

# BIG DATA DIGEST



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FAMU Students Honored by the American Society for Microbiology

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AI, ML & IoT Power New Environmental Curricula



### FAMU Launches Mobile STEM Lab to Drive Environmental Innovation

Florida A&M University recently celebrated the launch of its Nexus Innovate Geospatial AI Mobile Lab, a high-tech mobile unit designed to transform environmental science education and research.



### FAMU Scholars Dive into Big Data at Oak Ridge National Lab

FAMU School of the Environment's Scholars-in-Residence recently traveled to Oak Ridge National Laboratory, where they explored cutting-edge research in climate science, supercomputing, and environmental AI.



## Message from the Dean

To attain a high level of dynamic academic excellence, we must reconsider our conventional approaches to solving complex problems and assess alternative strategies for tackling difficult tasks. This is the central theme of the Big Data Digest. The publication will explore new geospatial tools such as AI, machine learning, and IoT, examining how these technologies can be utilized to improve recruitment, graduate progression, and training of geospatial professionals. It will emphasize the growing importance of big data as a vital resource for informed decision-making in this evolving landscape.

# Elevating Student Success

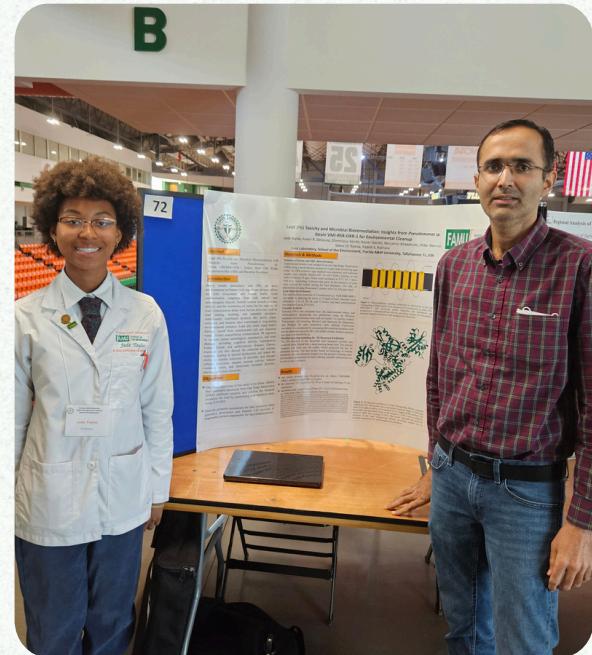
## Nexus Scholars Shine at Campus-Wide Research Symposium

Florida A&M University's School of the Environment Nexus Scholars-in-Residence program made a remarkable showing at this year's campus-wide Research Symposium, where 13 of our scholars presented original research posters, representing over 20% of the total 60 student participants.

Our scholars showcased capstone projects rooted in environmental science and big data analysis, covering topics such as microbial bioremediation of heavy metals, nutrient analysis in local waterbodies, and molecular mechanisms of detoxification using native bacterial strains. These presentations reflected the rigorous 100-hour research requirement completed over two semesters under faculty mentorship.

We are proud to celebrate the following award-winning scholars:

- Jada Taylor, with Amari Desouza as co-author, secured 2nd Place in the Freshman Category
- Xavier Harrell earned 2nd Place in the Sophomore and Above Category
- Sydney Beeker placed 3rd in the Freshman Category



Pictured: Jada Taylor and Dr. Rajesh Rathore

Their outstanding work not only exemplifies academic excellence but also underscores the Nexus program's mission to cultivate the next generation of environmental scientists through hands-on, data-driven research and community engagement.

## Brittany Lindsay Named ASM Young Ambassador to Florida



Brittany Lindsay, an Environmental Science Ph.D. candidate in the School of the Environment, has been appointed as the American Society of Microbiology (ASM) Young Ambassador to Florida for 2025. Her term will run from January 1, 2025, to December 31, 2025.

Brittany joins a global network of over 100 ASM Young Ambassadors dedicated to advancing microbial sciences locally and globally. ASM, the largest single life science society in the world, is committed to advancing microbial sciences through research, education, and advocacy.

As a Young Ambassador, Brittany will act as a vital liaison between ASM and the Florida microbiology community. Her role will involve helping to expand ASM's member network, promoting collaboration with universities and institutions, and contributing to the growth and recognition of young scientists in the field of microbial sciences.

Brittany will also attend the annual ASM Microbe conference, where she will engage with peers and experts in the field.

Brittany was selected through a competitive process based on her academic excellence, leadership experience, and commitment to ASM's mission. Additionally, Brittany has been named a Tidal Wave Fellow for Black in Marine Science (BIMS) for 2025.

