FAMU-FSU College of Engineering

The Joint College *for* Florida A&M University *and* Florida State University

Engineering Education & Research
Annual Report 2024

Innovating technological advances while educating the next generation of engineers

Fall 2024

Unique Research Ecosystem Rewards

$538K

Expenditures per Tenure-Track Faculty

20 Distinct

Research Centers/Labs

Including several nationally-renowned centers such as the National High Magnetic Field Laboratory.

$56M

Record Research Expenditures in One Year

126%

Increase in Research Expenditures Over Past 5 Years

Research Expenditures
FY 2024, in millions

A Tremendous Trajectory for Research Growth

FAMU-FSU College of Engineering

View from Here

Suvranu De, Sc.D.
Dean, FAMU-FSU College of Engineering

Throughout history, humanity's progress has been marked by its mastery over materials. From the Stone Age to the Silicon Age, each leap forward has been defined by our ability to shape, harness and transform the elements around us. Today, at the FAMU-FSU College of Engineering, we stand on the threshold of a new frontier—not merely creating with materials but delving into their innermost structures to uncover the building blocks of the future.

This year, our journey has been propelled by an intensified focus on Engineering New Materials. No longer confined to crafting tools and devices, we are now exploring the atomic intricacies that underpin innovation in areas such as quantum computing, sustainable energy and advanced manufacturing. Our newly launched Department of Materials Science and Engineering is dedicated to this vision, pushing the boundaries of what materials can achieve and opening doors to applications once thought beyond reach.

With initiatives like the InSPIRE Institute in Panama City and the Neutron Nexus, as well as the newly funded NASA MIRO Center for In-Space Additive Manufacturing, our researchers are peering into the very fabric of matter, examining materials at a scale that was unimaginable just decades ago. Here, we are uncovering pathways to new properties, new behaviors and new capabilities, creating materials that will shape the future of computation, communication and energy resilience.

In this report, you'll glimpse how our faculty and students are redefining engineering through materials science. Their work goes beyond the lab—each discovery and insight is a step toward a world where the materials we understand and control today become the bedrock of tomorrow's technologies. We invite you to explore these achievements, knowing that they represent not just progress, but the very essence of what it means to build and innovate in the 21st century.

FAMU-FSU College of Engineering

The Joint College of Engineering for Florida A&M University and Florida State University

#60

Public Engineering College with Doctorate

(U.S. News & World Report 2024)

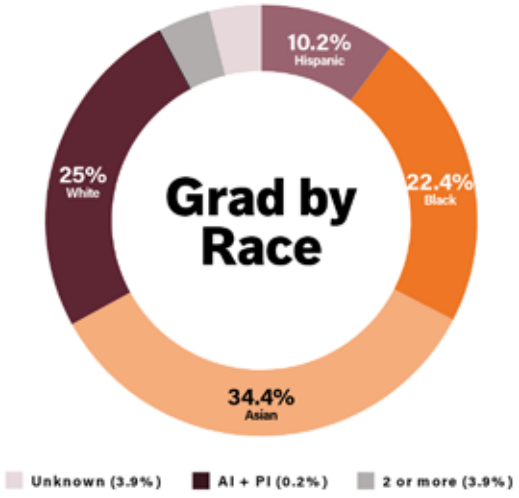
Climbing in Rank

7 Ph.D. Programs

#49 **Industrial & Manufacturing Engineering** Program Ranking

#54 **Materials Science & Engineering** Program Ranking

#72 **Civil & Environmental Engineering** Program Ranking



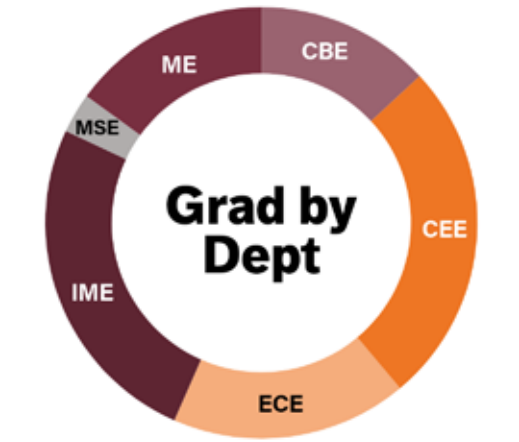
Graduate Engineering by the Numbers

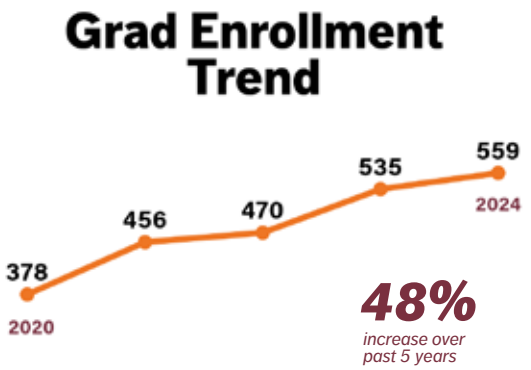
(Fall 2024)

559 **GRAD** Students

64% **STEM Under-represented Minority (URM)** Grad Students

27% **FEMALE** Grad Students





Joint College Emerges as a Quantum Research and Education Hub

With a strong foundation in quantum research and with new funding from the NSF, the college is poised to become a leader in quantum research and scientific discovery.

