MESSAGE FROM THE DEPARTMENT HEAD

Thank you for taking the time to read the 2021 BSEN Newsletter.

Despite the challenges posed by the COVID pandemic, this has been a fruitful year for the Biosystems Engineering department. This past spring, 53 undergraduate students received their Bachelors of Biosystems Engineering degree. This is the largest graduating class for the department (i.e. in 102 years of history of the department). Within 6 months of graduation graduates were placed in either engineering consulting firms (48%) or are pursuing graduate degrees (26%) in the department or peer institutions. I personally want to thank our alumni for staying engaged and connected with the department. Because of this open line of communication and growing BSEN network, several of our students have received job opportunities from past graduates.

We are a continuously growing department, and recruited 2 new faculty this year. Several faculty members received grants from highly competitive grant funding agencies such as USDA-NIFA, Department of Energy, National Science Foundation, and NOAA. This is another evidence that biosystems engineering students are being trained and educated by nationally recognized faculty. I am very proud of the faculty members in the department for their dedication to research, instruction, and extension/outreach excellence. Another major milestone, is Biosystems Engineering’s undergraduate student body has officially reached 51% female. This newsletter includes several other highlights about alumni and graduate students, as well as how some of our students learned about the Biosystems Engineering major. The purpose of the BSEN annual newsletter is to share a few activities and achievements the department has gained over the year. I therefore encourage you to follow us on our Instagram @bsen_au and other social media outlets to keep up with us! I hope you enjoy reading this 2021 edition of the BSEN newsletter and I thank you for all you support of the Biosystems Engineering department. War Eagle!

Dr. Oladiran Fasina

AWARDS

OUTSTANDING STUDENT AWARD
Mary Beth Cassidy

SUPERIOR TEACHING AWARD
Jon Davis, PE

OUTSTANDING FACULTY AWARD
Jon Davis, PE

OUTSTANDING STUDENT EPORTFOLIO
Naomi Pitts

OUTSTANDING ALUMNUS AWARD
Greg Nichols

OUTSTANDING STAFF AWARD
Genta Mills Stanfield
$1.3 Million in scholarships awarded to Biosystems Engineering students in one single year.
The highest female percentage of any engineering discipline at Auburn University.

51% FEMALE
NEW FACULTY

Dr. Anna Linhoss, Associate Professor

Dr. Anna Linhoss will be focusing on Coastal Ecological Engineering such as coastal hazards and climate variability impact on ecosystems, coastal watershed and modeling, and management of coastal ecosystem. Dr. Linhoss was previously an Associate Professor in the Department of Agricultural and Biological Engineering at Mississippi State University, and was also Associate Director of the Geosystem Research Institute, and the Northern Gulf Institute both at Mississippi State University. Dr. Linhoss received her PhD from University of Florida Department of Agricultural and Biological Engineering, her MS degree from University of Georgia in Agricultural and Biological Engineering, and a B.S. degree in Anthropology from University of Colorado Boulder.

Dr. John Linhoss, Assistant Professor

Dr. John Linhoss was previously an Assistant Extension Professor at Mississippi State University. He received his PhD from Mississippi State University in Agricultural Science and Engineering Technology, an M.S. in Soil and Water Science from University of Florida, and Bachelor’s degree in Biology from Birmingham Southern College. Dr. John Linhoss will focus on Agricultural Engineering Technology such as use of precision technologies in confined animal production systems to improve animal housing management, environmental control and better understand animal behavior and welfare. Dr. Linhoss is also interested in spatial statistics and mapping of sensors that are placed in these confined animal housing systems. In addition, Dr. Linhoss will provide leadership to the BATM major and the students in the major.

TENURED & PROMOTED

Dr. Jasmeet Lamba, Associate Professor

Dr. Lamba joined the department in 2015 and since then has made significant contribution to Water Resources Engineering research and teaching in the department and Auburn University. Specifically he has improved our understanding of the dynamics, the fate, and the transport of sediments and nutrients in agricultural and urbanized watersheds. Dr. Lamba’s research group is using a novel X-ray tomography approach to better characterize soil macropores with the overall goal of developing a new and improved version of the HYDRUS model. This model is very important to the soil and water resources engineering discipline as a decision support tool for understanding water, heat, and solute movement in saturated soil conditions.
Biosystems Engineering takes pride in the hands-on and engaging learning environment fostered within the department. So there was no doubt about collaborating, when the first children’s STEM museum opened in the Auburn area.

