MORGAN™

Office of Undergraduate Research

2022–2023 Report

The Office of Undergraduate Research remains committed to a straightforward, clear, and achievable mission that supports undergraduates who aspire to engage in research.

Morgan State University created the Office of Undergraduate Research (OUR) in 2020. Now entering their third year as an official academic and research office, OUR remains committed to their straightforward, clear, and achievable mission to support undergraduates who aspire to engage in research. Building on the ASCEND Entrepreneurial Research Training Model (ERTM), OUR appreciates that student inspiration often blossoms after performing firsthand research in a topic of interest.

OUR offers opportunities and a meeting place for students to exchange ideas, acquire skills, and develop their own research projects to pursue.

OUR makes research accessible to students.

OUR creates partnerships, programs, training, and workshops for emerging student researchers.

OUR collaborates with MSU departments and significant academic and organizational partners to offer students the best options to find their research niche and manage their projects.

CONFERENCES: Learning How to Communicate Science

It is often challenging for budding researchers to confidently explain the goal, process, and outcome of their research projects to a public audience. But Morgan State University believes that presenting complicated science in comprehensible language is an essential skill for researchers.

- To enable students to gain confidence, MSU collaborates with Coppin State and Johns Hopkins University's Department of Biomedical Engineering to offer a monthly undergraduate cross-institutional seminar series known as **PULSE (Presentations by Undergraduates in Life Science and Engineering)**. Each seminar features an undergraduate student from each institution who presents and answers questions about their faculty-mentored research project, thus increasing their ability to competently communicate science. The following six MSU students presented their research recently:

Chemistry & Biochemistry
MaryAgnes Balogun, Chemistry, and Trinity Bolton, Chemistry

Biological & Cell-Based Sciences
Iyana Gross, Biology, and Emma Gudmundsson, Nutritional Science

Computational Sciences
Shaimeira Meekins, Computer Science, and Teqwon Norman, Computer Science

- Five students sponsored by the Office of Undergraduate Research participated in the **Annual Biomedical Research Conference for Minoritized Students (ABRCMS 2022)** in Anaheim, California. Morgan State University students were actively engaged in both poster and oral presentations:

39 MSU students attended

24 MSU students made presentations

9 students were sponsored by the ASCEND program

7 students were sponsored by the National Institute of General Medical Sciences RISE program

5 students were sponsored by the Office of Undergraduate Research

2 students were sponsored by MSU psychology Professor, Dr. Ingrid Tulloch

2 MSU students were award winners: Faith Hudnall and Iyana Gross

PROGRAMS: Discovering and Exploring Options

In Spring 2023, MSU offered several exciting programs to empower and educate students about opportunities to advance their academic and professional journeys.

- **OUR's Annual Spring into Research Week** offered four days of hybrid sessions that included the 28th Annual Undergraduate and Graduate Research Symposium, the Annual Graduate Research, Interdisciplinary Network & Development (GRIND) Conference, and the Annual Student Research Center's Week.

- The Graduate and Professional Careers Conference was rebranded as "**Fall into Your Future: Graduate and Professional Careers Prep Week**."

  Considering the many options open to MSU graduates, the conference focused on supporting transitions into post-Morgan plans, such as graduate school, professional school, and/or postbaccalaureate programs. Fifty-one undergraduate and graduate students registered for the virtual workshops/panels held in Fall 2022.

The following conference panels and workshops generated insightful guidance and information:

VTSI Day: Information sessions that highlighted Johns Hopkins University's Vivien Thomas Scholars Initiative.

Inspiration Day: Concurrent panels, which highlighted the diversity of STEM careers and illustrated the excellence of Black women and men in research fields.

Next Steps Day: Professionals who highlighted the value of pursuing a postbaccalaureate training opportunity during a gap year and provided advice on how to narrow down graduate schools and programs of interest.

SRC (Student Research Center) Day: Held on the final day of the workshop series. Interested students could take guided MSU lab tours (The 411 on Lab Techniques) or attend a recruitment event for Ross University School of Medicine and American University of the Caribbean School of Medicine.

INTERNSHIPS: Partners Collaborate so Students Succeed

On-the-job learning is a time-honored and successful method of helping students explore their interest in a specific career. MSU is a proponent of mentored research that focuses on one-on-one relationships and exposure to a wide variety of projects. Many internship opportunities are offered in collaboration with outstanding academic and scientific partners.