The FAMU-FSU College of Engineering is positioning itself as a key player in the burgeoning field of quantum engineering through innovative research and educational initiatives. Building upon a major investment by Florida A&M University (FAMU) and Florida State University (FSU) , along with ongoing quantum research by several faculty members, the college recently received a boost from the federal government. Two professors, **Wei Guo** from the Department of Mechanical Engineering and **Bayaner Arigong** from the Department of Electrical and Computer Engineering, have each secured $5 million grants as part of the National Science Foundation's (NSF) $39 million Expanding Capacity in Quantum Information Science and Engineering (NSF ExpandQISE) program. These awards will help transform the college into a hub for quantum research and education.

Guo's project, titled "Quantum Fluids and Solids as Platforms for Quantum Science and Engineering," is aimed at advancing research on quantum phenomena and enhancing education in the field. Collaborating with experts from Notre Dame, Yale, and FAMU, his team is launching several research initiatives focused on using quantum fluids and solids to explore and manipulate quantum behaviors. In addition, the project includes plans to develop a quantum information science and engineering (QISE) curriculum at the college, which will lay the foundation for a future master's program. This effort will be bolstered by the creation of a QISE research center, fostering collaboration among leading experts and establishing a quantum research ecosystem.

"Our work pushes the boundaries of quantum technology and solidifies FAMU's role as a cornerstone in QISE research," Guo said.

Arigong's project, "Developing Quantum Information Science and Engineering Research and Education Program at FAMU," focuses on building a quantum science education pipeline. In collaboration with the University of Chicago, and industry partners, his team is developing quantum chips and training platforms that will redefine quantum education and workforce development. An important component of the project is creating a quantum-savvy workforce, with new courses, professional training and outreach efforts designed to prepare students for leadership roles in QISE and STEM fields.

"Our goal is to provide multidisciplinary opportunities in QISE for both our faculty and students, equipping them with the tools to excel in this emerging field," Arigong said.

Both projects share a common vision: transforming the FAMU-FSU College of Engineering into a leader in QISE research and education. Collaborations with national labs and industry partners ensure that students will gain cutting-edge experience and be prepared to lead in quantum technologies.

Quantum mechanics, which governs matter at atomic and subatomic scales, is expected to revolutionize many industries. Future technologies, including quantum computers, communications systems and cryptography, will harness quantum phenomena like superposition and entanglement to solve complex problems far beyond the capabilities of classical physics. Recognizing this, the federal government has made QISE a strategic priority through initiatives like the $2.6 billion National Quantum Initiative, supported by agencies including the NSF, Department of Energy (DOE) and Department of Defense.

In alignment with these national efforts, FSU committed more than $20 million to quantum science over the next three years. This investment will support the hiring of at least eight new faculty members, the procurement of advanced equipment, and the creation of dedicated space within the new Interdisciplinary Research and Commercialization Building. FSU President Richard McCullough emphasized the university's drive to lead the second quantum revolution during the Quantum Science and Engineering Symposium last year.

FSU's Vice President for Research Stacey Patterson noted the university's commitment to enhancing its strengths in areas like magnetism, superconductors and quantum materials, positioning the university as a major player in QISE. "The university is committed to building on these programs by investing in top national talent and fostering new opportunities for faculty and students," she said.

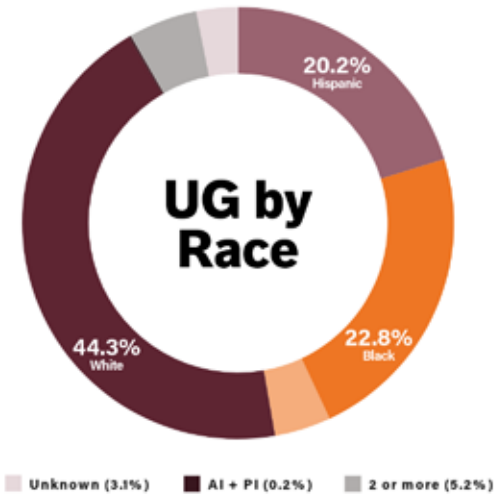
Beyond academic partnerships, the college's quantum initiatives are drawing the attention of industry leaders. Representatives from companies like Amazon and Keysight Technologies were involved in quantum science discussions at a university-hosted symposium, underscoring the strong potential for industry-academic collaborations.

Dean Suvranu De of the FAMU-FSU College of Engineering sees quantum science as a natural extension of engineering's problem-solving legacy. "Our college is proud to bolster the university's initiatives in this rapidly emerging field," De said. "Quantum science and technology represent the next frontier for engineers seeking to solve complex real-world problems."

As the college continues to build momentum in quantum research, it is clear that these investments in both research and talent development will position the joint college as a leader in quantum science and technology, ready to help drive the next wave of innovation in this critical field.