AO Discover! is a children’s museum and science center created to provide hands-on educational exposure to science, technology, engineering, mathematics, and arts. Introduction to Biosystems classes were tasked with creating interactive exhibits for two different installations in the museum. The spring 2021 class created music exploration exhibits using only PVC pipe and wood for the structural designs. The fall 2021 class created magnetically mounted exhibits that interactively demonstrated potential and kinetic energy. The exhibits had to be functional, creative, and most importantly, safe for children. The exhibits were tested in the Corley Courtyard by some of the very cutest judges (see pictures) and by AO Discover! CEO and Director, Katie Murrah.

AO Discover! wants to keep things dynamic and fresh. Murrah stated, “We want to make sure that every time a family comes into the museum, they have a new and exciting experience.” Biosystems Engineering hope to stay involved in creating new exhibits for the community that showcase science and engineering principles. Both, AO Discover! and Biosystems Engineering, have the same goal; creating a strong foundation in critical thinking, creativity, and perseverance in the face of failure.
2 Majors

Biosystems Engineering
  Ecological Engineering Option
  Bioprocess Engineering Option
  Forest Engineering Option

Biological & Agricultural Technology Management
My journey to Biosystems roots back to my undergraduate institution, Punjab Agricultural University in India. There is where I developed a proclivity towards soil and water engineering. I was intrigued by the work being done to address issues related to water quality. After my undergraduate, I decided to pursue my masters in Biosystems Engineering at Auburn University. I worked under the guidance of experts who actively conduct research related to the transport of contaminants in natural waters, ecosystem restoration, and the nutrient dynamics in coupled natural human systems.

My research focuses on understanding the environmental issues related to agricultural and urban systems, such as nutrient and sediment transport to bodies of water. I am deeply interested in how human activities impact water quality. To analyze the impact in the vadose zone and on the watershed scale, I use a combination of field data collection, laboratory experiments, and modeling to study the water and nutrient transport.

Most recently, Kritika was the recipient of the Presidential Graduate Research Fellowship. This Fellowship is given to only 33 highly qualified students that are pursuing a doctoral or terminal professional degrees in established and emerging areas of excellence.

My journey to Biosystems began when joined my high school’s Engineering Academy program. Each year we were introduced to different concepts; the engineering design process and CAD freshman year, instrumentation and analysis sophomore year, programming junior year, and an engineering capstone project senior year. When it came time to choose a major, I knew I’d go to Auburn for engineering, but I didn’t know what discipline of engineering. As a kid, I spent most of my time outside and around water, so Biosystems was a natural fit for me. My interest in the role water plays in agricultural and the environment has driven my research as a graduate student.

My main research focus is on water needs for modern commercial broiler farms. Depending on farm location, number of houses, and bird size, a farm can consume millions of gallons of water a year. In some cases, farmers across the US experience high water costs or rely on low yield wells. Trying to provide that much water can be both costly and difficult. My master’s research looked at how to reduce the financial or yield burdens on farmers by developing a model to analyze if farms across the US could benefit from installing rainwater harvesting systems. That research led me to my current Ph.D. research of estimating water consumption values for modern broiler farms. There’s been an increased interest in how much water is really used on modern broiler farms, but current research and data doesn’t reflect modern housing and management systems. Establishing a baseline for water consumption in broiler producing areas across the US will help growers anticipate water needs throughout the year and throughout a flock. In the end, putting a number to farm water needs can help the poultry industry better understand their impact on water sources and identify ways to use water wisely.
WHAT BROUGHT YOU TO AUBURN UNIVERSITY?
I was looking to make a change in the focus of my career and the opportunity to teach had always been something I’d kept in the back of my mind. When the position opened, I applied but had doubts and didn’t really think I would be considered. I’m glad I was wrong. I thoroughly enjoyed my time in consulting, but I have truly found a home here with Biosystems Engineering.

TELL US ABOUT YOUR INDUSTRY EXPERIENCE?
I started my career working in the Water & Wastewater group at Stantec. It was a great learning experience, I really lucked out with my first boss, Garry Garretson, who was an incredible mentor and example of a professional engineer. I worked on a lot of different projects while at Stantec, from water treatment plants, to residential master planning, to urban streetscapes. We also did a lot of storm water design and planning in Georgia. With Foresite, I primarily worked in residential and commercial site design projects. I had the opportunity to work on a unique project for West Fraser lumber in Opelika that entailed a 24-hour, non-stop concrete pour for their new drying kilns. My Forest Engineering degree came in handy! At Goodwyn, Mills, and Cawood I helped with several projects in small communities throughout Alabama. I’m grateful for the experience I had in consulting; it shaped my teaching approach and provided me with hundreds of practical, real world examples to relay to students.

