



2025 NEWSLETTER



AUBURN UNIVERSITY
Biosystems Engineering

FROM THE DEPARTMENT HEAD

WAR EAGLE! Thank you for reading this edition of the Auburn University Department of Biosystems Engineering Newsletter! I sincerely thank our graduates and friends for your continued support of the department. The newsletter is a snapshot of the great work and outstanding achievements of faculty, staff and students in the department. You can read examples of these about the undergraduate and graduate students in the department on pages 16-22, and 24-40 respectively.

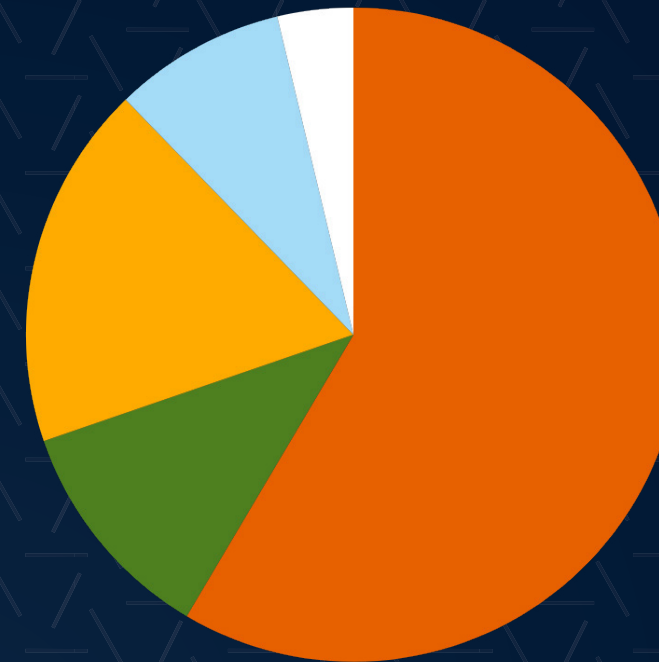
Also, we have new faculty and staff that joined the department in the last year. They are featured on pages 4 and 5. I congratulate Dr. William Batchelor and Dr. Sushil Adhikari for their appointments as Director of Water Resources Center, and Interim Associate Dean for Research in College of Agriculture respectively. These are examples of the impacts that BSEN faculty continue to make on and beyond campus. With average job placement rate of over 90% for our graduates for the past 5 years, I thank the companies and government agencies that support the department and more importantly hire our graduates. Examples of those entities who also contributed towards the production of this newsletter can be found on pages 40-45. Lastly, please stop by Corley building when you are around Auburn. One of the highlights of a day for me is to be able to chat with graduates and friends of the department.



Dr. Oladiran Fasina, P. Eng
Professor and Head
Biosystems Engineering Department

OUR NUMBERS

2025



- 153 Engineering Students
- 29 Technology Students
- 51 Graduate Students
- 25 Faculty
- 13 Staff



11:1
Student Faculty
Ratio



30
Department
Awards



\$1.1M
Scholarship
Awards



72
Peer Reviewed
Journal Articles

A GROWING DEPARTMENT



DR. DIVYA HANDA

Dr. Divya Handa is originally from Punjab, India. She earned her B.Tech. in Agricultural Engineering from Punjab Agricultural University before completing her M.S. in Biosystems and Agricultural Engineering at Oklahoma State University and her Ph.D. in Agricultural Engineering at Iowa State University in July 2022. Prior to joining Auburn, she worked as a research engineer at Iowa State University and later as a data scientist in industry. She joined the department in August 2025 as a Lecturer.



DR. HARMAN SANGHA

Originally from Punjab, India, Dr. Harman Sanga earned his B.Tech. in Agricultural Engineering from Punjab Agricultural University before completing his M.S. in Biological and Agricultural Engineering at Kansas State University and his Ph.D. in Agricultural and Biosystems Engineering at Iowa State University. Prior to joining Auburn, he worked as a research engineer at Iowa State University. He joined the BSEN department in August 2025, as an Assistant Professor of Digital Agriculture. Dr. Sangha's expertise is in system integration and automation for agricultural machinery including digitizing agricultural systems and processes.



HAILEY RHODES

Originally from Wetumpka, AL., Hailey graduated from Auburn University in May 2025 with a degree in Biosystems Engineering. She move to Auburn in 2021 to pursue her biosystems engineering undergraduate degree. Hailey joined the BSEN department in June 2025 as a Research Engineer. In her role, she manages equipment inventory, the reservation portal, and the work order system. She also assists with recruitment and safety management. Additionally, Hailey spends half of her time supporting the project manager for the Auburn University Rural Partnership Institute.



EMMA ROBERTS

Hailing from Selma, AL., Emma graduated from Auburn University at Montgomery in December 2024 with a Bachelor's degree in Business Administration, Accounting. She began her Master's in Accounting at Auburn University at Montgomery in June 2025. Emma lived in Montgomery while completing her studies and moved to Auburn in April 2024. She joined the BSEN department in July 2025 as the department accountant. In her role, Emma manages invoices, reconciliations, financial reports, and supports faculty with their project accounts and grant proposals.



ABBY TRACY

Abby is originally from Birmingham, AL., and graduated from Auburn University in May 2024 with a degree in Rehabilitation and Disability Studies. Prior to moving to Auburn in 2020 to pursue her studies, she gained valuable experience working at University of Alabama at Birmingham, Alabama Neuro, and various nonprofit organizations during her internships. Abby joined the BSEN department in October 2024 as an Admin Support Specialist. In her role, she serves as an HR liaison, assisting with payroll and managing student hiring. Her responsibilities also include building management, event planning, and offering support to faculty and staff. Additionally, she helps with process management, preparing reports, and ensuring that all documents meet policy standards.



FACULTY SPOTLIGHT

DR. TANZEEL REHMAN

TELL US ABOUT YOURSELF

I was born in Pullman, Washington, and spent the first few years of my life there before my family moved back to Lahore, Pakistan — a vibrant and bustling city where I grew up. I completed my undergraduate degree in Agricultural Engineering at the University of Agriculture, Faisalabad, the largest and oldest agricultural university in Pakistan. After graduation, I spent a year teaching there before moving to Canada to pursue my master’s at Dalhousie University. I later earned my Ph.D. from Purdue University, where I specialized in automation and data-driven technologies for agriculture. Outside of work, I enjoy reading history, traveling, and spending time with my family.

WHY AUBURN UNIVERSITY?

I was drawn to Auburn’s strong reputation and the supportive culture within the Biosystems Engineering program. My role in Smart Systems Engineering for Horticultural Crops aligns with Auburn’s mission to advance state agriculture and the local economy. Plus, it’s a great community and an ideal place for families.

TELL US ABOUT BIOSYSTEMS

Biosystems Engineering blends engineering with biology and environmental science to solve real-world challenges in agriculture and natural resources. It’s a field that directly impacts food systems, communities, and the environment—offering students a chance to make a real difference.

TELL US ABOUT YOUR INDUSTRY EXPERIENCE

I have been working in the area of Agricultural Automation for more than 10 years. My experience spans a wide range of production systems, from controlled environments to open-field operations. I have collaborated with commercial nurseries in the Mobile area, robotics partners in California, and agrochemical companies such as Bayer and FMC. These collaborations have focused on automation, robotics, precision agriculture, and machine-learning applications to improve efficiency, productivity, and sustainability in agricultural systems. Working alongside talented colleagues, students, and industry partners has been key to translating innovative research into practical solutions for growers. My research applies automation, robotics, and data-driven tools to make agriculture more efficient and sustainable. I focus on horticultural and ornamental crops, developing technologies that address growers’ real-world needs and strengthen the agricultural industry.

WHAT’S THE BEST PART OF YOUR JOB?

Teaching and mentoring students is the most rewarding part of my job. Helping them grow into confident engineers is incredibly fulfilling. I also enjoy research—developing innovative technologies that make agriculture more efficient, sustainable, and productive.

DO YOU HAVE ANY ADVICE?

The best advice I’ve received is to stay curious and never stop learning. Challenges are opportunities to grow, and collaboration is key—great progress comes from working together and valuing different perspectives.