Undergraduate Engineering by the Numbers

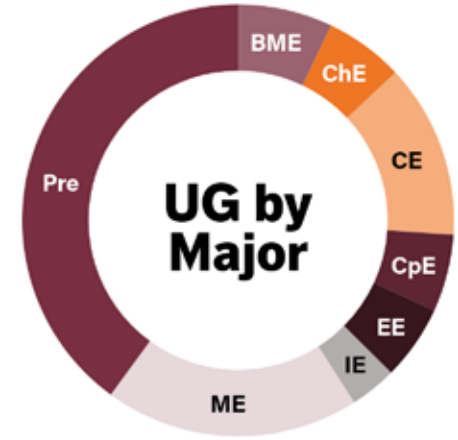
(Fall 2024)



2726 **UNDERGRAD** Students

65% **STEM Under-represented Minority (URM)** UG Students

30% **FEMALE** UG Students



UG Enrollment Trend

22% *increase over past 5 years*

Our Universities by the Numbers

FAMU

#1

Public HBCU **Florida A&M University (FAMU)**

(U.S. News & World Report 2024)

FAMU-FSU College of Engineering

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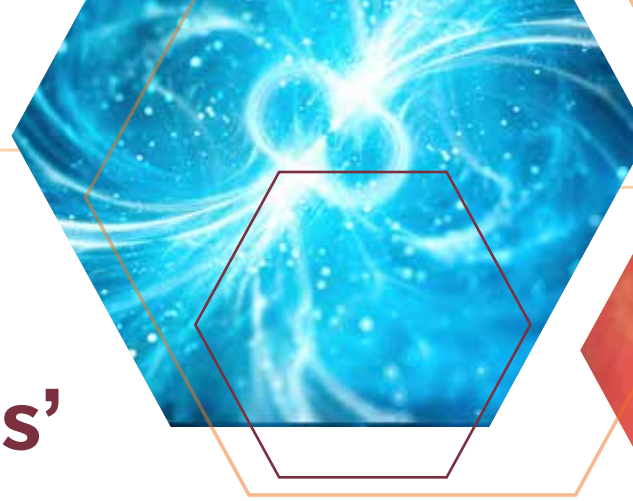
FSU

#23

Public University **Florida State University (FSU)**

(U.S. News & World Report 2024)



Nation's First ORNL 'Neutron Nexus' Launched

Oak Ridge National Laboratory has launched its Neutron Nexus pilot program with FAMU and FSU through the FAMU-FSU College of Engineering.

The FAMU-FSU College of Engineering has joined forces with Oak Ridge National Laboratory (ORNL) to launch the **Neutron Nexus program,** the first of its kind in the nation. This initiative aims to expand scientific collaboration and increase the diversity of the scientific community by engaging a broad range of universities, including Minority Serving Institutions (MSIs), community colleges, and technical colleges. The program is designed to broaden access to neutron scattering research, a critical tool for advancing scientific knowledge and innovation.

Despite the recent cancellation of part of a planned two-day "ORNL Days" event in Florida due to Hurricane Helene, the first day of presentations and networking laid the groundwork for the ambitious goals of the Neutron Nexus program. This initiative seeks to foster professional relationships, enhance neutron science educational opportunities, facilitate visits to ORNL for students and faculty, and increase access to neutron scattering capabilities for regional colleges and universities.

As a key partner, the FAMU-FSU College of Engineering is working closely with ORNL to make neutron research more accessible. The college's newly established **Department of Materials Science and Engineering** is at the forefront of this partnership, leveraging ORNL's cutting-edge neutron scattering and imaging facilities to advance research in northern Florida. This collaboration provides a unique opportunity for new users in the region to conduct transformative research that spans fields such as advanced manufacturing, polymers, soft materials and quantum engineering.

Susan Hubbard, ORNL's Deputy for Science and Technology, emphasized the significance of this partnership: "The Neutron Nexus program brings together a premier national lab and a premier engineering department to address critical topics for the nation's future. We will explore a range of mechanisms to grow our partnership, including joint faculty, collaborative research and graduate student engagements."

This partnership builds on the existing strong relationships between ORNL and both FSU and FAMU. According to Jens Dilling, ORNL's Associate Laboratory Director for Neutron Sciences, the goal is to expand these relationships and create new partnerships to enhance scientific advancements. "We are thrilled to bring the wonder of neutrons to a new generation of undergraduate and graduate students and help faculty expand their science and technology impact," he said.

The joint engineering college offers a unique model that is particularly beneficial to the pilot Neutron Nexus program. The kickoff event included discussions on critical research areas at the college that dovetail with the ORNL neutron science capabilities such as magnets for neutron scattering, neutron scattering applications and the future of

quantum engineering. FAMU President Timothy L. Beard expressed the importance of the collaboration: "The launch of the new materials science and engineering department at the college will ensure that our graduates are prepared to assume leadership roles in a rapidly evolving technological landscape." FSU President Richard McCullough added, "ORNL is a powerhouse in scientific research, and this partnership strengthens the joint college's ability to lead in engineering innovation."

McCullough further noted that the university is making significant investments to recruit tenure-track and research faculty for the new materials science and engineering department. This influx of talent will enhance the college's research and teaching capabilities, positioning it as a leader in materials science.