WHAT DO YOU WANT THE PUBLIC TO KNOW ABOUT BIOSYSTEMS ENGINEERING?
That we have some of the best students EVER! I’m constantly amazed at what our students achieve while in school and their success after graduation. We have a really strong curriculum and our commitment to teaching and assessment is reflected from our student success. Our students, typically find employment in their field of interest within 6 months of graduation. Also, I’m always blown away by the faculty research and the extent to which they collaborate with other fields – that’s certainly reflective of the multi-dimensional nature of our curriculum and subsequent skills of our graduates.

JON DAVIS, LECTURER

TELL US ABOUT YOURSELF.
I was born in Opelika, Alabama and grew up in Salem, Alabama. I attended Smiths Station High School and it was there, that I decided I wanted to further my education and pursue an undergraduate degree in engineering at Auburn University. I earned my undergraduate degree in Forest Engineering, and went on to get a Masters in Civil Engineering working under Dr. Jim Baier in the Biosystems Engineering department. After graduation in 2004, I entered the industry and began working for Stantec, Inc. in Macon, Georgia. After working for Stantec, I moved back to Auburn and ended up working for two different firms during that time: Foresite Group and Goodwyn, Mills, and Cawood. In 2017, I joined the BSEN department and have been here ever since! I’m currently working on a PhD in Science Education, and hope to finish in 2022.
WHAT IS YOUR FAVORITE PART OF YOUR JOB? WHAT IS THE MOST CHALLENGING PART?

My favorite part of this job is seeing that look of recognition and excitement when a student understands a difficult concept or accomplishes a challenging task. Being able to help students learn new things is an incredible privilege and I love having the opportunity to play a small part in that. The most challenging part is maintaining a high level of teaching and quality assessment throughout the semester – especially towards the end. Similarly for students, the end of the semester is a grind for professors as well. I remind myself of the main goal and purpose, and how important it is for me to educate the next generation of engineers.

WHAT WAS THE BEST PIECE OF ADVICE YOU RECEIVED ALONG THE WAY?

That’s a tough one – I’ve received so much great advice it’s hard to narrow it down. I’d say the best advice I received was to “always be yourself.” One of my high school teachers gave this advice, to help me understand it is a waste of time pretending to be someone I am not. I think all of us have value and are unique in some way; we should celebrate that, not try and hide it.

BSEN YouTuber.

She put in her two-week notice in August 2014, then moved back to Opelika. By March 2015, she was living the dream and forging her own path to success... Literally.

Jessica “Dixie” Mills graduated from the Biosystems Engineering department in 2012 and immediately began working as an agricultural engineer with the Natural Resources Conservation Lab. Soon after, a Colorado opportunity came calling. More money? An address in the Rocky Mountains? She knew she had to apply. Mills got the job with Halliburton and began working as a liaison of between the sales department and Colorado oil rig engineers. For a year and a half, she worked. The weeks were long and she just simply waited for the weekends; deep down she knew she was meant to do something else. She made her mind up in August 2014; she was going to hike the Appalachian Trail and document her experience.

By the time Jessica “Dixie” Mills took her last step, 2,190 miles later — a smile on her face, an Auburn hat on her head — the YouTube channel she’d started just before leaving had more than 1,000 subscribers. She has gone on to hike the Pinhoti Trail, the Continental Divide Trail, and the Pacific Crest Trail documenting it the whole way. Her YouTube channel, Homemade Wanderlust, is where she shares everything from current hikes to gear reviews. With “Homemade Wanderlust” now reaching almost 385,000 subscribers, she has built a huge online community and has paved a completely new career path for herself.

“It’s not easy, especially on a trip that takes six months or more — you have to want it. It’s like with engineering; you have to want it. It’s not something you put minimal effort into and come out with a degree. You have to work very hard at it.”
Recent Employment Destinations


95% job placement within 6 months of graduation.
BSEN Alumni:

**Hagen Kaylor, EIT**

**Current Position?**
Senior Engineer for the Alabama Power Company E.C. Gaston Steam Plant

**Why BSEN?**
I wanted a major that would challenge my mind and prepare me for the real-world job market. Biosystems allowed me to accomplish these goals and developed me into a great Auburn man. The BSEN curriculum ensured that I was a well-rounded engineer and was ready for the challenges of the professional world. This was proven when I was offered a tremendous engineering opportunity before I graduated.