SEC ACHIEVEMENT AWARD

Nearly 25 years after earning his bachelor's degree in mechanical engineering from Tribhuvan University in Nepal, Dr. Sushil Adhikari has come full circle — from student to nationally recognized leader in academia. He also serves as director of the Center for Bioenergy and Bioproducts and, since February 2025, as interim associate dean for research in the College of Agriculture and interim associate director of the Alabama Agricultural Experiment Station.

In recognition of his outstanding contributions to the teaching and research mission of Auburn University, Dr. Adhikari was selected as the recipient of the Auburn University 2025 SEC Faculty Achievement Award.

For Adhikari, the honor reflects what he values most about academic life — impact. "Being on faculty gives you the flexibility to focus on your interests. I get to do research and work with students, who grow so much by the time they graduate. For me, it's about seeing the impact I can have on them," he said.

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His research focuses on bioenergy and bioproducts, including the use of biochar — a carbon-rich material made from plant or animal waste — to improve soil and water quality and reduce greenhouse gas emissions. Collaborating across campus, he and his students work to address challenges in food, water, energy, and the environment.

Adhikari views his interim leadership roles as an opportunity to expand that influence. "I have worked with many faculty members and students in my role as center director, and I see that I have made some impact. Now the challenge is, can I make a bigger impact at the college level?"

For Adhikari, the answer is simple: keep planting ideas, opportunities, and innovations that can grow and thrive.

WATER RESOURCES DIRECTOR

Dr. William Batchelor has assumed the role of Director of the Auburn University Water Resources Center in May, 2025. In this role, he leads a team of scientists collaborating with communities, farmers, governments, and agencies across Alabama to strengthen water monitoring, green infrastructure, watershed planning, and irrigation practices.

"Dr. Batchelor will bring great expertise and leadership experience to this position," said Arthur Appel, interim dean of the College of Agriculture. "With his background and expertise, he offers a valuable perspective on the wide range of needs the Water Resources Center addresses."

A professor of biosystems engineering at Auburn, Batchelor specializes in crop simulation modeling, precision agriculture, and irrigation. From 2010 to 2015, he served as dean of the College of Agriculture and director of the Alabama Agricultural Experiment Station.

"It is a tremendous honor to be named director of the Water Resources Center at Auburn University," Batchelor said. "Our work reaches every corner of the state and beyond — from safeguarding clean water to supporting agriculture, ecosystems, and communities. I'm excited to lead a dedicated team focused on research, extension, outreach, and collaboration to ensure our water resources are protected and wisely managed for future generations."

Before joining Auburn, Batchelor was professor and head of the Department of Agricultural and Biological Engineering at Mississippi State University, where he also directed the Sustainable Energy Research Center, the Energy Institute, and served as interim director of the Institute for Clean Energy Technology.

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CUTTING EDGE RESEARCH

Auburn University's Center for Bioenergy and Bioproducts is advancing innovative research on biochar — a carbon-rich material with transformative potential in agriculture, energy, and environmental protection.

Each year, nurseries and garden centers sell billions of dollars' worth of potted plants, yet their plastic containers can take centuries to decompose. Director Sushil Adhikari and his team are tackling this challenge by developing biodegradable pots made from biochar and plant-based plastics. Their findings show that cork is the most effective additive, improving durability while maintaining compostability — a step toward sustainable alternatives in horticulture.

Biochar is also proving valuable in water quality research. Dr. Jasmeet Lamba is studying how engineered biochar can capture pollutants such as arsenic and phosphorus. Supported by the National Science Foundation, his field trials indicate that biochar can reduce runoff, protect groundwater, and enhance soil health

— benefits that could safeguard both farms and ecosystems.

Methane, a potent greenhouse gas produced by livestock and landfills, represents another frontier for biochar innovation. Dr. Hossein Jahromi recently demonstrated that heating methane over biochar breaks it into clean hydrogen fuel and solid carbon. Hydrogen fuel produces no harmful emissions, while the carbon byproduct can be repurposed for advanced materials like batteries and electronics. In the future, modular biochar reactors on farms or in food processing plants could turn organic waste into renewable energy and local economic opportunity.

From plant pots to clean fuel, Auburn's biochar research exemplifies environmental stewardship and practical innovation. Together, these projects demonstrate Auburn's leadership in turning waste into resources, protecting natural systems, and shaping a more sustainable future through science and collaboration.

AUBURN TO TORONTO: ASABE 2025

Biosystems Engineering had a strong presence at the 2025 American Society of Agricultural and Biological Engineers (ASABE) Annual International Meeting in Toronto, Canada. With 30 attendees, Auburn was among the most represented institutions, delivering 35 presentations and bring home numerous awards.

Doctoral student Edith Ngoupeyou earned third place in the Boyd-Scott Graduate Research Award Competition in the Ph.D. category. She also joined fellow graduate students Vivian Usha and Natacha Kakama to take third place in the Bioprocess Startup Competition for their project, BioCore Shield, which merges sustainability with innovation in bioprocessing. Another Auburn team, including Ayden Kemp, Dale Hartmann, Clay Dorrill, Pravalika Boini, Sagar Kafle, and Sudip Kapota, earned second place in the same competition for their startup concept, Bioseal Mulch.

Several Auburn faculty were also recognized. Dr. Simerjeet Virk received the Larry W. Turner Young Extension Professional Award for his outreach and service. Dr. Jeremiah Davis was selected to a three-year term on the ASABE Board of Trustees, and Dr. Brendan Higgins joined the ASABE Nomination Committee, reinforcing Auburn's national leadership.

Auburn's commitment to teaching and student engagement was highlighted as well. Dr. John Linhoss, Dr. Mark Dougherty, Dr. Jon Davis, Instructional Designer Megan Slatton, and Multimedia Specialist Devontae Lindsey, earned the Educational Aids Blue Ribbon Award for their innovative URISE program, which enhances undergraduate research experiences.

The department's student leadership also excelled. For the second consecutive year, Auburn's Delta Beta chapter of Alpha Epsilon, the honor society for agricultural and biological engineering, was named Most Outstanding Chapter in the nation.



EXTENSION AT THE FOREFRONT

Associate professor and Alabama Extension specialist Dr. Simerjeet Virk received one of the American Society of Agricultural and Biological Engineers' highest honors — the Larry W. Turner Young Extension Professional Award — at the 2025 ASABE Annual International Meeting. The award recognizes his outstanding commitment to bringing cutting-edge research directly to Alabama's agricultural producers.

Dr. Virk's work centers on helping farmers apply precision agriculture technologies that improve productivity and simplify management. "My role is to evaluate various precision agriculture technologies through on-farm research trials as well as at the Alabama Agricultural Experiment Stations across the state," Dr. Virk explained. "That helps in testing these newer technologies in different production systems and allows us to work with growers to demonstrate their benefits and real returns on investment."

Throughout his career, Dr. Virk has remained focused on advancing agricultural innovation through education and outreach.

His dedication to Extension work brought him back to Auburn, where he continues to strengthen the connection between research and real-world application.

"While I was a graduate student at Auburn, my mentor, Dr. John Fulton — now at Ohio State — trained me to conduct relevant, grower-focused research and build impactful Extension programs," Dr. Virk said. "Being in his role now, I'm honored to be recognized by our society and my peers. Having been part of this organization since the start of my career nearly 15 years ago, this award feels like coming full circle."

Dr. Virk's recognition adds to a strong showing for Auburn Biosystems Engineering at this year's ASABE conference, where faculty and students alike earned top honors and reaffirmed Auburn's leadership within the society.



OUTSTANDING BSEN STAFF

Kelly Griggs is the recipient of the 2025 Outstanding Biosystems Engineering Staff Award, recognizing her dedication, innovation, and service to Auburn University and Alabama's agricultural community.

An Auburn alumna, Griggs earned her bachelor's in Biosystems Engineering with a minor in Poultry Science in 2018 and completed her master's in 2024. She has worked with the National Poultry Technology Center (NPTC) for nine years, beginning as an undergraduate student in 2016 and now serving as a research engineer. Her passion for applied research began early, when she conducted an undergraduate research fellowship project examining how pen design affects the thermal environment of broilers.