The Neutron Nexus program aims to address key challenges in science and technology by leveraging neutron scattering—a method that offers unique insights into the atomic and molecular structure of materials. Neutrons are non-invasive and capable of penetrating even the densest materials, making them invaluable for studying a wide range of substances, from organic materials and batteries to advanced quantum devices.

Neutrons also possess a magnetic moment, which allows them to detect magnetic materials and behaviors, a critical feature for understanding electronic devices and quantum computers. Neutron scattering enables researchers to explore the fundamental nature of materials at the atomic scale, spurring innovations that can lead to more powerful computers, better drugs, stronger batteries and more sustainable infrastructure.

As the world confronts grand challenges such as clean energy and national security, neutron research will play a pivotal role in finding solutions. By partnering with ORNL, the joint college is poised to contribute to these critical efforts, expanding its impact on science and technology while preparing the next generation of engineers and scientists for leadership roles in these transformative fields.

In addition to the scientific advancements, the Neutron Nexus program also aims to enrich educational opportunities. By organizing in-person visits to ORNL and increasing engagement for remote experiments, the program offers students and faculty at participating institutions the chance to gain hands-on experience with state-of-the-art neutron scattering techniques. This exposure will not only enhance their academic and professional development but also contribute to building a more diverse and capable workforce in neutron science.

As the collaboration continues to grow, the Neutron Nexus program represents a bold step toward expanding access to neutron research and fostering a new generation of scientists and engineers. With a shared commitment to advancing science and technology, this partnership is set to make a lasting impact on both academic research and the broader scientific community.

AT THE INTERSECTION OF INNOVATION AND OPPORTUNITY

In Spring 2024, the college took a significant step forward with the inauguration of the Department of Materials Science and Engineering (MS&E), its first new department this century. Building on decades of excellence at the National High Magnetic Field Laboratory (MagLab)—Florida's only national laboratory, High-Performance Materials Institute (HPMI), Florida Center for Advanced Aero-Propulsion (FCAAP), Center for Plasma Science and Technology (CePaST), and Center for Advanced Power Systems (CAPS), MS&E is positioned to drive innovation across diverse fields, addressing urgent needs in energy, technology and sustainable materials. With approved MS and PhD programs at FAMU and FSU, MS&E is poised to attract top talent and cultivate a new generation of leaders in materials science.

Led by Professor David Larbalestier—a world-renowned scholar in superconducting materials and a National Academy of Engineering member—and associate chair Professor Tarik Dickens, a rising star in nanotechnology and materials processing, MS&E benefits from a leadership team committed to driving dynamic and innovative growth in the department. The department's research agenda aligns well with the college's strategic focus on quantum engineering and nanoengineering, emphasizing research in semiconductor and quantum materials, superconductors and magnetic materials, and polymers, composites, and energy solutions. By leveraging partnerships across both universities' colleges and affiliated research centers, MS&E is fostering collaborative approaches to material challenges, advancing our role in Florida's evolving high-tech industry.

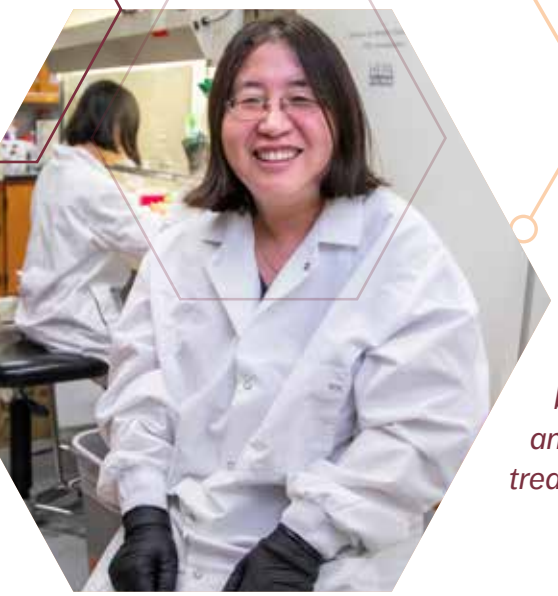
Looking ahead, MS&E is positioned for transformative growth, supported by large-scale faculty recruitment, cutting-edge facilities in the new Interdisciplinary Research and Commercialization Building (IRCB), and interdisciplinary research initiatives on the horizon. Key projects launching in Spring 2025, along with an incoming cohort in Fall 2025, will allow MS&E to expand its impact and drive the our broader research mission. Positioned at the intersection of innovation and opportunity, MS&E is ready to shape the future of materials science. ***Dive deeper: famufsu.engineer/MSE***

David Larbalestier, Ph.D., CHAIR

Tarik Dickens, Ph.D., ASSOCIATE CHAIR

Launching a New Department with a Traditional Focus and New Model

Creating a new department in the nation's joint college presented an exciting opportunity to embody formally the unique nexus that exists here. Dean De envisioned a unit that would be jointly-yoked, tied from the beginning to both FAMU and FSU. Leveraging the best of both universities, the new MS&E department would have 50% of faculty from each institution and embody a focus not only on bleeding-edge materials science research, but a foundational focus on seeking out and developing Black and female engineers in the field. Without the historical remnants from the college's beginning days, this new department is a fresh take on partnership and the joint college mission.



