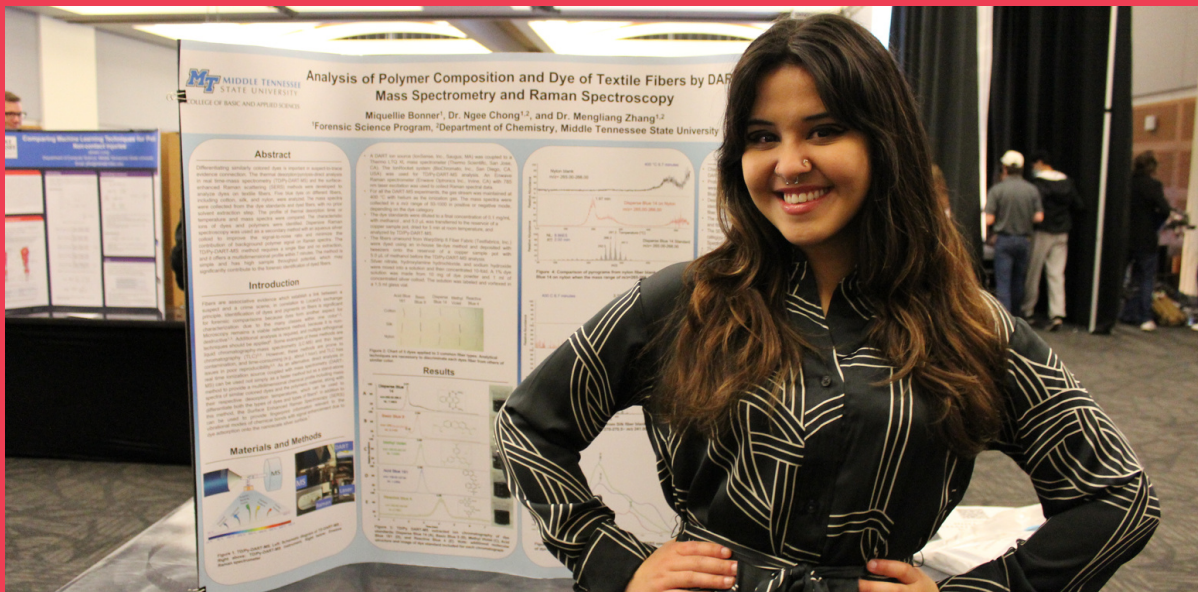
The MTSU cohort will travel to the Tennessee State Capitol alongside the following universities:

- Austin Peay State University
- East Tennessee State University
- Middle Tennessee State University
- Tennessee State University
- Tennessee Technological University
- University of Memphis
- The University of Tennessee at Chattanooga
- The University of Tennessee, Knoxville
- The University of Tennessee, Martin



# SPRING URECA GRANTS

APPLICATION DEADLINE: JANUARY 26, 2023 BY 4:30PM



*Want to get paid to do research  
or work on a creative project?*

THEN CHECK OUT OUR  
UNDERGRADUATE RESEARCH  
AND CREATIVE ACTIVITY  
GRANTS



STUDENTS MAY  
APPLY FOR THE  
FOLLOWING  
LEVELS:

---

Assistant - beginners,  
one semester  
project, \$500 stipend

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Silver Scholar -  
experienced student  
researcher, one  
semester project,  
\$1000 stipend

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Gold Level -  
experienced student  
researcher, 2  
semester project (fall  
& spring), \$2,400  
stipend

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Team - All levels

To support our vision of nurturing a culture of research and creative activity at MTSU, the URC offers Undergraduate Research Experience and Creative Activity (URECA) grants to students three times a year. Awards range from \$500 for beginners to \$3,500 for experienced researchers.

Team applications are now being offered during the fall, spring, and summer semester. More information about the team structure can be found [here](#).

To learn more about URECA grants and how to submit proposals, check out our [website](#).

**NEW!!** Need assistance finding a mentoring or figuring out which level grant is best for you? Contact our Peer Mentor Scholar, Foram Patel, at [fp2n@mtmail.mtsu.edu](mailto:fp2n@mtmail.mtsu.edu). Foram can also help with proposal development, budget and justification, creating a timeline, and proposal review. More info about our new SOAR Ambassadors on Page 5!