- **The Johns-Hopkins-HBCU Biomedical Engineering (BME) Pathway** is a structured year-long internship designed to equip undergraduate students with skills for biomedical engineering research careers. Created in 2020, selected students from Morgan State University and/or Coppin State University engage in mentored research with JHU BME faculty. The mentored program serves to demystify biomedical careers and prepares students for future graduate study. Six students submitted applications and all were accepted to the program.

- **The University of Minnesota-Morgan State University Biomedical Engineering (BME) Pathway**, created in 2021, replicates the JHU-HBCU BME Pathway by also offering a structured year-long program that prepares participants for future graduate studies.

- **The Johns Hopkins-Morgan State University Cancer Research Summer Program** is a collaboration with the Sidney Kimmel Comprehensive Cancer Center, a National Cancer Institute designated cancer center. Developed in 2021, selected undergraduates engage in interdisciplinary research with JHU faculty researchers and physicians. By offering students meaningful research opportunities, collaborators hope to increase the pipeline of underrepresented students aspiring to careers in oncology or cancer research. Eight undergraduates applied to and were offered placements in the Program.

- **National Institute on Drug Abuse (NIDA) Summer Research Internship Program** with a goal to further train, mentor, and prepare undergraduates who have strong interests in STEM fields to consider careers in addiction research. Students engage in research internships mentored by NIDA IRP scientists. As they learn about the intricacies of data collection, analysis, and presentation, they gain a comprehensive understanding of addiction theory. NIDA hopes that the students will be encouraged to enter the field of addiction research as they solidify their choice of science careers. Ten students applied for the internship. Of those, four students accepted placements in the program for the 2023–2024 academic year.

- The **Patuxent Environmental & Aquatic Research Laboratory (PEARL) offers paid summer internships to Morgan undergraduates and recent graduates**. PEARL offers students the ability to perform hands-on mentored research in marine and environmental science in Aquaculture and Shellfish Genomics, Ecology, and Environmental Economics. Two OUR students served as interns at the southern Maryland research facility in 2023.

MENTORSHIPS: Guidance and Support

Morgan State University believes students can benefit by engaging in a mentoring relationship with faculty, external research professionals, staff, and other more advanced students. Engaged mentorships can result in innovative research ideas and personal guidance from scholars.

- HBCU students often have challenges achieving parity in the sciences. Johns Hopkins University led a partnership with HBCUs, including MSU, to develop the **Diversity Postdoctoral Alliance Committee (DPAC) HBCU Program**. The goal is to help STEM undergraduates — especially those interested in biomedical careers — improve academic performance, produce research, and broaden career awareness. Students are paired with JHU postdoctoral or graduate students or medical residents. This past semester, **seven MSU undergraduates with biomedical career aspirations were matched with Johns Hopkins trainees** as part of the second annual Diversity Postdoctoral Alliance Committee (DPAC) HBCU Mentoring Program. Twenty-nine percent of all placed students from DPAC HBCU schools (Morehouse, Coppin State, Norfolk State, Tennessee State) were Morgan State University students. The DPAC HBCU program strives to help diverse students acknowledge their own achievements and recognize that they can have a significant role in biomedical research.

- In Fall 2022, OUR Director Dr. Lisa Brown coached and advised three aspiring Health Research Concepts Competition applicants on their research topics.

WORKSHOPS

- **Nine workshops were offered throughout Fall 2022 and Spring 2023.** All were delivered in a hybrid approach by Ms. Kelly Murphy, ASCEND Scholar Career Guidance Counselor. The programs were well planned and provided guidance for emerging scientists. Students were offered information on: Time Management Tips and Techniques (offered twice); Networking; Graduate School I; Resumes and CVs; Summer Internships I; Preparing for the Graduate School Interview; Summer Goal Setting; Summer Internships II: Your Responsibilities and Expectations.

- **Five workshops were offered in Fall 2022 for students who wished to secure Health Research Concepts Competition (HRCC) funding** for self-developed, faculty-mentored research projects. Six undergraduates remained engaged in these developmental workshops. They included: Information Session*; Concept Brainstorming; Mutual Expectations*; Research Skills*; Concept Development.