Yan Li ***Professor of Chemical & Biomedical Engineering***

"My research enables human stem cell-based therapeutics and brain tissue models for drug screening by regulating cell-matrix and cell-cell signaling, which can lead to the therapeutic targets for treating ischemic stroke, Alzheimer's disease, brain tumors and more."

POLYMERS

Using CO2 and Biomass, Engineering Researchers Find Path to More Environmentally Friendly Recyclable Plastics

Ho Yong Chung and a team of researchers have created a potential alternative to traditional petroleum-based plastic made from carbon dioxide (CO2) and lignin, a component of wood that is a low-cost byproduct of paper manufacturing and biofuel production. This study is the first to demonstrate the direct synthesis of what's known as a cyclic carbonate monomer—a molecule made of carbon and oxygen atoms that can be linked with other molecules—made from these components.

ARTIFICIAL INTELLIGENCE

Unleashing the Power of AI to Solve Important Microscale Challenges

Researchers led by **Leo Liu** are advancing the power of high-performance computing powered by artificial intelligence (AI) to combat blood disorders like thrombosis, which causes heart attacks and strokes. Liu's group investigates flow-mediated solidification, a phenomenon related to biological processes like blood clotting. Using supercomputing powered with AI, the team develops multiphysics and multiscale modeling tools to understand what's happening.

ADVANCING MINORITY ENGINEERS

Launching a NASA-Funded Space Research and Additive Manufacturing Educational Initiative

The joint college recently received a $5 million NASA MIRO grant to develop advanced 3D printing technologies for space exploration. Led by **Subramanian Ramakrishnan,** the project focuses on creating composite materials for sustainable space missions while significantly boosting opportunities for minority engineers in the aerospace sector. Through partnerships with NASA centers and industry leaders, the initiative will provide hands-on research experience to students and aims to produce African American and Hispanic Ph.D. graduates in space-related fields.

METABOLIC DISEASE

Zinc and pH Modulate the Ability of Insulin to Inhibit Aggregation of Islet Amyloid Polypeptide

Aggregation and toxicity of a human hormone, amylin, are linked to the pathology of type-2 diabetes. In a recent study, **Rams Ramamoorthy's** team reported the ability of insulin to inhibit amylin's susceptibility to these issues.

MATERIALS

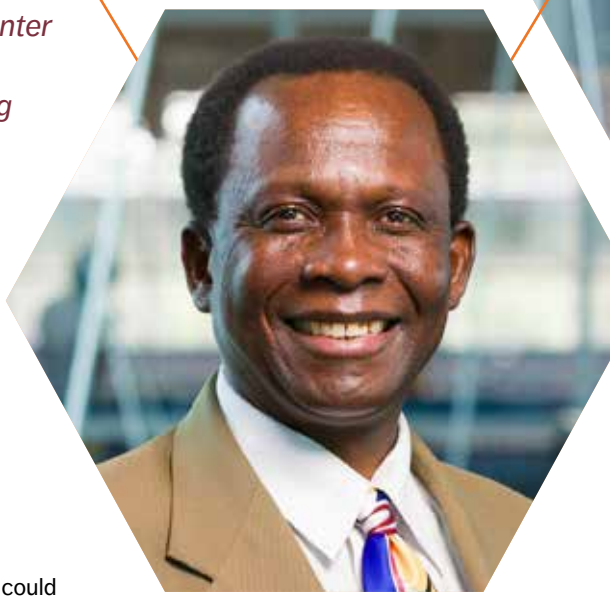
Tin Selenide May Hold the Key for Thermoelectric Solutions

Theo Siegrist and his research team discovered that atomic-level structural changes occur when the compound tin selenide heats up—changes that help it to conduct electricity but not heat. A good thermoelectric material needs strong electrical conductivity but thermal conductivity that is as low as possible. In tin selenide, this is achieved by a dynamic partial disorder of the tin atoms at elevated temperatures that results in a reduction of the heat conductivity. The study provides information that could lead to new technologies for applications such as refrigeration or waste heat recovery from cars or nuclear power plants.

Dive deeper: ***famufsu.engineer/cbe***

Ren Moses ***Professor of Civil & Environmental Engineering***

"Working with various stakeholders in rural areas, the REAT Center projects are geared towards improving safety and access to multimodal transportation with the attendant results of uplifting economic well-being of diverse rural communities."



RESILIENCE, RECYCLING AND REUSE

Tracking Storm Debris for Better Management and Resource Allocation

Juyeong Choi leads a research team from the joint college and California Polytechnic State University focused on improving debris management. Using a data-driven model to track changes in debris over time and space, the team provides insights into post-storm debris management. With these findings, they will develop a simulation model for debris collection operations, comparing it to current practices to create a more sustainable and efficient management framework.

ELECTRIC BATTERY SAFETY

Advancing Electric Vehicle Battery Safety with New Energy Absorption Design

Sungmoon Jung is improving the safety and performance of electric vehicles through a new design that protects their batteries. Jung and his research team use paraffin wax-filled tubes as dual-purpose crash absorbers and thermal protectors for electric vehicle batteries. These phase change material (PCM) tubes cushion impacts, absorb heat and prevent temperature spikes that could lead to fires. Experiments showed that PCM-filled tubes absorbed 74% more energy than unfilled tubes, improving EV safety and battery reliability.