**Most interesting place you’ve worked?**
My first engineering position after graduation was in an oil and gas field. I was based in Fort Worth, Texas, but I got to travel throughout the United States and see different parts of the industry. My job allowed me to visit parts of the U.S. that I would have never seen otherwise. The intricate details of how many small pieces it takes for a large industry to work is remarkable.

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**Katelyn Rheinlander**

**Current Position?**
Service and Distribution Performance Manager at the Frito Lay Plant in Perry, GA

**Why BSEN?**
I knew I wanted to solve problems, but problems with solutions that would have a direct impact on people in their daily lives. I loved the flexibility the Biosystems curriculum provided for me to tailor my experience and set myself up for success, regardless of what industry I decided to join. While I may not have known when I joined the department, I quickly realized the professors and the challenging, yet supportive environment they have created within Corley became a key component to my growth and development as an engineer.

**Most interesting place you’ve worked?**
I currently work at the Perry Plant, which is the largest Frito Lay Manufacturing Facility in North America. The facility is more than a million square feet, contains 15 production lines and ships out 1.5 million cases each week. Perks of working at a chip factory include warm chips straight out of the fryer on a tough day – nothing better than a warm Funyun!

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BSEN Retiree:

**Bobby Epling**

Bobby Epling retired in January of 2021 after 34 years of service to the Biosystems Engineering department. He was hired as part of the tech department and his job evolved into IT Specialist. He assisted in all technical setup and technical related issues around the Corley building. Bobby is skilled and talented with wood work and is continuing his passion for carving in his retirement. He is enjoying his freedom with his wife, children, and grandchildren.
Clean water is one of the main global challenges Biosystems Engineering students work to solve. Similarly, “Students for Clean Water” is a student run organization striving to serve the world by educating Auburn University about the water crisis and the scarcity of clean water amongst many communities. With a common goal like this, Biosystems Engineering and Students for Clean Water were bound to cross paths.

Students for Clean Water’s purpose is to raise money to purchase water filters for communities that have no access to clean water. This year, the organization wanted interactive activities at the annual New Member Kickoff, to get students engaged and help them understand their purpose. With that in mind, Biosystems Engineering students Kaylee Neal and Molly Killpatrick decided to design a small-scale water filter to model the actual bio-sand water filters the organization aids in sending to communities like Nepal, Cambodia, and Uganda. To construct the water filter, they used a plastic two-liter bottle as the base; and cotton balls, coffee filters, sand, and pea gravel to filter the water. “We used the methods and design principles we learned in BSEN 2210-Engineering Methods for Biological Systems to develop the model.” (Molly Kilpatrick).

There have been a total of eleven Biosystems Engineering students in the Students for Clean Water organization over the past two years, four of which have held positions on the executive board.

- Kylie DeGilio : Assistant Director of Campus Relations
- Kaylee Neal : Assistant Director of Special Events 2019 & Secretary 2020
- Molly Kilpatrick : Assistant Director of Outreach 2019, Vice President of Member Relations 2020, & President 2021
- Caroline Varner : Director of Outreach 2021

The organizations holds fundraising events like “Water Week”, Carry the Jerry 5k, a bowling tournament, and a benefit concert throughout the year that support Neverthirst, a Birmingham, AL based non-profit agency. Last year alone, Students for Clean Water raised almost $17,000 for those who lack access to clean water and their goal for the upcoming year is $22,000.

“The thing that has stuck with me the most, is how the water crisis affects women and young girls. Women and young girls collectively spend almost 200 million hours hauling clean water to their families every day. This leaves little to no time for women and young girls to receive an education. As a female engineering student, this has stuck with me through my college career. As Biosystems Engineering students, we study how to develop sustainable solutions to global challenges, and the water crisis is a global challenge.” - Molly Kilpatrick
Student Stories.

Charles Reichley

My favorite experience has been all the friends that I’ve made from the department. I’ve been able to grow extremely close with some of the members of my cohort to where we hang out with each other on the weekends most weeks. The tight knit community that our faculty & students have fostered sets us apart from other departments in my eyes. Since we are not as large as some of the other engineering departments it really allows students to grow closer with one another & with the faculty that we’ve seen for 4 years now. I am forever grateful for the department for all the joy & knowledge that have surrounded me the last few years.