# Undergraduate Research and Creative Activity OPEN HOUSE

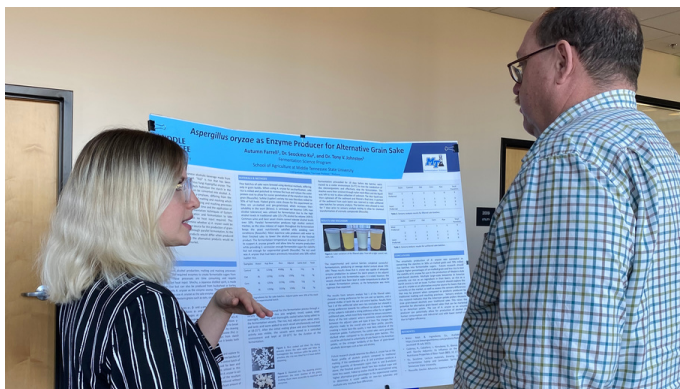
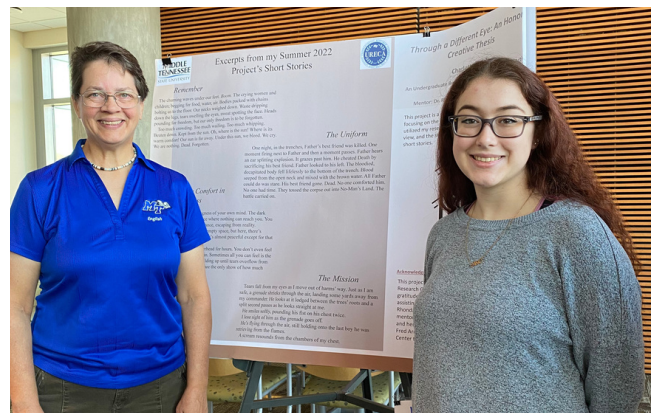
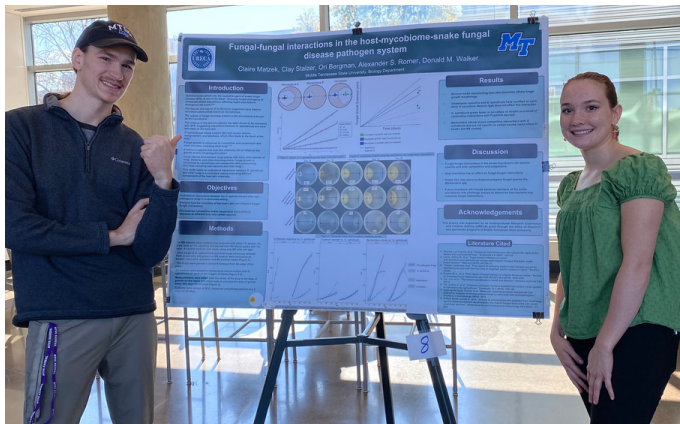
**MIDDLE TENNESSEE**  
STATE UNIVERSITY.