OPTIMIZING FOOD WASTE CONVERSION

Converting Food Waste to Sustainable Energy Using Microwave Technology

Gang Chen's team has developed a sustainable method to convert food waste into energy using hydrothermal technology, which avoids energy-intensive drying. The process produces hydrochar, a carbon-neutral solid fuel with low environmental impact, reduced moisture, and improved storage properties. A key innovation is reusing process water, which enhances its heating capacity. This breakthrough could transform food waste processing for sustainable fuel production.

POPULATION HEALTH

Hidden Health Impacts of Natural Disasters

Ebrahim Ahmadisharaf's team studied flood-damaged homes in New Orleans and New York City, uncovering factors linked to mold growth and asthma symptoms. Using machine learning, led by doctoral student Maryam Pakdehi, they identified influences like flood depth and roof age on mold and respiratory issues. Their findings offer insights for disaster management and public health, aiming to inform building design, educate families on indoor air pollution risks and improve responses in flood-prone communities.

ENVIRONMENTAL RISK

Revealing Harmful Blue-Green Algae Hotspots Across Florida's Lakes

Nasrin Alamdari's team is developing a predictive tool for harmful cyanobacteria blooms in Florida's lakes. Using machine learning, water quality, climatological and remote sensing data, the tool helps identify bloom-prone areas. This proactive approach allows officials to manage and prevent outbreaks, protecting public health, ecosystems and local economies impacted by blue-green algae.

Dive deeper: ***famufsu.engineer/cee***

Olugbenga (Moses) Anubi

Assistant Professor of Electrical & Computer Engineering

"My research utilizes control theory and machine learning to enhance safety and resilience in cyber-physical systems, aiming to advance the efficiency, resilience and safety of critical infrastructures in energy and transportation."

SIGNAL PROCESSING

Developing RF Processors Using Novel Materials

Bayaner Arigong received an NSF Early Career Award for his aim to design an RF real-time configurable analog signal co-processor using nanoparticles and 3-D printing. The process transmits signals in the analog domain before converting them to digital and accelerates computing speed. The complex calculations are used in everything from high-tech AI to wireless communications. The engineered nanoparticle composite film and 3-D printing techniques reduce the cost of fabrication and design. His design speeds up signal processing while lowering the cost and complexity by using less energy.

CYBERSECURITY

Improving Electric Grid Cybersecurity

Assistant Professor Olugbenga Moses Anubi's CyberPREPS project aims to secure electric power systems against cyberattacks by employing advanced machine learning algorithms that utilize operational data and secondary information sources. Supported by a $2.89 million grant from the U.S. Department of Energy, this approach mimics the immune system's response, allowing the grid to adapt and maintain function during attacks. The project will leverage the Center for Advanced Power Systems' testing facilities to enhance grid resilience and address growing cybersecurity threats.

SAFETY TECHNOLOGY

Improving Intersection Safety

The PREDISS project, led by professors **Olugbenga Anubi and Ren Moses with Joshua Hollingsworth,** aims to enhance intersection safety using predictive technology. By integrating low-cost sensors, cameras and V2X technology, PREDISS tracks vehicles and pedestrians, predicts potential collisions and sends real-time alerts or adjusts traffic signals to prevent accidents. The team is advancing this system for Tallahassee, focusing on protecting vulnerable road users. The project aligns with USDOT's national safety goals and involves hands-on development for students in the Resilient and Autonomous Systems Lab.

FACULTY ACHIEVEMENTS

Google Endowed Professorship Awarded to Electrical Engineer

Shonda Bernadin is one of the first Google Endowed Professors at Florida A&M University. Supported by a $5 million Google grant, her work bridges computer engineering and computer science, focusing on speech processing, data analysis and AI. Bernadin founded the SPADAL lab and promotes STEM education for underserved communities, receiving several awards for her efforts. She also advises the WiSTEM and NSBE Pre-Collegiate chapters and serves on the STEM4Girls board.

ELECTRIC VEHICLES

Improving Electric Vehicle Technology with New Power Train Innovation

Researchers **Jinyeong Moon** (FAMU-FSU College of Engineering) and Woongkul Lee (Michigan State University), funded by the Department of Energy and General Motors, are advancing electric vehicle technology with a new three-level inverter that offers smoother power delivery, enhanced efficiency and reduced cost. This innovative design decreases physical volume and improves motor performance by eliminating the need for a neutral clamp and integrating Gallium Nitride transistors. This collaboration, with partners including NexGen and NREL, aims to propel EV reliability and accessibility.

Dive deeper: ***famufsu.engineer/ece***

Hui Wang

Associate Professor of Industrial & Manufacturing Engineering

"We create AI capabilities for additive manufacturing systems, allowing printers to learn skills to improve printing quality and productivity autonomously from all available resources, thereby reducing the testing cost and expediting new process development."