This fellowship will include participation in major conferences, such as BIMS Week in San Diego and the HBCU Climate Change Conference in New Orleans. Brittany's dedication to microbial and marine sciences ensures she will make significant contributions in both roles.

# Elevating Student Success

## ASM Fellowship Fuels Binda Tembeng Andongma's Leadership Path



Binda Tembeng Andongma, a dedicated PhD student in Environmental Science at the School of the Environment, Florida Agricultural and Mechanical University (FAMU), Tallahassee, Florida, has been awarded a prestigious Future Leadership Mentors' Fellowship by the American Society for Microbiology (ASM).

This highly competitive two-year fellowship offers a unique platform for emerging scientists to gain academic and professional experience through structured mentorship, collaboration, and skill-building opportunities. Selection for this Fellowship is a testament to Binda's outstanding potential as a leader in the science field.

As part of this program, Binda has actively participated in workshops, training programs, and symposiums organized by the Fellowship, both online and in-person at the ASM Microbe Meeting (2024) in Atlanta, Georgia.

These engagements have equipped him with cutting-edge insights and networks essential for his professional growth.

The Fellowship also includes registration for ASM membership, further broadening his access to resources and professional communities within the field of microbiology.

Through the guidance and collaboration of his mentors, Binda is leveraging this opportunity to enhance his academic expertise and leadership skills, positioning himself as a future leader in environmental and microbial research.

## First-Year Scholars-in-Residence Shine at 2025 Bioremediation Symposium in Boston

Nine of our first-year Scholars-in-Residence students proudly represented Florida A&M University at the 2025 Bioremediation Symposium in Boston, Massachusetts. This premier event brought together researchers, industry leaders, and environmental professionals to explore cutting-edge solutions for environmental cleanup, with a particular emphasis on heavy metal and PFAS bioremediation.

Our students presented their research through poster sessions, showcasing both their early commitment to scientific inquiry and the high-caliber training they receive through our program. Their work drew interest from leading experts and demonstrated the promise of the next generation of environmental scientists.

In addition to their presentations, the students attended technical webinars and expert talks that provided a deep dive into real-world applications of bioremediation technologies. The experience also introduced them to a range of industry-level internship opportunities, helping to bridge the gap between academic research and professional practice.



Pictured (L-R) Tia Dukes, Thandi Kirk, Jada Taylor, Amari Desouza, Rajesh Rathore; Rosemarie Rosales, Alexandria Curry, Michael Spotsville, Sydney Beeker

Participation in the symposium marked a milestone moment for these first-year scholars, affirming the value of early research engagement and experiential learning in building future-ready environmental leaders.

# Elevating Student Success

## FAMU Scholars Explore the Future of Environmental Research at Oak Ridge National Laboratory

Earlier this year, a group of Scholars-in-Residence from the Florida A&M University School of the Environment traveled to Oak Ridge National Laboratory (ORNL) in Oak Ridge, Tennessee—one of the nation's most advanced research institutions. Over three days, students were immersed in a dynamic exploration of big data, artificial intelligence, and climate science, gaining firsthand insight into the intersection of cutting-edge technology and environmental research.

The visit was coordinated through the support of Dr. Eric Pierce, Director of the Environmental Sciences Division at ORNL and a long-time partner of FAMU. For the students, the experience offered more than a tour of a national lab—it was a glimpse into the scientific frontlines of global change.

### Unlocking Big Data for Global Impact

A standout moment was the tour of Frontier, the world's fastest supercomputer. With exascale speed, it transforms complex simulations—from climate modeling to space exploration—into near-instant results. "Seeing Frontier up close made me realize how powerful AI and high-performance computing are in solving real-world problems," said Tia Dukes.

### Monitoring Ecosystems with Remote Sensing

Dr. KC Cushman shared her research on tropical forest disturbance, showing how drones, LiDAR, and satellite data reveal the carbon impact of extreme weather events. "Her analysis considered everything from soil parent material to forest age," said Xavier Osorio. "The precision and complexity of her work were incredible."

### Understanding Arctic Climate Change

ORNL's NGE Arctic team introduced students to innovative tools like warming chambers and hyperspectral imaging to study permafrost thaw and shifting carbon cycles. "We learned how Arctic research isn't just about temperature—it's about carbon feedback loops and global impact," noted Anna Manning.



### Big Data, GeoAI, and Environmental Mapping

Presenters, including Abishek Potnis and Dr. Bhartendu Pandey, explored the evolving role of Geospatial AI and Generative AI models in mapping our changing world. Students engaged with tools that integrate remote sensing, distributed computing, and AI/ML models to forecast land use changes, assess flood risks, and analyze infrastructure growth.

From building classification to land cover transformation models, these technologies are driving real-time decision-making across the globe. The team emphasized the need for high-quality, labeled data and the importance of task-specific models tailored to particular environmental challenges.