Courtney Eagle

All of my favorite memories in Biosystems include the building itself - Corley. This building has been the home for generations of students who enter as freshmen with big dreams & leave as professionals with practical tools to build a better future. The long hours & late nights in the computer lab & design room have built some of the best friendships I have & been the setting to some of my favorite memories. Most importantly, I have learned the value of hard work, perseverance, & life-long learning.

Andrew Sauer

Originally, I was interested in biomedical engineering. I applied to Auburn at the last minute & saw no biomedical engineering option, but I saw Biosystems & figured, “Eh, close enough.” It was not close, but here I am receiving my Bachelors in Biosystems Engineering. Why did I stay? BSEN turned out to be a better fit for me than I believe biomedical engineering would have been. I grew up loving nature & the outdoors, & Biosystems has given me the skills to not only understand those things better, but to work with them for human solutions. Working to gain understanding & an ability to solve problems in that arena is what kept me here. Food & water are the essentials of human life, & I feel that my education will allow me to have a positive impact on the world.

Jessie Williford

In high school, I was in a leadership program that showed career paths like military, health, & agriculture. Two Ag Ambassadors spoke about different career options & went over all of the majors the College of Agriculture offered. The last major they covered was Biosystems. They opened my eyes to the food shortages that the world is expected to face in 2050 & beyond. I’ve always wanted to do something meaningful with my life, & I instantly knew that Biosystems was the way to do it. My degree direction has changed since then, but I am thankful I was exposed to what BSEN has to offer. Earning this degree will be one of the most pivotal moments in my life.
The increase in activity across campus has created an issue of litter entering & impairing the Parkerson Mill Creek that runs through the campus of Auburn University. Auburn Facilities has stressed the need for a new litter collection system implementation for the area, as the current litter collection systems has safety limitations & requires field technicians to physically enter the stream.

With society’s increasing dependence on fossil fuels, algal biofuel is one potential and promising solution. Dr. Higgins of the Biosystems Engineering Department at Auburn University is seeking a novel design of an algal bioreactor capable of medium-scale production of algae. Issues to consider when growing algae include improper light depth, the presence of hydraulic dead zones, under & overheating, & appropriate aeration of the algae.

The City of Opelika has proposed renovations to Floral Park which include a new parking lot, a multiuse sports field, a playground, a press box/concession stand building, a new restroom facility, two water features, & additional walking paths. Opelika needs a re-designed storm water management system to accommodate the renovation, while improving infrastructure, & incorporating storm water best management practices.
WE STAND FOR DIVERSITY & INCLUSION.

The Biosystems Engineering profession inherently consists of diverse sub-disciplines that collectively focus on the main goal of the profession – to develop engineering-based sustainable solutions to essentials of life - ample food, clean water, affordable energy, and healthy environment, but also value the broad array of perspectives required to achieve this common goal. At Auburn University Department of Biosystems Engineering, we also value the diverse students, faculty, and staff in the department, and commit to ensuring they experience a workplace environment that is safe, equitable, and inclusive. An example of our commitment to diversity, equity and, inclusion is that female student comprise half of our undergraduate student population; this is the highest percentage of female enrollment amongst the Auburn University Samuel Ginn College of Engineering departments.

We are committed to fostering a culture that does not tolerate discrimination, and acknowledges and values all dimensions of diversity including those based on life experiences, creative ideas, gender, nationality, race, identity, ethnicity, and religion. We care for the well-being of and respect the contributions of each faculty, staff, and student. Increasing the number of underrepresented groups in our family, ensuring that all feel welcome and that our department is accessible to all qualified individuals is a top priority for us. If you feel that any of these principles are not being followed by any member of the department, or by the department itself, we encourage you to talk to the Department Head or report it through the Auburn University Bias Reporting website (aub.ie/BERT).

BSEN BY THE NUMBERS FALL 2021

UNDERGRADUATE:  
189 ENGINEERING STUDENTS  
24 TECHNOLOGY STUDENTS  

GRADUATE STUDENTS:  
28  
Masters: 15  
PhD: 13

FACULTY:  
17  
5 have PE license  
3 have leadership appointments  
» Sushil Adhikari, Director, Center for Bioenergy & Bioproducts  
» Jeremiah Davis, Director, National Poultry Technology Center  
» Steve Taylor, College of Engineering Associate Dean for Research

STAFF:  
10  
Administrative: 4  
Research: 6

If you have alumni stories or updates you would like to include in our newsletter, send them to Meri Margaret Fank at mmf0036@auburn.edu.

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