Since then, Griggs has helped shape the NPTC's growth and outreach. She played a central role in constructing the center's 6,500-square-foot teaching and demonstration facility, supported more than 70 extension events, and helped develop over 20 teaching demonstration units

used to train farmers and students. Her current research explores evaporative cooling systems and water quality, identifying practical strategies that help farmers save water and improve system performance. She also leads hands-on workshops, guiding participants through real-world challenges and solutions.

Colleagues describe Griggs as someone who "will do what it takes to get the job done," whether she's assisting with facility construction, designing experimental test stands, or leading classroom-style demonstrations. Her technical skills, problem-solving ability, and commitment to farmer education make her an essential member of the Biosystems Engineering team.

For Griggs, the most rewarding part of her work is connecting with producers. "Being on a farm means that I will learn something new that day — good, bad, or ugly," she said. "Our research wouldn't mean anything without each of them and what they do for the world every day."

PEER REVIEWED JOURNAL ARTICLES

Click to view all peer
reviewed journal articles.



ECOLOGICAL & WATER RESOURCES

20

BIOPROCESS ENGINEERING

35

EMERGING SYSTEMS

5

CONTROLLED ENVIRONMENT AGRICULTURE

6

SMART SYSTEMS

6

GRADUATE STUDENTS



Md. HASIBUR RAHMAN

During my bachelor's in food engineering at Bangladesh Agricultural University, I encountered an intriguing question: Could we use images of fruits to assess their quality? This curiosity led me to explore computer vision and its applications in agriculture. After completing my bachelor's degree in 2022, I actively sought opportunities to deepen my understanding through research. That's when I discovered the Biosystems Engineering department at Auburn University and reached out to Dr. Tanzeel Rehman to discuss my interest in digital agriculture.

After several in-depth discussions, I joined the Biosystems Engineering department as a master's student in Spring 2023. After completing my master's in December 2024, I transitioned into the Ph.D. program in Spring 2025 to further my research in high-throughput plant phenotyping.

My research focuses on integrating deep learning and computer vision into plant phenotyping to predict physiological properties. During my master's, I successfully developed two deep-learning models to assist plant breeders in understanding and developing new plant varieties. Currently, I am working on a self-supervised learning approach to automate the analysis of plant root cross-sections, which will help enhance precision agriculture and breeding programs.

In Fall 2024, I was honored to receive the Presidential Graduate Research Fellowship for outstanding incoming Ph.D. students. Additionally, I received the AG2PI Student Conference Travel Award for presenting my research at the American Society of Agricultural and Biological Engineering Annual International Meeting 2024. With a deep commitment to advancing AI in agriculture, I look forward to making impactful contributions to the field of smart plant phenotyping.

RAHMAN'S AWARDS

- Outstanding Master's Student
- AI Forum Graduate Student Poster Competition Winner
- Presidential Graduate Research Fellowship
- Student Conference Travel Award



GURPARSHAD SINGH BRAR

In Spring 2022, after earning my Bachelor's in Agricultural Engineering from Punjab Agricultural University, I connected with Dr. Jasmeet Lamba to pursue a Master's in Biosystems Engineering. This journey has been incredibly rewarding, filled with hands-on learning, research opportunities, and skill development. It has deepened my understanding of sustainable systems and technological innovations, making the experience both joyful and enriching.

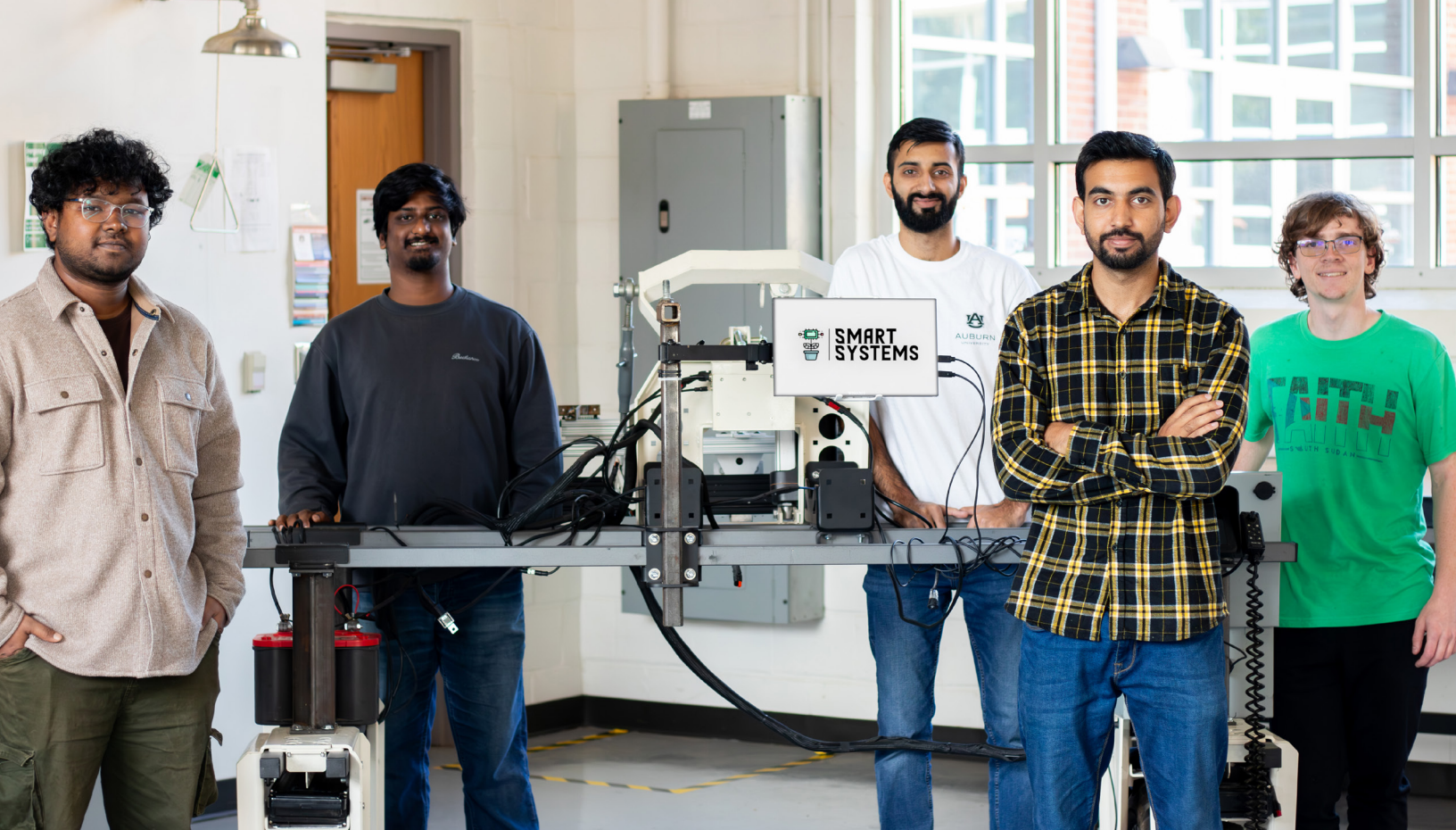
My research focuses on the transportation and contamination of groundwater, particularly the impact of different manure application methods on nutrient leaching. I am also investigating the use of biochar as a mitigation strategy to reduce nutrient loss into soil and groundwater. Additionally, my work involves modeling these processes to better understand and predict their environmental effects.

I recently started my Ph.D. after completing my master's under Dr. Jasmeet Lamba to delve deeper into these concepts. My current research focuses on the application of biochar in the agricultural sector. Moreover, modeling will help me to learn its impact on nutrient leaching, aiming to enhance soil health and protect groundwater quality.

My future plan is to continue research as a postdoctoral researcher, further exploring sustainable solutions for groundwater contamination. Alternatively, I aspire to return to my hometown to raise awareness about the impacts of contaminant leaching in groundwater and promote alternative strategies to reduce it.