Office of Research and Sponsored Programs  
Undergraduate Research Center

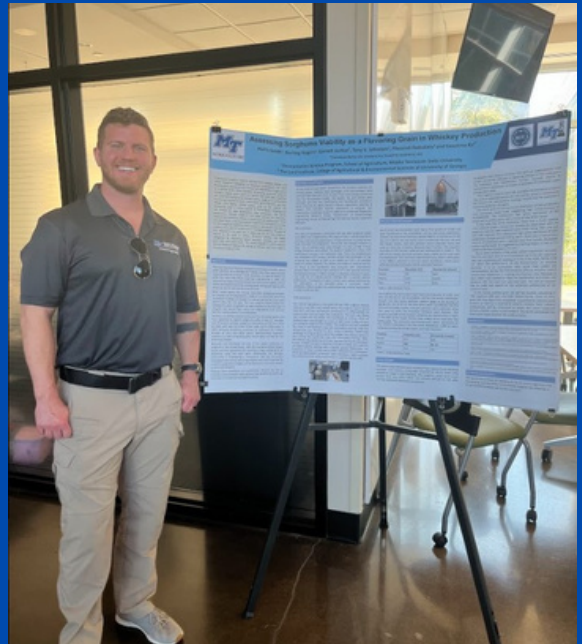
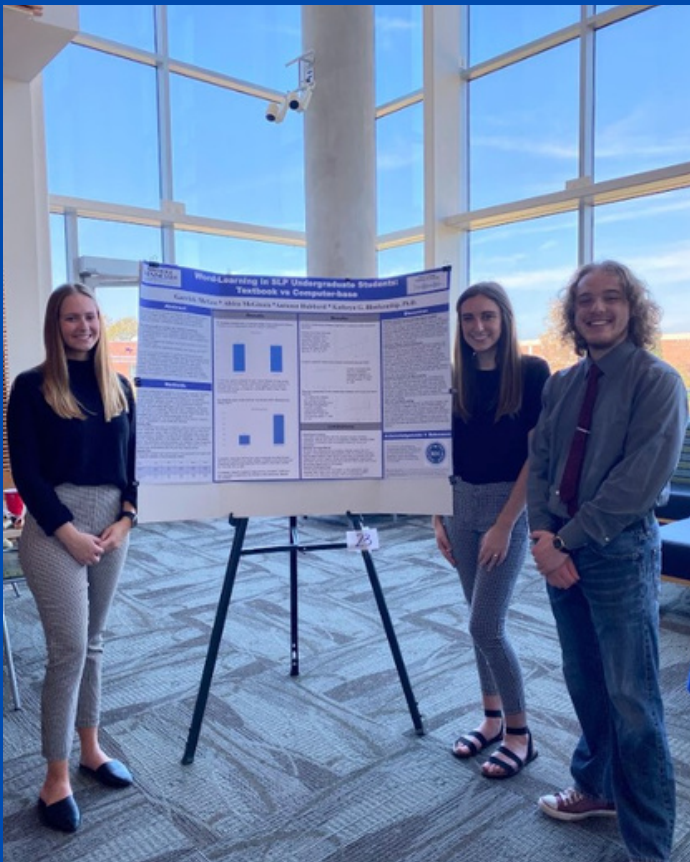
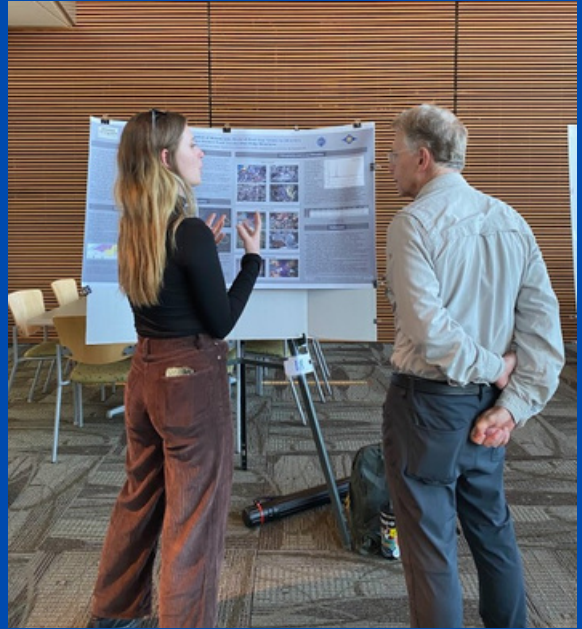
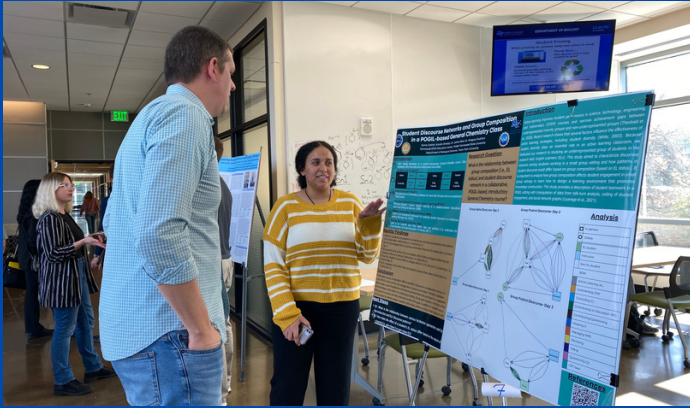
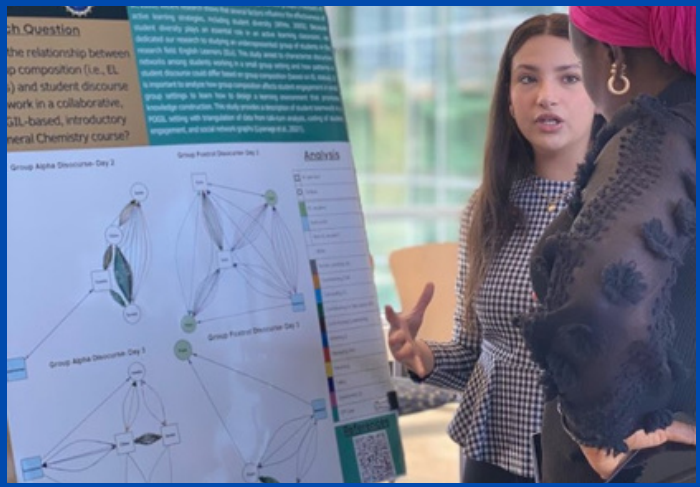