### From Observation to Aspiration

The visit concluded with a mix of gratitude, reflection, and future ambition. Inclement weather shortened the visit slightly, but students made the most of their final day by exploring the American Museum of Science and Energy, where interactive exhibits sparked even more curiosity about the intersection of science, history, and innovation. For many of the students, the trip solidified their passion for environmental science and big data.

"I'm so grateful for the opportunity," shared student Danae Gibson. "I left inspired by the work being done and motivated to make my own impact."

# Workshop Training & Development



## Microbes Without Borders: Environmental Metagenomics Workshop Empowers Future Scientists

As part of its commitment to student training and development, the School of the Environment hosted a dynamic workshop titled "Microbes Without Borders: An Introduction to Environmental Metagenomics" from May 20–23 and May 27–29, 2025. The event welcomed 15 enthusiastic participants eager to explore the rapidly evolving field of metagenomics.

The workshop provided a comprehensive introduction to the diversity, structure, and function of microbial communities in environmental samples. Through a blend of theoretical sessions and hands-on training, participants gained experience with both wet-lab techniques and advanced computational tools essential for analyzing complex microbial datasets.

This immersive program highlighted the significance of metagenomics in environmental biology, microbial ecology, and biotechnology. By the end of the workshop, participants were equipped with the skills needed to independently conduct metagenomic research and contribute meaningfully to multidisciplinary scientific efforts.

## Exploring Innovation: Geospatial-AI Workshop Prepares Students for DOE Careers

### Workshop Brief

On June 9, 2025, the School of the Environment hosted a highly impactful Workforce & Professional Development Workshop on Geospatial-AI for Environmental Management, attracting 43 student participants. The event introduced attendees to the powerful role geospatial artificial intelligence plays in advancing the U.S. Department of Energy's Environmental Management (DOE-EM) mission.

Participants engaged with core concepts such as spatial data analytics, machine learning, and remote sensing, while exploring real-world applications in environmental monitoring, site remediation, and infrastructure planning. Students were introduced to essential data sources frequently used in Geospatial-AI, including satellite imagery (e.g., Landsat and Sentinel), aerial surveys, drone-based LiDAR and imagery, as well as publicly available GIS datasets from the USGS, NOAA, and DOE platforms.

A special guest lecture, Nekyla Oliver of the DOE's Idaho National Laboratory, provided students with firsthand insight into DOE career pathways, while FAMU Career Center staff offered strategies for navigating internship and job opportunities.

# The Nexus Mobile Lab Debuts

## FAMU Unveils State-of-the-Art Nexus Innovate Geospatial AI Mobile Lab

On Wednesday, April 30, 2025, the Florida A&M University School of the Environment officially launched the Nexus Innovate Geospatial AI Mobile Lab (GAML) during a special event held at the Frederick S. Humphries Science & Research Building parking lot. The celebration brought together university leadership, faculty, students, community members, and partner institutions to mark the arrival of this cutting-edge, mobile STEM education and research platform.

Funded by a grant from the U.S. Department of Energy, the GAML represents a major step forward in integrating Geospatial Science, Artificial Intelligence (AI), Machine Learning (ML), and the Internet of Things (IoT) into environmental science curricula. The mobile lab is a key component of a larger initiative to strengthen transdisciplinary education at Minority Serving Institutions (MSIs) through the development of a Geospatial-Artificial Intelligence Enhanced Curriculum (GAIEC).

The lab's unveiling included live demonstrations of its interactive workstations and geospatial tools, highlighting how it will be used to expand the university's EnergyWaterFoodClimate Nexus (EWFCN) research and education enterprise. Designed to travel between partner institutions—Kentucky State University and Clark Atlanta University—as well as local high schools, the lab serves as a mobile hub for collaboration, hands-on learning, and student recruitment in STEM.



Pictured: Dr. Benjamin Mwashote Shows Rattler Moji and Venom Air Dashboards



Pictured: (L-R) Dr. Gang Chen, Dr. Rosny Jean, Kinsley Herbert ,Autumn Dancy

Dr. Victor Ibeanusi, Dean of the School of the Environment, praised the initiative as a transformative addition to FAMU's academic infrastructure. "This mobile lab allows our students to engage with real-time environmental data, build practical AI and geospatial analysis skills, and contribute meaningfully to solving today's global challenges," he said.

The launch of the GAML directly supports several of FAMU's strategic priorities, including Exceptional Student Experience, Academic Excellence, High-Impact Research, and Organizational Effectiveness. It also plays a critical role in promoting diversity in the geospatial and environmental sciences, ensuring that underrepresented students have access to world-class training and research tools.

With the Nexus Innovate Mobile Lab now in motion, FAMU continues to lead nationally in advancing innovative, community-connected, and future-facing STEM education.