BRAR'S AWARDS

- 1st Place - 2024 College of Agriculture Graduate Research Poster Showcase
- Graduate Certificate in Modeling and Data Analytics for Operations
- Graduate Certificate in Data Science



AI DRIVEN EXCELLENCE

Thanks to Florabot, an AI-driven robot developed in Auburn's Smart Systems Lab, farmers may soon be able to assess rows of ornamental plants - azaleas, hydrangeas, petunias and more - in minutes with the touch of a button.

"Helping growers monitor plant growth, manage inventory and save time and money - that's what we were trying to do," said Hamid Syed, graduate research assistant in the lab led by assistant professor Dr. Tanzeel Rehman.

The effort paid off. Teammates Mohtasim Hadi, Md Mesbahul Maruf, Hamid Syed, Faraz Ahmad, and Carter Freeman earned the Excellence in Productivity Award at the Farm Robotics Challenge at FIRA - World Ag Robotics, the premiere global farming robotics convention. The award also came with a \$5,000 prize.

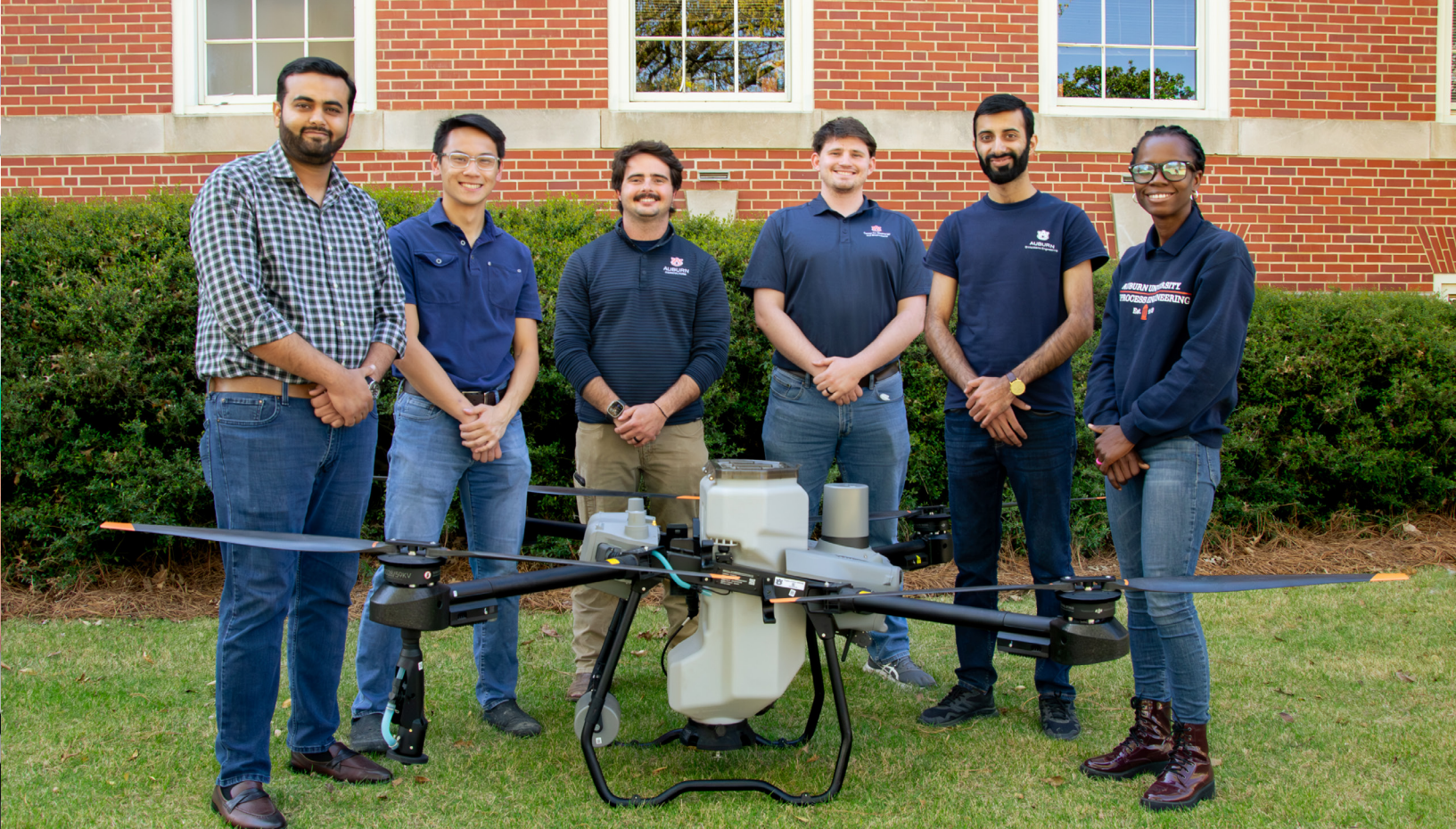
"This is the first time Auburn has won an award in this worldwide competition, which fosters solutions to real-world agricultural challenges," Dr. Rehman said.

Florabot was built with input from Alabama nurseries, using plant data to train algorithms that recognize size, shape, color, fullness, and even stress from pests or disease. Its advanced image analysis pipeline processes 4K video in real time, providing accurate plant counts and quality assessments while navigating autonomously through nursery rows.

"There were certainly challenges in transforming our idea into a practical solution," Syed said. "The varying heights of plants required Florabot to be highly adaptable. With adjustments both in the field and in design, it can now offer nurseries significant ease and efficiency."

"Winning the highest productivity award among our peers and universities felt like a major achievement," he added.

Click to watch the Florabot demonstration video.



BLUE SKIES COMPETITION

A team of Auburn Biosystems Engineering students is tackling precise fertilizer application using cutting-edge drone technology — and NASA is taking notice.

Their project, the Proactive Resource Efficiency via Coordinated Imaging and Sprayer Execution (PRECISE) System, was named a finalist in NASA's 2025 Gateways to Blue Skies Competition, which highlights innovative aviation solutions for agricultural challenges.

"Agricultural practices have evolved for thousands of years, but precise calibration of fertilizer is still a challenge," said Al Dean Francisco, a junior on the team.