ADDITIVE MANUFACTURING

3-D Printed Polymer Matrix Composites for Low-Cost Optoelectronic Manufacturing

Zhibin Yu and Tarik Dickens are developing perovskite-polymer composites that can be 3-D printed for high-resolution pixelated radiation detectors and other devices, like detector arrays, and synthesizing new semiconductor-polymer composites with better manufacturing flexibility than current materials. If successful, the composites can be processed into commodity plastics by solution casting, hot pressing, melt extrusion and injection molding—techniques that allow manufacturers to produce radiation detectors of various shapes and sizes.

FUTURE FACULTY

Building Futures, Breaking Barriers, Empowering Female Students in Science

More female graduate students are playing a pivotal role in the traditionally male-dominated fields of science, technology, engineering and mathematics (STEM) fields. Nowhere is this better illustrated than in **Rebekah Sweat's** lab at the FAMU-FSU College of Engineering. Two of her female students recently produced first-author research publications. In addition, her team includes two female rising high school seniors who collaborated on the work and are acknowledged in the papers for their contribution to the research. This is quite remarkable.

ADVANCED MATERIALS

Research at the Extreme Helps Students Forge Careers

A new research program promises to produce a robust, well-trained and diverse workforce for the future—and the high-tech materials needed for harsh new frontiers like deep space. Led by **Tarik Dickens,** the new project funded by the Department of Energy (DOE) is dubbed NNSA Minority Serving Institution Partnership Program (MSIPP) Gulf Coast Consortium: Materials-At-The-Extreme (MATE). It aims to increase research and educational opportunities in advanced materials processing, especially at the high school level and beyond.

NANOMATERIALS

Creating New Smart Materials for Wearable Technology

Wearable devices use light-emitting diodes (LEDs) to project light onto human tissues and a photodiode to detect the light. The intensities and waveforms of this interaction correlate to cardiovascular changes in the body. Many of these devices use rigid LEDs and photodiodes embedded in a stiff material like a watchband. A research team, including **Zhibin Yu,** developed a soft, stretchable photodiode embedded in an elastic polymer matrix as an alternative. The new photodiode fits securely on the skin because it is soft and pliable like human bodies, giving the user a more precise cardiovascular reading over time.

Dive deeper: ***famufsu.engineer/ime***

Rajan Kumar ***Professor of Mechanical Engineering***

"The continued demand for improved performance of aerospace systems and safety for those in uniform operating those flight vehicles must, in large part, be met by addressing new challenges through a more comprehensive understanding of the underlying fundamental phenomena. We support the design and development of next-generation flight vehicles and solve complex high-speed aerodynamic problems."

HYPERSONICS

New Modeling for Supercharged Engines

Alexandre Berger focuses on computational fluid dynamics, particularly developing advanced models for turbulence and combustion in aerospace applications. His work is essential for improving the design and efficiency of aircraft and spacecraft and contributes to advancements in the aerospace industry.

ENERGY

Leading a $2.25 Million DOE Effort to Enable Clean Hydrogen Energy

One of the challenges of hydrogen as a clean energy is that its molecules are small and can make their way through traditional materials like steel. When the fuel enters the metal, it causes hydrogen embrittlement, rendering metals less ductile. **Associate Professor Brandon Krick** leads a team trying to develop hydrogen-tolerant materials that can survive the extreme environment associated with hydrogen use, storage and production— temperatures ranging from below -423°F to greater than 2200°F.

ROBOTIC AUGMENTATION

Engineering Research Center to Improve Robot Dexterity

Through Florida A&M University, the joint college is partnering in a large multi-institutional collaboration that has received $26 million from the National Science Foundation (NSF) to launch a new Engineering Research Center (ERC). The center, led by Northwestern University, is dedicated to revolutionizing robots' ability to amplify human labor. **Carl Moore,** an associate professor and robotics researcher in the Department of Mechanical Engineering, leads the FAMU team at the joint college. Moore will focus on robotic touch interaction and lead the project's recruiting, mentoring and inclusion efforts.

ATMOSPHERIC AERODYNAMICS

Understanding the Mathematics of Aerodynamics for Climate Challenges

Neda Yaghoobian's research focuses on atmospheric aerodynamics, particularly in understanding how airflows interact with natural and built environments. Her work includes studying the cooling mechanisms of termite mounds, modeling wildfire behavior, and exploring how atmospheric conditions influence the spread of wildfires. This research is vital for improving our understanding of climate interactions and developing strategies to mitigate the impacts of wildfires and other environmental challenges.

LEGGED ROBOTS

Developing Robotic Technology for High-Risk Situations

Christian Hubicki specializes in legged robotics, focusing on how robots can walk, run and navigate complex terrains with agility and efficiency. His work combines principles of biomechanics and control systems to develop robots that can adapt to challenging environments, which has important applications in search and rescue missions, disaster response and exploration. By advancing legged robot technology, Hubicki's research contributes to creating more capable and resilient robots that can perform tasks in situations where traditional machines might fail.

STUDENT SUCCESS

Students Make History with a Clean Sweep at SAMPE University Research Symposium

In an unparalleled achievement, students from the joint college emerged as the undisputed champions at the Society for the Advancement of Material and Process Engineering (SAMPE) university research symposium at CAMX last fall. The 2023 SAMPE symposium saw a historic win for the institution as its talented researchers **clinched the gold medal in all three categories: Ph.D., M.S., and B.S.** The team from the Department of Industrial & Manufacturing Engineering, Department of Materials Science & Engineering and the High-Performance Materials Institute (HPMI) placed at the top of each degree category in the competition—for the first time in its history.