  **These are mandatory workshops for aspiring HRCC applicants*

- **Research Ethics and Responsible Conduct of Research** is a workshop offered twice a year to both emerging and established researchers. Morgan State University and OUR uphold the standards for humane treatment of animal and human research subjects. The workshops are led by MSU faculty, staff, and external professionals, including:

  Dr. Daniel Brunson, Assistant Professor, Philosophy & Religious Studies, MSU

  Dr. Edet Isuk, Director and Chief of Staff to VP of Research and Economic Development, Research Compliance, MSU

  Ms. Mollie Lange, Senior Research Associate, ASCEND Center for Biomedical Research, MSU

  Dr. Adil E. Shamoo, President of Shamoo Consulting; co-author with David B. Resnick of *Responsible Conduct of Research*. May 2022, Oxford University Press

Fifty-three registrants attended the Fall training program: 20 undergraduates, 6 master's students, and 27 doctoral students. Thirty-one registrants attended the Spring training program: 4 undergraduates, 8 master's students, and 19 doctoral

students. At the conclusion of the workshops, participants were encouraged to complete defined Collaborative Institutional Training Initiative (CITI) training modules to supplement their learning.

Topics included:

- Conflicts of interest: personal, professional, and financial
- Philosophical approaches to making ethical decisions
- Research misconduct and methods for handling
- Secure and ethical data use: confidentiality, management, sharing, and ownership
- Responsible authorship and publishing
- Data acquisition and analysis; laboratory tools for data analysis and images; recordkeeping, including electronic laboratory notebooks
- Scientists as responsible society members; contemporary ethical issues in biomedical research; the impacts of research on the environment and society
- Policies regarding human subjects (IRB), live vertebrate animal subjects in research (IACUC), and safe laboratory practices

CURE INSTITUTE

Faculty play an essential role in teaching students to become adept researchers; however, faculty also seek support and advice when it comes to integrating a research project into their coursework. While some science courses lend themselves more naturally to laboratory experiences, other courses may not have a natural lead-in to integrate research. Morgan State University appreciates the complexities of research integration and has created an exceptional teaching resource for faculty who want to include a **Course Based Undergraduate Research Experience (CURE). A CURE experience is a project that engages an entire class to address a research question or problem that interests the scientific community.** The CURE Institute teaches faculty how to successfully design and assess such a classroom project. The Office of Undergraduate Research collaborated with the Center for Innovative Instruction and Scholarship to promote this excellent opportunity to faculty.

Dr. Erin Dolan (University of Georgia Athletic Association Professor of Innovative Science Education and a principal investigator on CUREnet2) facilitated the May CURE Institute, an in-person two-and-a-half-day workshop. She led MSU faculty in discussion and guided activities on how to use evidence-based instructional strategies to develop plans, instructional materials, and assessments to integrate a defined research project into their courses.

Twelve faculty members who currently participate in research engagement and/or teach laboratory course sessions were selected to participate in the CURE Institute from the following schools and colleges:

- **College of Liberal Arts** (CLA)
- **School of Architecture & Planning** (SA&P)
- **School of Business Management** (SBM)
- **School of Computer, Mathematical, and Natural Sciences** (SCMNS)
- **School of Education and Urban Studies** (SEUS)
- **School of Engineering** (SOE)
- **School of Global Journalism and Communications** (SGJC)

Each faculty member committed to implementing a CURE into one of their undergraduate courses in either Fall 2023 or Spring 2024 and to provide the student learning outcome data.

OUR RESEARCHERS: Finding Their Niche

HELPING VULNERABLE POPULATIONS

Sophia Selenou-Yemgang *(she/her/hers), MSU Senior, Biology major, Psychology and Chemistry minors*

Accessibility is a strong motivator for Sophia Selenou-Yemgang. She aspires to be a researcher who helps discover impactful and accessible medical interventions. In addition, she would like to see scientific findings published in accessible language so that the average reader may understand recent discoveries that impact their lives. A more comprehensive understanding of research projects can lead to public advocacy for specific research accompanied by increased funding.