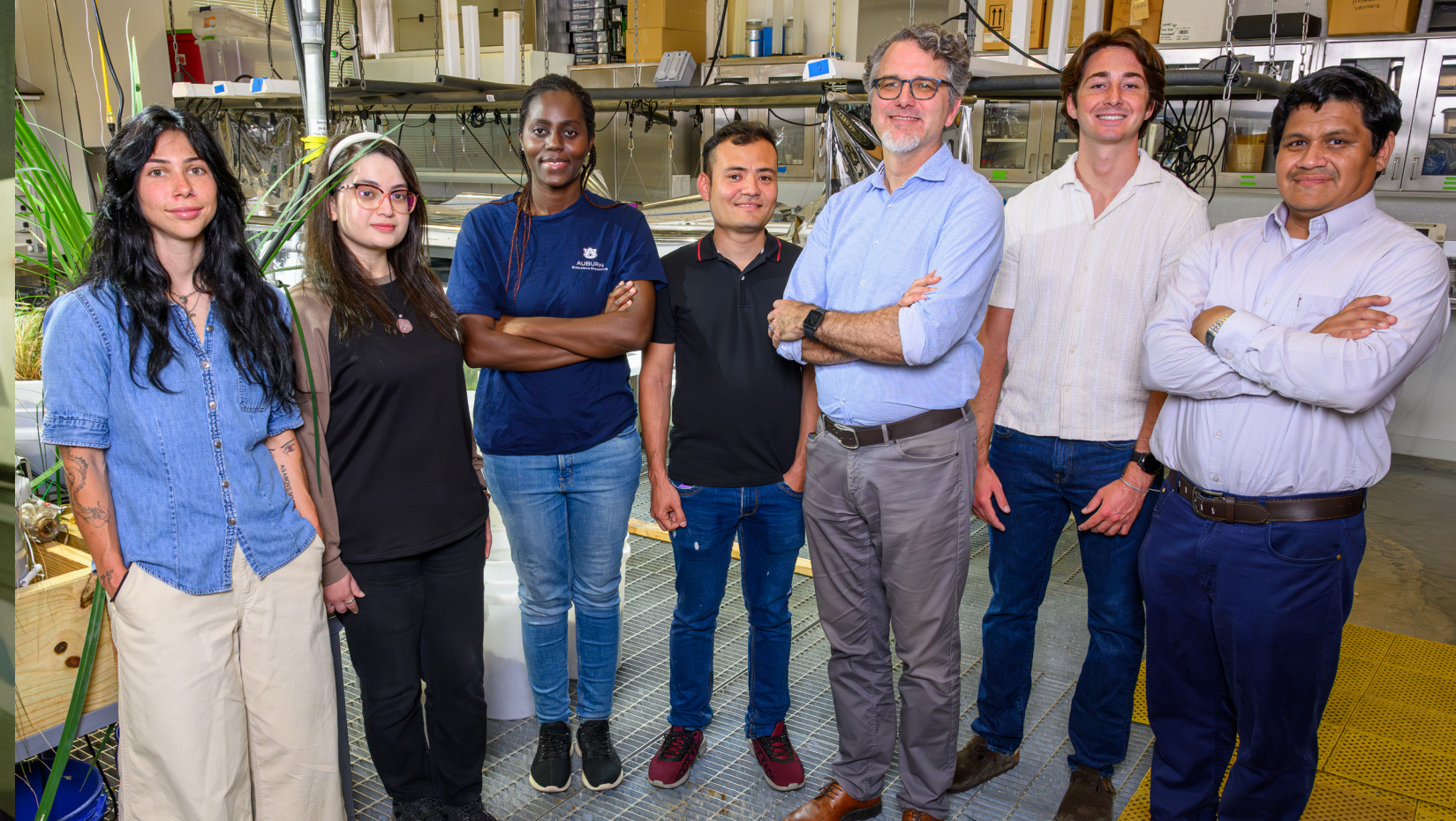
The PRECISE system uses a coordinated tandem drone approach with slow-release, biochar-based fertilizer. One drone scans fields with multi-spectral cameras to detect nutrient deficiencies, while onboard computers calculate precise spray rates and communicate instructions to a second "spreader" drone.

Doctoral student Hamid Syed explained, "The system interprets imaging data into spray values, which the ground unit then forwards to the spreader drone for application."

Team lead Vivian Usha said the recognition reflects the students' dedication. "We're excited and honored to make it to the finals. It's a testament to hard work from a lot of really committed students."

The team also includes graduate students Louie Harris and Ayden Kemp. Usha added, "PRECISE demonstrates the department's emphasis on technology-based sustainable methods to deliver life's essentials. We're proud to see our project live up to that mission."

With its innovative approach to saving time, reducing costs, and protecting the environment, PRECISE is poised to make an impact in both agriculture and aviation — and maybe bring home the blue ribbon.



PRESTIGIOUS FFAR FELLOWSHIP

Graduate research assistant, Vivian Usha, recently received the Rocky Fellowship from the Foundation for Food & Agriculture Research (FFAR). The fellowship provides early-career support to graduate students addressing agricultural sustainability challenges — a category Usha already fits.

Through her work in the Center for Bioenergy and Bioproducts (CBB), Usha studies a dual-function biochar, a porous, charcoal-like material made from plant biomass, that captures excess phosphorus from wastewater and repurposes it into a slow-release biofertilizer. This process supports cleaner water and healthier soil and has become a major CBB focus, thanks to a \$1 million USDA NIFA grant awarded in 2023.

“I believe I was selected for the fellowship because my research addresses critical challenges at the intersection of environmental sustainability, water quality, and agricultural innovation,” Usha said.

She credited her mentors, Dr. Sushil Adhikari and Dr. Hossein Jahromi, for their guidance and support in achieving this recognition.

Usha plans to leverage the fellowship to gain mentorship, networking, and leadership experience that will advance her research and career. “I look forward to acquiring significant experience that will notably advance my skills in agricultural and biosystems engineering and environmental sustainability,” she said.

Her long-term goal is to return that knowledge to academia. “I want to guide future engineers and environmental scientists while advancing research that impacts policy and real-world applications. Ultimately, I hope to drive a global shift toward more sustainable, efficient, and resilient agricultural systems,” Usha said.

GREEN INFRASTRUCTURE

“Green infrastructure uses natural processes to reduce pollution, improve water quality, and enhance biodiversity in built environments,” said Dr. David Blersch, associate professor of ecological engineering. “It incorporates green space, wetlands, green roofs, trees, rain gardens, and permeable surfaces that mimic natural ecosystems to manage water, reduce urban heat, and create healthier environments.”

Dr. Blersch’s research plays a vital role in advancing water quality and biodiversity through nature-inspired engineering. His team recreates natural systems in the lab, using overhead lighting to simulate sunlight and encourage algae growth on fabric materials designed to resemble rocks and aquatic plants. These materials line gutters that carry continuous wastewater flow, where algae naturally absorb pollutants. By harvesting the algae, the researchers both remove contaminants and generate a reusable resource.

“These algae can be used as feedstock for soil fertilizer or bioplastics,” Dr. Blersch explained.

“The project is a resource recovery strategy that maximizes sustainability through photosynthesis.”

Supported by the USDA Agricultural Research Service, the project also examines tidal flow wetlands, which filter and transform pollutants. Lab-scale recreations combine plants, peat moss, limestone, and flowing wastewater under artificial sunlight to test how these systems can improve water quality and ecological function.

When not in the Green Infrastructure Lab, Dr. Blersch leads the Algae Systems and Ecological Engineering Lab. These labs are utilized by Dr. Blersch to promote green infrastructure and ecological engineering as essential tools for long-term environmental resilience.

Dr. Blersch envisions a future where sustainable systems serve as cost-effective, adaptable, and environmentally friendly alternatives to conventional water treatment — turning pollutants into valuable resources while protecting the planet’s most critical natural asset: clean water.

UNDERGRADUATE MAJORS

Biosystems Engineering

- » Bioprocess Engineering
- » Ecological Engineering
- » Forest Engineering

Biological & Agricultural Technology Management

GRADUATE PROGRAMS

- Master of Science
- Doctor of Philosophy



MY BSEN EXPERIENCE



MATTIE BRENNAN

When I chose to pursue a degree in Biosystems Engineering, I was uncertain about the future. It's a diverse major, combining unique classes with hands-on experiences that create wide-ranging opportunities. Early on, I found the freedom to explore career paths that aligned with my passion for sustainability. Biosystems stood out because the department emphasizes hands-on learning as much as learning in lectures. I've been knee-deep in creeks sorting bugs to study water quality and gained a stronger understanding of both the environment and my role as an engineer. Above all, the supportive faculty, staff, and students have made the department a close-knit community that feels like home.



ALLI BROOM

From day one, Biosystems Engineering has felt like where I belong. It's taught me that no problem is unsolvable when approached with purpose and for the good of others. My BSEN experience has helped me grow academically, professionally, and personally through passionate faculty, rigorous coursework, and hands-on projects that are both challenging and fun. Surrounded by an incredible group of students, I'm grateful for the knowledge, opportunities, and friendships this department has given me. Thanks to BSEN, I feel prepared to do the work that makes the world work.



BRANYON CLARKE

After earning my first bachelor's degree, I knew I wanted to continue my education but wasn't sure how—until a friend's enthusiasm for Biosystems sparked my interest. A conversation with Dr. Fasina sealed the deal, and by the next semester I was enrolled. At first I worried about classes and fitting in, but those fears quickly disappeared. Classmates became friends, then family. The courses were challenging yet exciting, and the professors were approachable, supportive, and genuinely invested in my success. Their guidance has prepared me for the real world in countless ways. Biosystems has truly become my home, and I can say with confidence—you won't find anywhere as special as Auburn University Biosystems Engineering.