## A Successful Fall Open House

Thank you to everyone who participated in our Fall Open House! We had 36 excellent presenters from a wide variety of disciplines including health and human performance, physics, environmental science, sociology and anthropology, biology, chemistry, history, recording industry, fermentation science, English, dance and theatre, data science, psychology, geology, and animal science. We also had many wonderful volunteers and attendees, including faculty mentors. Please check out some pictures from the event!







# Fall 2022 Research & Creative Activity Open House



# THANK YOU, OPEN HOUSE VOLUNTEERS!

WE ARE SO GRATEFUL FOR YOUR TIME AND WILLINGNESS  
TO SERVE OUR RESEARCH COMMUNITY





# FEATURED SOAR STUDENT

## GRÉTI MÜLLER

**Major:** Art (Visual Arts)

**Faculty Mentor:** Dr. Mary Evins

**Current Research Focus:**

Pionír – A Narrative Inspired by the Historical Pioneering Heritage of a Transylvanian Family

**Project Description:**

The creative project Pionír developed a narrative inspired by accounts told to the author by older generations of her family who lived under the Romanian communist regime and witnessed its overthrow in 1989. Pionír was written to acknowledge and honor the individuals on whom the characters of the narrative are developed. Their story of struggle, pioneering, overcoming, changing, growing, and moving forward hopefully brings richness and depth to the stories that shaped the history of the United States and its immigration heritage.

**Why does this topic interest you?**

Growing up in Transylvania, I heard many stories from my family and friends about life under communism and the (more or less) glorious moment of Revolution in 1989. I believe that better understanding this part of Transylvanian history will help me better understand my own history, while writing the narrative will make it possible for me to share some of the old values of my family, values that I very much respect and admire.

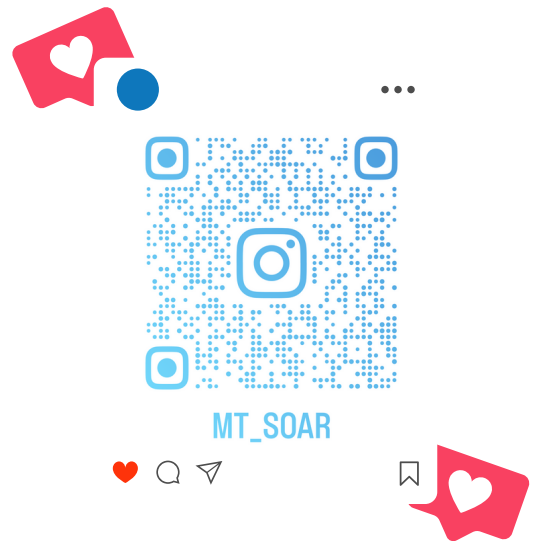
**Do you have any advice for future researchers?**

There is beauty in the process!



## SOAR Instagram

Follow us @mtsoar and let others know about our new page!