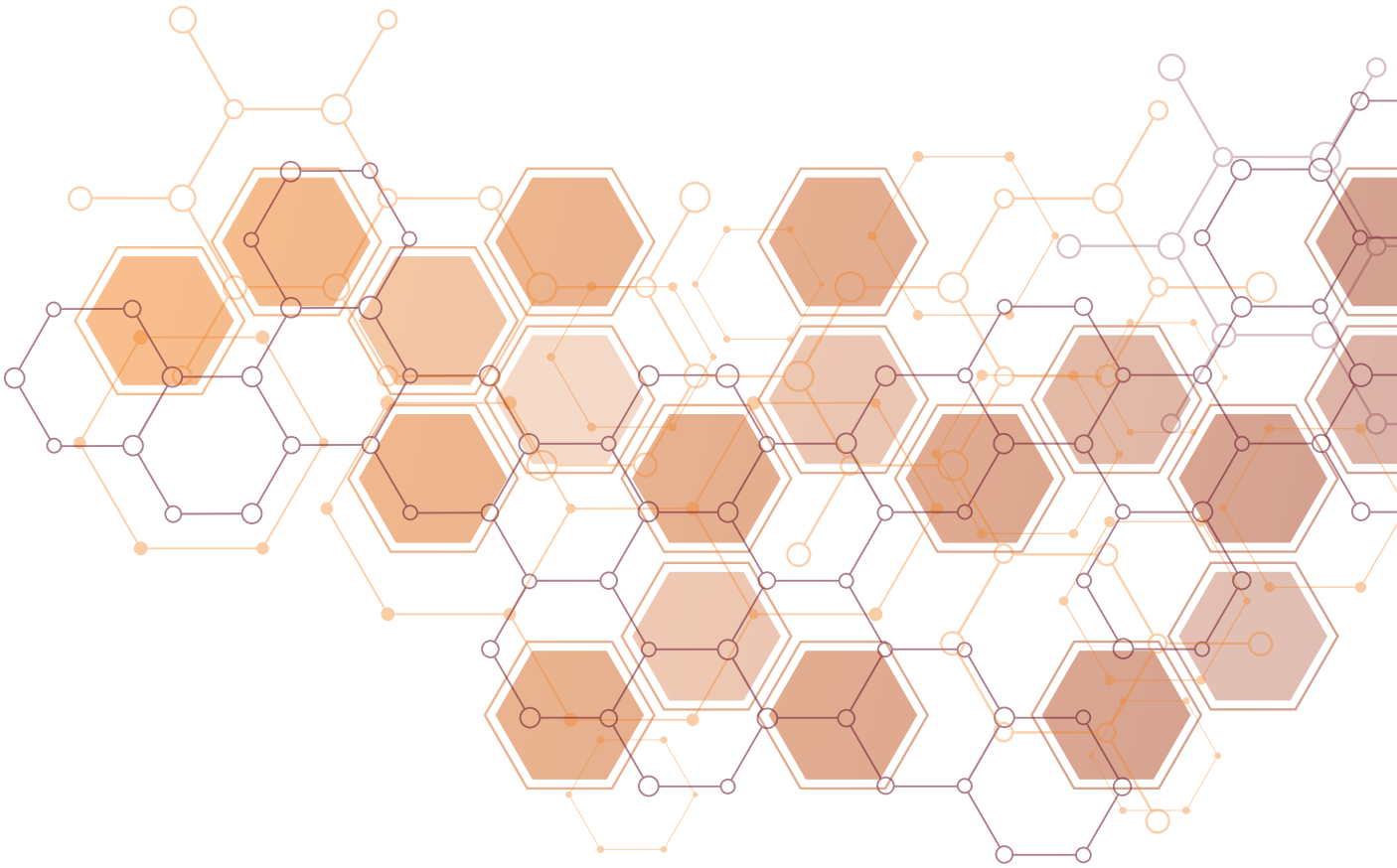
The nexus of an HBCU and an R-1 university

provides an opportunity to level STEM inequities. Minoritized groups attend our joint college via either Florida A&M University or Florida State University, and all students learn, work and develop together in our shared labs, classrooms and research centers. This synergy provides benefits far beyond the obvious. Future faculty members are able to form positive, experience-based relationships with professors who are mentors and strong models of engineering research success—a critical factor in increasing the number of engineering faculty who are from minoritized groups.

FAMU-FSU College of Engineering

The Joint College
for Florida A&M University
and Florida State University

2525 Pottsdamer Street
Tallahassee, FL 32310
www.eng.famu.fsu.edu



One **college,**
two **universities,**
unlimited **opportunity.**

The FAMU-FSU College of Engineering is the joint engineering institution for Florida A&M and Florida State universities, the only such shared college in the nation. We are located less than three miles from each campus. After satisfying prerequisites at their home university, students learn together at the central engineering campus with its adjacent, associated research centers and a national laboratory.