JAKE GAERTNER

I always knew I wanted to attend Auburn, though I wasn't sure about my major at first. Interested in medical school but also eager to study engineering, I found the perfect fit in Biosystems. After touring the department in high school, I knew it was the place to take the next step in my education. Through engaging classes, hands-on research, and the support of exceptional faculty and staff, I've been able to reach my goals—including acceptance into medical school. The Biosystems Engineering Department has shaped me both professionally and personally, and I'll always be proud to be a BSEN alumnus.



MITCHELL KOSER

I've thoroughly enjoyed my five years in Auburn's Biosystems Engineering program, where I pursued the Ecological track and gained a strong foundation in both theory and practical application. The program's blend of lectures and hands-on labs emphasized real-world problem-solving and innovative solutions, helping me grow academically and professionally. I've appreciated the small class sizes, which foster close connections with professors and peers, as well as friendships that enriched my college experience. Biosystems has equipped me with the skills, experience, and network to pursue a fulfilling engineering career.



JORDAN LOGAN

I began at Auburn as a chemical engineering student but soon realized Biosystems Engineering was a better fit. The program's hands-on experiences in food processing, GIS, natural resources, and biofuels allowed me to apply classroom knowledge in labs while developing technical skills with tools like AutoCAD and ArcGIS. The rigorous coursework challenged me and broadened my expertise, preparing me for a variety of career paths. I'm grateful for the opportunities, knowledge, and growth I've gained—Biosystems has provided a strong foundation for my future and the confidence to excel in any field I pursue.



NATALIE MACALUSO

My time in Biosystems Engineering has been both personally and professionally transformative. I entered Auburn undecided, exploring everything from philanthropic studies to philosophy, but the students I met in Biosystems stood out for their compassion, ambition, and drive to make the world better. After interviewing Dr. Fasina for a class project, I was inspired by his passion and commitment to the program. Over the past four years, I've tackled challenging projects, built lasting friendships, and developed strong engineering skills. The department's efforts to connect students across Auburn Engineering advanced my job search and opened leadership opportunities. Choosing Biosystems has been the most fulfilling decision of my Auburn experience.



CALEB POWELL

My time as a Biosystems Engineering student at Auburn has been defined by the relationships I've built and the lessons I've learned. From tackling challenging coursework with classmates to collaborating on group projects, the connections I've made have been invaluable. A strong support system made the hard moments easier and the successes more rewarding. Beyond my peers, the professors have been true mentors—helping me grow not only in technical skills, but also in problem-solving and critical thinking that will serve me throughout my career. Auburn has given me more than an education; it's given me lasting friendships, meaningful guidance, and the confidence to face future challenges.

Click to watch the BSEN Experience video.





AWARD-WINNING STUDENT

Recent Auburn graduate Ali Boardwine received a prestigious honor shortly before earning her Bachelor of Science in Bioprocess Engineering with minors in Business and Public Health.

The National Student Employment Association annually recognizes outstanding student workers, advancing nominees from the institutional to national level. Boardwine was awarded the Technology & Innovation Competency Award, nominated by her supervisor, Dr. Tham Hoang.

"Receiving this honor was a deeply humbling and meaningful experience for me," Boardwine said. "The integration of technology into our research has allowed us to better understand environmental challenges and how to mitigate them. This award validates our lab's work and encourages continued pursuit of innovative solutions for environmental preservation."

Boardwine has worked in Dr. Hoang's Ecotoxicology and Risk Assessment Lab since May 2023. Her contributions include studying the effects of pollutants such as heavy metals and microplastics on aquatic ecosystems, assisting with publications, designing aquatic toxicology tests, and conducting field sampling in the Alabama River while recording water quality data.

"This opportunity to contribute to research and publications is something I will cherish forever," she added. "This award reflects not only my work, but also the guidance of Dr. Hoang and the efforts of my colleagues."

Boardwine's recognition highlights the significant role student researchers play in advancing scientific knowledge and applying innovative solutions to environmental challenges.



HANDS-ON EXPERIENCE

Ecological Engineering student Sally Wingard has turned a lifelong passion for conservation into hands-on research aimed at protecting one of the world's most vital resources — clean water.

Growing up in Maryland along the Chesapeake Bay, she was immersed in conversations about the Bay's health and environmental challenges, including water quality and its impact on local communities and ecosystems. "It was clear how vital the Bay's ecosystem is to both the environment and local communities," Wingard said.

Her interest in environmental protection deepened at Auburn, with a particular focus on water quality and wetlands. With the support of a fellowship, she is now conducting research to better understand how wetlands filter water and how that knowledge can improve management strategies.

"I am hopeful that my research will contribute to a deeper understanding of wetlands and their ability to filter water," she said. "Ultimately, I want my work to make a meaningful impact in advancing environmental science."

The fellowship allows Wingard to experience the research process from start to finish, giving her the opportunity to fully immerse herself in the work. "I'm most excited about being involved in the entire research process," she added. "With the support of this fellowship, I'll have the opportunity to contribute meaningfully to the project."

For Wingard, the research is more than an academic pursuit — it is a continuation of a personal commitment to conservation that began along the Chesapeake Bay and now extends into Alabama's wetlands.



COLLABORATION & INNOVATION

In Dr. Brendan Higgins’ Lab, Bioprocess Engineering student Al Dean Francisco and mentor Dr. Qichen Wang are transforming food, agricultural, and aquaponic waste into valuable resources. Their research focuses on waste valorization—using natural bioprocesses to convert waste streams into sustainable solutions for modern agriculture.

“Since my freshman year, I’ve been working in Dr. Higgins’ Lab under Dr. Wang’s mentorship, studying how to transform waste into something beneficial,” Francisco said.

Through anaerobic digestion and bacterial pretreatment, the team turns waste from Auburn’s dining halls and aquaponic systems into nutrient-rich effluent, which is then used to grow algae for fish feed. The process creates a closed-loop aquaponic system that maximizes efficiency and reduces environmental impact.

Their collaboration combines Francisco’s curiosity and developing skills in bioprocessing with Dr. Wang’s expertise in sustainable waste treatment. Together, they are developing methods that could improve municipal and industrial waste management by extracting greater value from byproducts.

“We hope to make aquaponics one of the next sustainable agricultural systems,” Francisco said. “By targeting its waste, we’re making the entire process more self-sustaining.”

For Francisco, the partnership has also reshaped how he approaches engineering. “Research keeps me curious,” he added. “It helps me understand the ‘whys’ behind what we do—and how we can make it better.”



EMMA GRACE BOYD

Be it on the bars or in the classroom, Emma Grace Boyd is on her way to a Tide-tamin’, big-brainin’ total score you can’t ignore. A gymnast and biosystems engineering student at Auburn, she’s leveraging her love of numbers and analytical skills to set her sights on a career in sales.

Click to listen to Emma’s episode.



KATE SHAW

Kate Shaw is trusting the process—the bioprocess. The Auburn senior followed the Path to the Plains program at Southern Union State Community College and is pursuing the bioprocess engineering option of the biosystems engineering degree.

Click to listen to Kate’s episode.



HAILEY RHODES

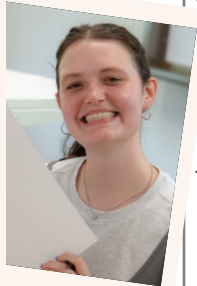
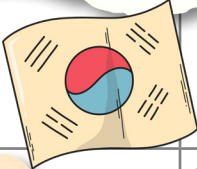
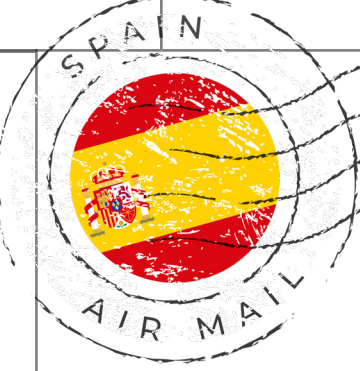
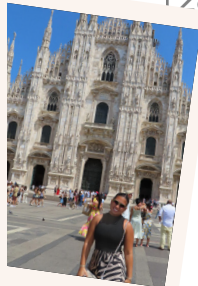
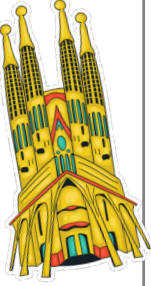
Hailey Rhodes is a 2025 Auburn biosystems engineering graduate making the most of the field’s diverse opportunities. Drawn to BSEN for its blend of biology and problem-solving, she’s now utilizing her training to help faculty and students in the department as well as the Auburn University Rural Partnership Institute.