**Check out more SOAR profiles here!**

[MTSU.EDU/URC/SOAR-PROFILE/](https://MTSU.EDU/URC/SOAR-PROFILE/)



# SOAR SOCIAL NIGHT



## *Tennessee STEM Education Center (TSEC)*

TSEC shared ways to get involved in undergraduate research through their center and highlighted current research projects. Thank you to Dr. Greg Rushton and his team for sponsoring our SOAR Social.

## *Surprise Guest: Dean Van Patten*

Dean Van Patten dropped by our first ever SOAR Social Night to talk about the importance of undergraduate research.



## *PUZZLES!*

The best way to beat end of semester stress? With a friendly puzzle competition! SOAR members and invited guests worked together on cereal boxed themed puzzles.



# FEATURED FACULTY MENTOR

## DR. SAMUEL HARUNA

**Department:** Agriculture

**Bio:** Dr. Haruna received his B.S. degree in Geology from Kogi State University in 2008, M.S. degree in Environmental Science from Lincoln University (Missouri) in 2013 and Ph.D. in Soils, Environmental and Atmospheric Sciences from University of Missouri in 2017.

**Research Interests:** His research interests revolve around evaluating the influence of various crop and soil management practices on soil hydraulic properties, soil thermal properties, and the spatial distribution of soil physico-chemical properties. His research has demonstrated the influence of a combination of various management practices (e.g. cover crops, crop rotation, tillage) on soil physical and hydraulic properties, and on water infiltration parameters. He is also passionate about soil health, soil conservation and sustainable soil management practices for increased crop productivity.

### **Mentored URECA Projects:**

- Influence of Land Management Practices and Population Density on Soil Hydraulic and Thermal Properties (Fall 2021)
- Defining Landscape Effects on the Spatial Variability of Hydraulic and Thermal Properties (Summer 2020)
- Effects of Aerated Irrigation Through Subsurface Drip Irrigation on Soil Thermal and Physical Properties (Team Project, Spring 2020)
- Effects of Landscape Position on Soil Hydraulic and Thermal Properties (Spring 2020)



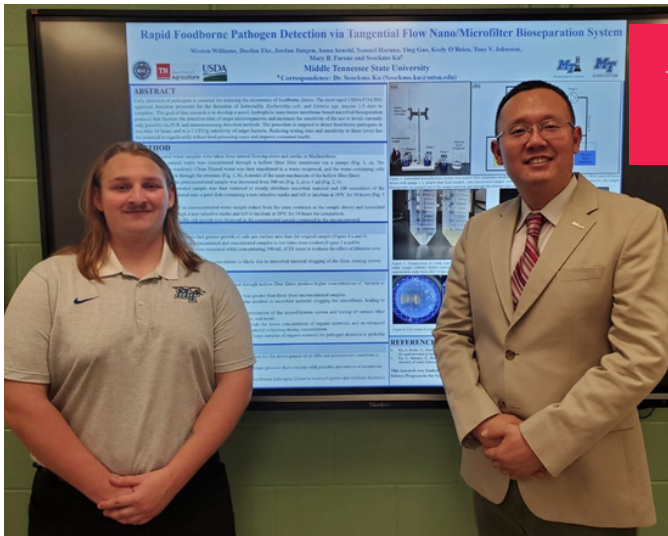
### **Publications with URECA Students:**

- Hernandez J.R., Gulizia, J.P., Adkins, J.B., Rueda, M.S., **Haruna, S.I.**, Pacheco, W.J., and Downs, K.M. 2022. Effect of phytase level and form on broiler performance, tibia characteristics, and residual fecal phytate phosphorus in broilers from 1 to 21 days of age. *Animals*. 12(15):1952. <https://doi.org/10.3390/ani12151952>
- Mitchell-Fostyk, B., and S.I. Haruna. 2021. Spatial and fractal variability of soil hydraulic properties along a catena. *Soil Science Society of America Journal*. 85:1710-1726 <https://DOI: 10.1002/saj2.20286>
- Mitchell-Fostyk, B., S.I. Haruna, and K. Downs. 2021. Variability of soil thermal properties along a catena in Middle Tennessee, USA. *International Agrophysics*. 35:209-219.