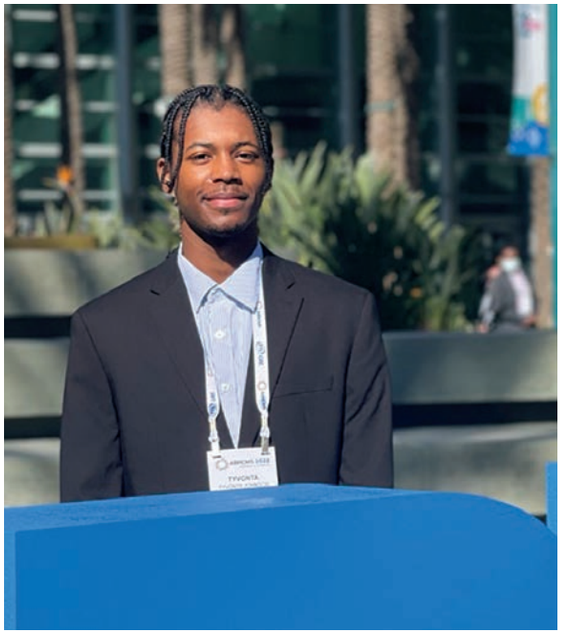
Selenou-Yemgang engaged in two research projects over the summer. In the first, sponsored by MSU in conjunction with the National Institute on Drug Abuse (NIDA), she analyzed data from the NIDA Adverse Social States Survey, which examined the association between adverse childhood experiences and social outcomes in adults with substance use disorders. The second, as a Maternal Child Health LEARN Scholar (Leadership, Education, Advocacy, Research Network) at the Kennedy Krieger Institute, she examined the effects of sleep deprivation on SYNGAP1 mice. In humans, SYNGAP1 is a gene-related disorder that causes several types of disabilities and often includes sleep disturbances. Both projects focused on gaining a better understanding of the issues and struggles of these two vulnerable populations.

Selenou-Yemgang was fortunate to have three mentors at MSU. Dr. Lisa Brown, Claton Lewis, and Thomas Waters were instrumental in cultivating her research opportunities. The Office of Undergraduate Research is an excellent first-stop to discover mentors, motivations, and skills.

PROTECTING THE COAST

Tyvonta Rashon Servance *(he/him/his), MSU BS '23, Biology; 1st year graduate student in Ecology, Evolutionary Biology and Genetics, Pennsylvania State University*

In his spare time, Tyvonta Servance may indulge in a fantasy movie, but his research is as real as it gets: climate change. "Climate change is especially evident in coastal areas," he says. "It drives an increase in the frequency and intensity of storms, flooding, and erosion."



His research is connected to the U.S. Geological Survey's decision support tool known as Coastal Change Likelihood (CCL). CCL predicts the probability of change along the coast. But to be accurately predictive, validation of the model is important. Severance conducted an accuracy assessment of CCL outcomes from 1996–2016 using the National Oceanic and Atmospheric Administration's Coastal Change Analysis Program (CCAP). CCL was quite accurate in predicting areas that were extremely likely to change (a CCL of 8–10), but not as accurate in predicting areas less likely to change (a CCL of 3–7). As a validation study, findings indicated that CCL data is an accurate predictor of future change in areas where past coastal change has occurred, inspiring solutions for preserving coastal resources.

A first-generation college student with four younger siblings, Severance is concerned about how climate change will affect future generations, how it will affect his family. He worries that government funding for climate change research may affect scientific progress due to polarized political factions. Public advocacy for research and government allocation of funds are essential for positive and lasting change. His experience at MSU and Penn State will ensure he is a positive vocal advocate for scientists, like him, who study our earth.

PROMOTING MENTAL HEALTH ACCESS

Ariel Perkins-Fenwick *(they/them/their) MSU Senior, Psychology major*

How can we help individuals in underrepresented populations who need psychological help but can't access or afford it? It's not a hypothetical question; it's a situation that challenges both the personal well-being of individuals as well as the health of communities and societies.

At Morgan State University, Perkins-Fenwick learned a great deal about the human science approach to psychology from their mentor, Professor Erick Guzman, MSU faculty member in Psychology. They used their acquired knowledge in their research project, which studies the affordability of psychodynamic therapy as opposed to traditional, long-term psychoanalysis.

Psychodynamic therapy offers an approach that uncovers difficult or painful emotions arising from one's own social environment. Confronting these emotions and understanding how they affect individual well-being is important for healing. Short-term Psychodynamic therapy is typically covered by insurance, a huge advantage for those with economic challenges. Using correlational research methodology and without intervention, Perkins-Fenwick will measure the accessibility of therapy for an underrepresented community.