Click to listen Hailey’s episode.



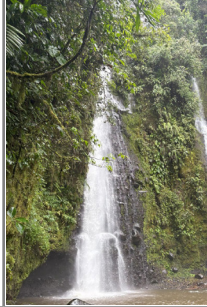
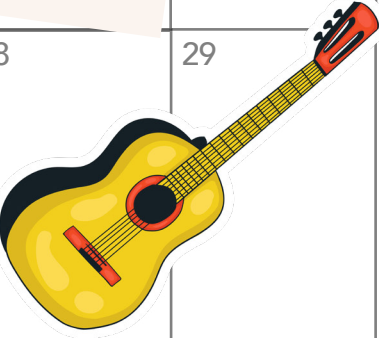
STUDY

JUNE

SUN	MON	TUES	WED	THURS	FRI	SAT
1 	2 	3 	This summer, I studied abroad in Daegu, South Korea at Keimyung University. I took language and culture classes, explored cities like Busan and Seoul, and experienced Korean traditions like Taekwondo, cooking, and traditional clothing. The best part was the connections I made—with Auburn classmates, Keimyung buddies, and the kind people I met along the way. One favorite memory was a picnic in the park with food and live music, a moment that captured the warmth of my experience abroad. -Maddie Spoor			
8 	9 	10 	11 	12 	13	14
I had the incredible opportunity to study abroad in Madrid, Spain during the summer of 2025. I studied Spanish at Universidad de Nebrija, where I gained a deeper understanding of the language, rich history, and culture of Spain. Immersing myself in the daily life of Madrid made learning and practicing Spanish much more natural and rewarding. Studying abroad was truly life changing. I not only improved my language skills but also created some of the best memories of my life. -Sheila Harter		20 	21	22	23	24
29 	30 	31 	32 	33 	34	35

ABROAD

JULY

SUN	MON	TUES	WED	THURS	FRI	SAT
I had an incredible experience this summer studying abroad in Costa Rica! For seven weeks, I stayed at CATIE Biological Research Station and earned a minor in Tropical Conservation and Sustainable Development. Highlights included visiting the Bri Bri Indigenous Territory, hiking the Monteverde Cloud Forest, and exploring research at La Selva Biological Station. This opportunity sparked new ideas for my career and strengthened my passion for conservation, sustainability, and finding innovative solutions to connect people and nature. -Eve Jenkins			5 			
			11 			
			12			
During my study abroad in Madrid, Spain, I completed my Spanish minor through Auburn University while living with a Spanish-speaking host family, which gave me full cultural immersion. I took courses in both cultural analysis and international business Spanish, strengthening my language skills and deepening my understanding of global perspectives. The experience taught me adaptability, cross-cultural communication, and the value of stepping outside my comfort zone; key takeaways that I will carry into both my personal and professional life. -Thomas Watson			15 			
			22			
27 	28 	29	30			

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SENIOR DESIGN

Conceptual Redesign of the Mobile Bay Causeway

Tiger Paw EcoHub: Connecting People, Nature, and Sustainable Innovation

Wetland Utilization in Poultry Processing Wastewater

Restoration of Privet Creek in Town Creek

Auburn University Davis E. Arboretum Site Design

Redesign of the Mobile Bay Causeway, Upper Mobile Bay

Ecological Restoration of Privet Creek

Parkerson Mill Creek Wellness Center

Sustainable Redevelopment of Farmer Landfill at Auburn University

Battleship Parkway Restoration Design

Davis Arboretum Nature Center and Conservatory Site Design

Beneath the Surface Enhancing Water Treatment at Miller Poultry Center



BIOLOGICAL & AGRICULTURAL TECHNOLOGY MANAGEMENT

The Bachelor of Applied Technology Management (BATM) program was created to blend technical know-how, hands-on problem-solving, and a foundation in business and accounting. The degree equips students with the skills needed to thrive in a world increasingly driven by technological innovation.

One standout example of the program's hands-on approach is the Sense and Spray senior capstone project. Over the past two years, two graduating classes have developed this innovative system to improve chemical application in blueberry fields.

The first team designed and built a system using proximity sensors to detect blueberry bushes, along with solenoid valves, spray equipment, and a programmable logic controller mounted on a utility vehicle (UTV) to apply chemicals between rows.

The next class enhanced the system with a rate controller to ensure consistent application, regardless of UTV speed. By integrating a flowmeter, regulating valve, and speed sensor, the students addressed a real agricultural challenge: delivering the right amount of chemicals at varying speeds. The project combined instrumentation, fabrication, and data analysis to create a fully student-led solution.

"At its core, the BATM program is about learning by doing," said a program representative. "Through hands-on projects and industry engagement, our students graduate with skills and experiences that directly translate to the workplace."

The program's approach is paying off: BATM graduates are securing competitive roles in agriculture, software development, manufacturing, and beyond. The BATM degree doesn't just prepare students for jobs—it helps them stand out in their fields.

Click to view more senior designs.



CAPSTONE DESIGN SHOWCASE



The Samuel Ginn College of Engineering hosted its second Capstone Design Poster Showcase, and seven Biosystems Engineering students earned top honors.

First-place winners Kylie Moore, Jake Gaertner, and Jada Neal presented “Parkerson Mill Creek Wellness Center”, a cost-effective design transforming a former landfill on campus into a vibrant outdoor space. Their plan includes multi-sport courts, pavilions, picnic areas, and 10,000 square feet of green space. Auburn University Facilities Management reviewed the team’s research-backed design.

“The university tasked us with deciding how to use the land to benefit Auburn,” Moore said. “We designed an outdoor wellness center with basketball, volleyball, and pickleball courts, two pavilions, and an elevated stage, integrated near existing campus facilities.”

Gaertner called first place “a huge honor.” “We put a lot of work into it, and to be recognized as first place among strong teams was awesome,” he said. Neal added, “The last three weeks were critical for optimizing the space and creating a design that engages both students and the community.”

Third-place winners Carson Bedics, Hailey Rhodes, Crissy Drummonds, and Morgan Maguire focused on creek restoration at Town Creek Park. Their project addresses significant erosion along Privet Creek, which deposits soil into a nearby pond and drives costly dredging. By reshaping the channel and floodplain, the team aims to reduce erosion, prevent sediment buildup, and save the city money.

These projects highlight how Biosystems students combine creativity, research, and practical engineering solutions to improve both campus and community environments.

PARKERSON MILL CREEK WELLNESS CENTER

The Former Rugby Field Landfill, a 7-acre site on Auburn’s Hemlock Drive, is being redeveloped into an Outdoor Wellness Space. The design includes multi-sport courts, shaded pavilions, and gathering areas to promote wellness and community.