# CONFERENCE SPOTLIGHT

*Check out our undergrad researchers and their presentations at state, local, and national conferences*



## WESTON WILLIAMS

**Conference:** *132nd Meeting of the Tennessee Academy of Science meeting*

**Project Title:** *Foodborne pathogen detection via tangential flow nano/microfilter bioseparation system*

**Faculty Mentor:** *Dr. Seockmo Ku*

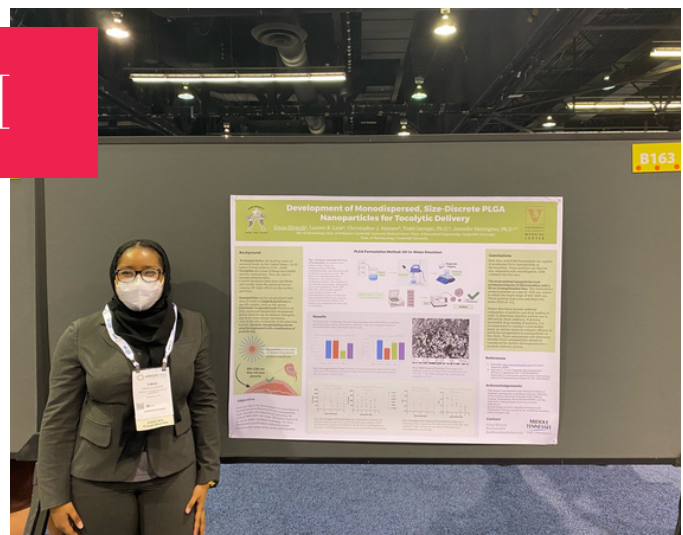
*Weston received 2nd place for his poster among graduate and undergraduate student Agriculture section posters presented by students from TSU, Lincoln Memorial University, The University of Memphis, UT Martin and MTSU*

## EMAA ELRAYAH

**Conference:** *Annual Biomedical Research Conference for Minoritized Scientists (ABRCMS)*

**Project Title:** *Development of Monodispersed, Size- Discrete PLGA Nanoparticles for Tocolytic Delivery*

**Faculty Mentor:** *Dr. Jennifer Herington*





# INTERNSHIPS & RESEARCH OPPORTUNITIES

Check out the following opportunities for fall research !

## [2023 DOE Scholars Program - Department of Energy](#)

- The DOE Scholars Program is designed to attract talented undergraduate and graduate students, and recent graduates to research, technical and professional opportunities within U.S. Department of Energy (DOE) and organizations that support the DOE mission. • Energy Sources and Security • Clean Energy • Energy Efficiency • Climate Change • Environmental Management • Nuclear Security • Artificial Intelligence • Emergency Response • Management and Operations • Cyber Security • Safeguards and Security As a participant in the DOE Scholars Program you will have the opportunity to explore a federal career with DOE and gain a competitive edge as you apply your education, talent and skills in a variety of settings within the DOE complex.

## [Cancer Research Summer Internship Program - University of Michigan - University of Michigan](#)

- As part of its Cancer Biology Training Program, the University of Michigan Rogel Cancer Center provides exposure to cancer research for highly motivated and talented college undergraduates. This program gives the successful applicants an opportunity to explore potential careers in the field of cancer research. Internships are aimed at students who are completing their sophomore or junior undergraduate year this spring. Applications are encouraged from individuals from minority groups that are currently underrepresented in biomedical and behavioral research. The program will run for a ten-week period in summer 2023 (May 24 - August 2). Students selected are matched with an appropriate U-M faculty. Interns are paid a stipend of \$5,500 and are responsible for their own housing and travel arrangements. Interns work directly in a cancer laboratory setting. Program mentors give presentations on their work in cancer every other week at an informal luncheon that interns are required to attend. At the end of the internship program, each intern will be asked to give a short presentation on their work.

## [Cell Manufacturing Technologies REU Program - CMaT](#)

- The 2023 REU program will be offered in-person at each institution with a series of professional development, seminars, and workshops held virtually during the summer to connect the cohort across CMaT campuses and foster collaborations. The health and safety of participants and researchers is paramount to CMaT and we will be providing an educational, hands-on, scientific experience that will push participants past their current knowledge base and boundaries. REU applications will be evaluated for placement at any of our four (4) CMaT campuses, where students will be paired with a graduate student and a faculty mentor to work on a research project related to cell manufacturing.