If you would like to learn more about the Nexus Innovate Geospatial AI Mobile Lab or schedule a tour and presentation, please contact Joel Blount at [joel.blount@famu.edu](mailto:joel.blount@famu.edu).

# Curriculum Development Briefs

## Advancing Environmental Education: FAMU Launches Cutting-Edge Curriculum Through DOE Grant

Florida A&M University's School of the Environment is proud to unveil a transformative new curriculum initiative funded by the U.S. Department of Energy. Designed to prepare students for emerging careers in environmental science, engineering, and data-driven decision-making, this curriculum infuses cutting-edge technologies, including Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), and geospatial tools—into four critical areas of study: Environmental Engineering, Remote Sensing, Bioinformatics, and a newly established Geospatial Science Remote Sensing concentration within the B.S. in Environmental Science.

This effort directly supports the university's growing role as a national leader in training a diverse, next-generation STEM workforce equipped to meet the challenges of environmental cleanup, resource optimization, and sustainable infrastructure design.

### Environmental Engineering: Smarter Systems for a Sustainable Future

The new Environmental Engineering curriculum emphasizes the use of AI and ML to analyze complex environmental datasets, identify patterns, and model predictive outcomes. Students learn how to optimize water treatment systems, waste management operations, and renewable energy infrastructure through data-driven design. Advanced AI algorithms also support environmental impact assessments and risk analyses, strengthening decision-making for projects aligned with DOE-EM missions.

### Remote Sensing: Eyes in the Sky, Insights on the Ground

The Remote Sensing curriculum introduces students to advanced interpretation of data gathered from satellites, drones, and sensor arrays. Through AI-powered image analysis and ML tools, students gain the ability to detect changes in land cover, monitor ecosystems and wetlands, assess the spread of invasive species, and track deforestation. Applications also include disaster response, such as wildfire mapping and evaluating the effects of natural disasters.

### Bioinformatics: Monitoring Life with IoT and Geospatial Tools

Students in the Bioinformatics track are gaining hands-on experience using IoT devices to monitor soils, plants, and wildlife habitats. This real-time data collection enables the analysis of spatial and temporal environmental patterns and supports ecological restoration, conservation, and biodiversity research. When integrated with GIS tools, these datasets help inform decisions related to cleanup efforts and habitat management.

### Geospatial Science Remote Sensing: A New Pathway in Environmental Science

The newly launched Geospatial Science Remote Sensing concentration joins five existing concentrations in FAMU's B.S. in Environmental Science program. While other concentrations focus on areas like Sustainability Science, Toxicology, and Environmental Policy, this new offering focuses specifically on collecting, managing, and analyzing spatial data. Applications range from agriculture and urban planning to natural resource management and climate change analysis—fields where spatial intelligence is critical.

Together, these curriculum advancements reflect FAMU's commitment to building interdisciplinary, future-ready academic pathways that respond to national workforce demands and the global need for sustainable environmental solutions. Students trained under this new framework are uniquely positioned to lead in areas where data science, technology, and environmental stewardship intersect.

To learn more about these curriculum enhancements or to explore how your students or institution can engage with the program, please contact Joel Blount at [joel.blount@famu.edu](mailto:joel.blount@famu.edu).



## Innovation and Breakthroughs: The Dean's Corner

### Leveraging Emerging Technologies for Environmental Innovation

By integrating AI / ML into the environmental science curriculum, students funded through the Department of Energy grant are acquiring valuable skills in data analysis, modeling, and decision-making, enabling them to tackle complex environmental challenges. These skills are critical to future DOE-EM workforce needs, as exposure to AI-driven tools and methodologies prepares students for emerging career opportunities in environmental science and engineering, where AI is becoming increasingly essential for informed decision-making and sustainable resource management.



The students are using ML to discover new areas to assist in environmental impact assessments, risk analysis, and decision-making processes related to pollution control, waste management, and resource optimization.

Furthermore, faculty members are integrating IoT into new enhanced curricula in environmental engineering, geospatial science, remote sensing, and bioinformatics, and enabling students to gain hands-on experience with real-time data collection, analysis, and decision-making processes. In this effort, students learn to leverage IoT technologies to monitor and manage environmental parameters, understand complex ecosystems, and develop sustainable solutions.

Exposure to IoT in conjunction with geospatial tools also prepares students for DOE-EM relevant careers in environmental science, equipping them with the skills to leverage IoT's potential for data-driven decision-making and innovation in the context of geospatial applications. These IoT applications include: 1) Environmental Engineering: IoT devices used to collect real-time data on various environmental parameters such as air quality, water quality, temperature, and humidity. The students and faculty researchers are using this data and integrating the technology with geospatial tools to monitor and analyze environmental conditions, optimize resource management, and improve the efficiency of infrastructure systems.

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## Our Community