Design Objectives:

- Create a cohesive, integrated recreation space
- Incorporate sustainable and functional design strategies
- Deliver a feasible, cost-effective plan for long-term use

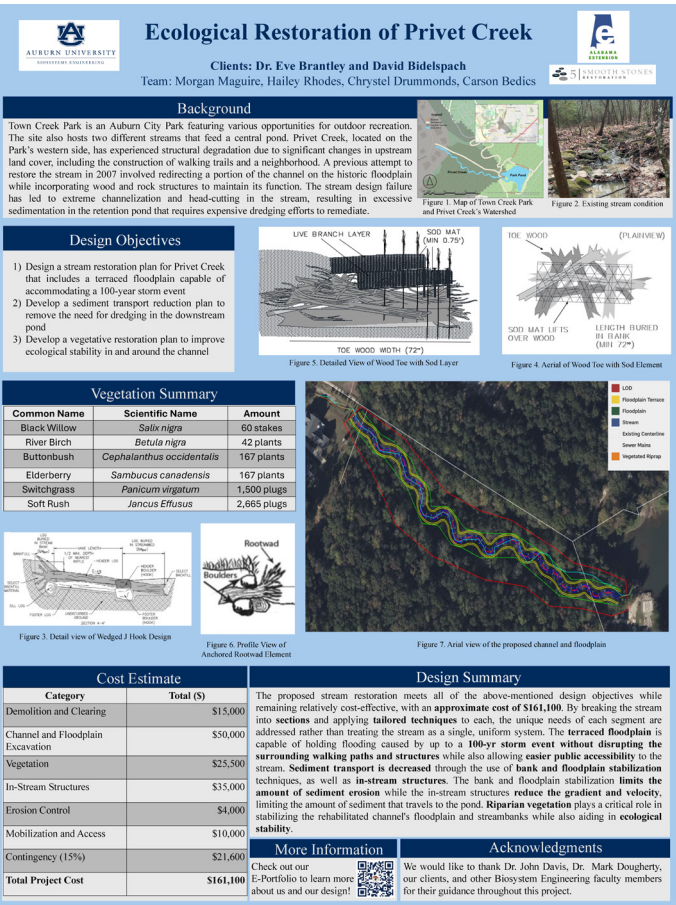


ECOLOGICAL RESTORATION OF PRIVET CREEK

Town Creek Park in Auburn features two streams feeding a central pond. Privet Creek, on the park’s west side, has degraded due to upstream land cover changes. The result: channelization, head-cutting, and excessive sedimentation requiring costly dredging.

Design Objectives

- Restore Privet Creek with a terraced floodplain for a 100-year storm event
- Reduce sediment transport to eliminate dredging needs
- Implement vegetative restoration to enhance ecological stability



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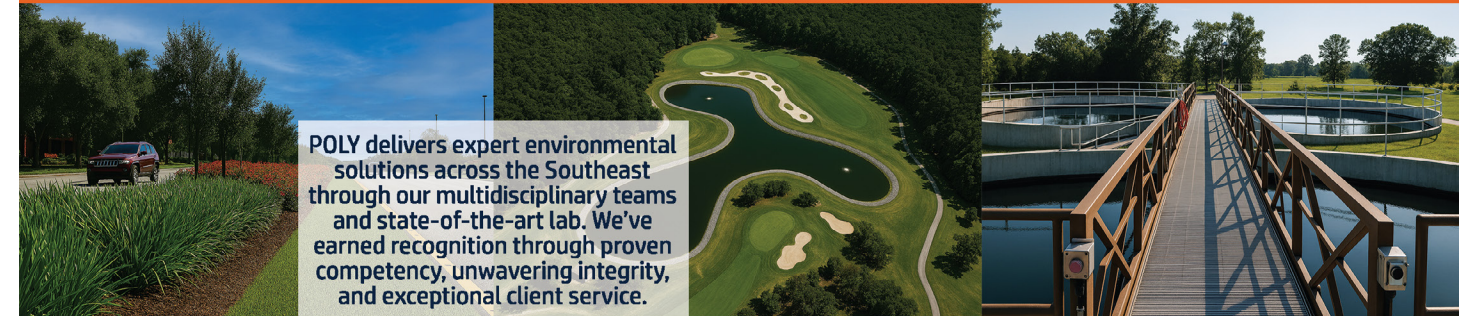
Since our founding in 2005, we've grown into a team of over 100 talented professionals across three Southeastern states — and we're still growing. As we celebrate two decades of delivering award-winning service to our clients and communities, we're looking ahead.

We're also proud to celebrate our Chief Operating Officer, Eddie Wade, PE, who was recently honored with the 2025 Outstanding Alumni Award from Auburn's Biosystems Engineering department. His recognition reflects our team's commitment to making a lasting, positive impact.

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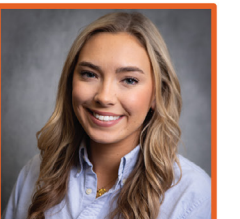
From safe drinking water to resilient infrastructure, POLY delivers innovative, practical solutions.

ABOUT POLY, INC.

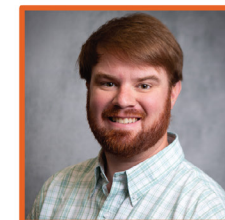
Founded in 1959, POLY, Inc. has evolved into a leader in architecture, engineering, and environmental services, serving municipal, industrial, and federal clients across the Southeast and around the World. With over 45 employees across offices in Dothan, AL (home to our 4,500 sq ft environmental lab), Fort Walton Beach, FL, and Birmingham, AL, we specialize in sustainable water and wastewater systems, pollution control, and regulatory compliance, aligning with BSEN's focus on ecological innovation.

PROUD AUBURN BSEN ALUMNI

"Auburn's BSEN program equipped me with the engineering background and tools to tackle real-world challenges at POLY, from navigating water use permits and rehabilitating vital infrastructure to conducting field surveys and creating hydraulic models for water, sewer, and reclaimed systems."



Anna Kate Davis - BSEN '24



"Auburn's BSEN program gave me a strong engineering foundation and hands-on skills I have applied at POLY, from securing permits and designing water/sewer pipelines to supporting land development projects. These experiences have sharpened my technical abilities and strengthened client communication."

Peyton McCord - BSEN '23

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Alpha Epsilon Honor Society

Alpha Epsilon is the honor society for outstanding agricultural, biological and food engineers. The objectives of the honor society are to promote the high ideals of the engineering profession, to give recognition to those agricultural, biological and food engineers who manifest worthy qualities of character, scholarship and professional attainment, and to encourage and support such improvements in the agricultural, biological and food engineering profession that make it an instrument of greater service to mankind. Pictured below are the Alpha Epsilon new inductees.

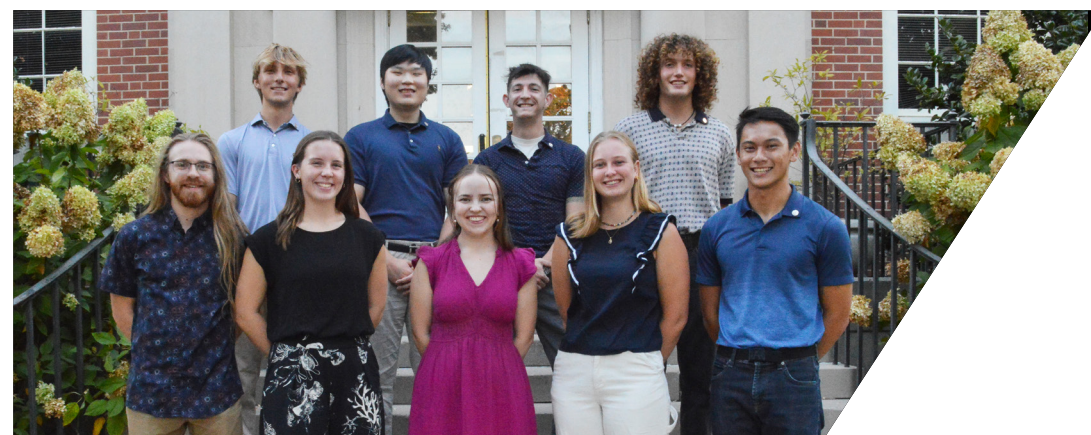


Click to learn more
about Alpha Epsilon.



American Society of Agricultural and Biological Engineers

The goal of the ASABE is to encourage the advancement of agricultural, biological, food, environmental, and ecological engineering. Agricultural, Food, and Biological Engineers develop efficient, effective, and environmentally sensitive techniques and methods of producing food, fiber, timber, and renewable energy sources for a growing world population. Pictured below are the 2025-2026 ASABE officers.



Click to learn more
about ASABE.



Water and Environmental Student Association

The Water and Environmental Student Association (WESA) at Auburn University connects students from interdisciplinary backgrounds and majors that have an interest in the water and wastewater industry. WEF and AWWA members, Member Associations, and staff proudly work to achieve our mission to provide bold leadership, champion innovation, connect water professionals, and leverage knowledge to support clean and safe water worldwide. Pictured below are the WESA members and volunteers.



Click to learn more
about WESA.





To share alumni stories or updates to be featured in future newsletters, please send them to Multimedia Specialist Devontae Lindsey at dtl0011@auburn.edu



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