## [Claudine K. Brown Internship in Education - Smithsonian](#)

- The internships are intended to increase participation of underserved students who are underrepresented in the education and museum leadership field. Interns experience opportunities in the central education office and collaborate with offices, museums, and research centers throughout the Smithsonian Institution where they help to create, develop, and disseminate innovative educational programs and resources at the Smithsonian, online, in the classroom and in communities. Each year, the Office of the Under Secretary for Education (OUSE) identifies new projects for the Claudine K. Brown Internship awardees. In 2023, the Claudine K. Brown interns will have an opportunity to learn through engagement with mentors at the OUSE central education office. In Summer 2023, internships will be offered remotely for 8 weeks.

# INTERNSHIPS & RESEARCH OPPORTUNITIES

Check out the following opportunities for fall research !

## [Data Science for Agriculture - Digital Ag REEU - Purdue University](#)

- Purdue University will again offer a 10-week experience focused on data science in agriculture. This USDA/NIFA-funded program gets rave reviews from past participants who have come from all around the US and from a wide variety of majors. Participants will get a blend of advanced spreadsheets, geographic information systems, Python, and R with applications in an assortment of agricultural production, processing, and marketing contexts. There is a \$5,250 stipend for participation. Faculty instructors represent Agricultural and Biological Engineering, Statistics, and Electrical and Computer Engineering. The deadline to apply is March 6, 2023.

## [Injury Prevention Center Summer Internships - University of Michigan](#)

- The University of Michigan Injury Prevention Center is pleased to announce 5 paid internship positions for graduate and upper-level undergraduate students for the summer of 2023. The internships are designed for students interested in injury prevention research or practice experiences. They offer important opportunities to gain mentored research and practice-based experience in a CDC-funded multidisciplinary injury prevention center. Interns could work with a mentor from the University of Michigan, the Michigan Department of Health & Human Services, or other organizations on ongoing injury prevention research or practice projects. This opportunity can fulfill the U-M MPH practicum internship requirements. Each selected applicant will be provided a stipend of \$1,500 per month for three months. Depending on current working environment and preceptor needs, internships may be in-person or hybrid.

## [Intel Research Experiences for Undergraduate Students - University of North Carolina](#)

- The University of North Carolina at Chapel Hill, in collaboration with Intel, is offering a research experience for undergraduates (REU) program in the summer of 2023. Students accepted into the program will come to UNC for the summer and conduct research in the areas of hardware and system security under the guidance of UNC faculty and Intel researchers. We invite rising juniors with an interest in research to apply. No prior research experience is required. Students from all majors are eligible to apply, however we seek students who are majoring in or otherwise have a background in computer science, computer engineering, or electrical engineering. The program is especially interested in applications from excellent students who share our goal of building an equitable and inclusive learning environment. We especially encourage womxn and students whose racial or ethnic identities have historically been underrepresented in computing to apply.

# UNDERGRADUATE RESEARCH GRADUATION DISTINCTION



## LEVELS OF RECOGNITION

### Distinction in Undergraduate Research

- Students receive a dark blue, light blue, and white cord

### Scholar Distinction in Undergraduate Research

- Students receive a dark blue, light blue and white cord  
AND a medallion (see image to the right)

## DISTINCTION CRITERIA

### Distinction in Undergraduate Research

\*Students must fulfill all requirements

- 1 Successful completion of an Assistant level URECA project - 50 hours of research or more.
- 2 Poster presentation or creative performance at one of the URC's signature events: Fall Open House, Scholars Week, or Summer Research Celebration.
- 3 Active participation for at least one academic year in the Student Organization for the Advancement of Research (SOAR).
- 4 Confirmation of support from URECA faculty mentor.

### Scholar Distinction in Undergraduate Research

\*Students must fulfill all requirements

- 1 Successful completion of a Scholar level URECA project - 100 hours of research or more.
- 2 Poster presentation or creative performance at one of the URC's signature events: Fall Open House, Scholars Week, or Summer Research Celebration.
- 3 Active participation for at least one academic year in the Student Organization for the Advancement of Research (SOAR).
- 4 Poster or presentation at the National Conference on Undergraduate Research or published in a peer-reviewed academic journal.
- 5 Confirmation of support from URECA faculty mentor.