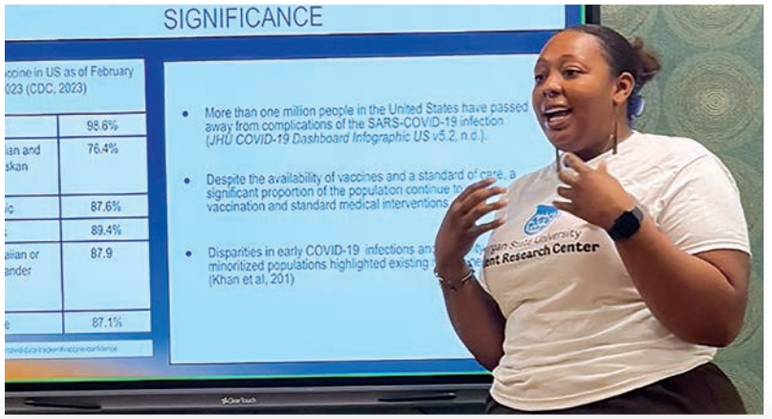
They are concerned that social and humanities research might be prone to misinformation, which can affect the acceptance of research outcomes that relate to marginalized communities. But accepting and understanding research outcomes helps individuals and communities take advantage of mental health options that are available, accessible, and affordable for them.

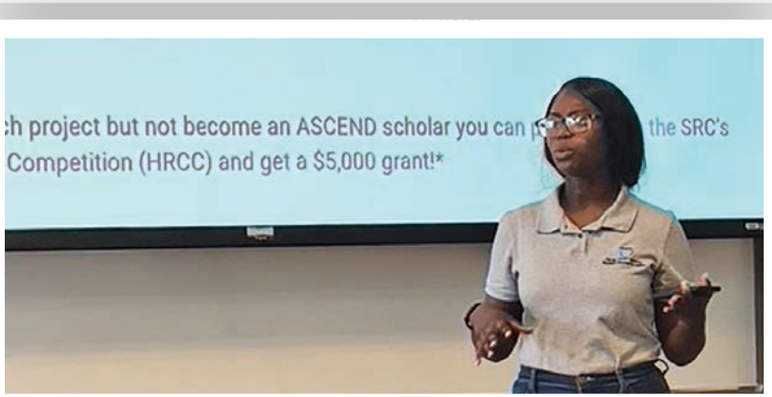
ANIMATED RESEARCH

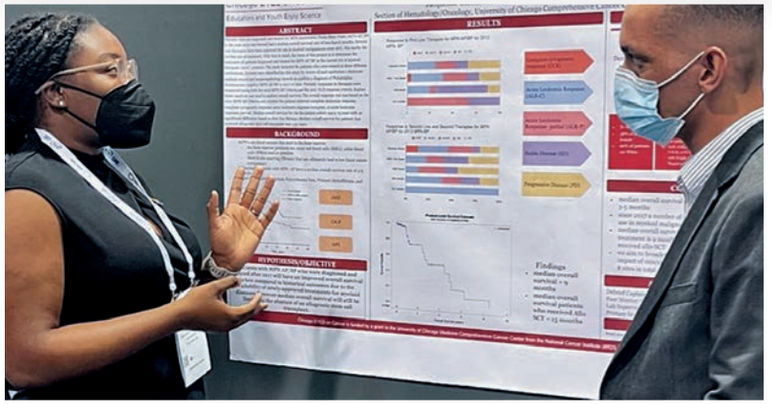
Ignatius Tochukwu Nwankwo, *(he/him/his) MSU Junior, Electrical Engineering major*

An inventive mind is always busy — thinking, wondering, discovering how things work. Ignatius Nwankwo has one of those minds and has been encouraged by this father to apply for research opportunities that relate to his interest in discovery.

"I want to learn about the underlying concepts that govern the devices we use daily, such as electronics and vehicles," he says. He believes his American and Nigerian dual citizenship and his schooling in both countries enriched his self-understanding and his interests in both technology and art and design. His research reflects those interests. He is adding new features to a software platform known as Cartoonimator, a low-cost animation tool that allows children to create simple animations with just paper and a smartphone. Using JavaScript and computer vision functions, Nwankwo plans to add a feature that increases the size of the fantasy creatures (sprites) for more visibility and allows for camera movement. He believes the software would then become accessible to more children as well as increase their ability to become more creative. Ignatius Nwankwo was fortunate to land at Morgan State University, where creative minds are valued, and opportunities are unlimited.







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