

Message From The Department Head

I became department head of Agricultural and Biological Engineering (ABE) in July 2020. Let me start by saying how honored and humbled I am to be serving in this role, in a great department at a university that I've loved for many years. For those of you who don't know me, I was a faculty member in ABE from 1997 through 2004, and I've had a lot of time in the interim to consider the strengths of the program as well as potential growth areas.



COVID-19 has made for a difficult transition into this new leadership role, but **I have been tremendously impressed with the courage, concern, and attention to detail that Mississippi State University's leadership have shown at all levels during this pandemic.** The fact that we made it through the fall semester with so few cases is a testament to the care and diligence of the administration, faculty, and students. The spring semester is shaping up in similar fashion, and we are all hopeful the new vaccines will put us on the path to be operating normally again in the summer and fall of 2021.

Let me now tell you a bit about ABE's progress since July 2020. You will notice (page 3) that **our student numbers have grown significantly** in recent years. We now stand at **about 450 undergraduate students** across our three majors. It is challenging yet critical to advise students well, so we have created an advising team of three senior faculty members (Drs. To, Elder, and Paz) to lead all undergraduate and graduate advising, coordination, and assessment efforts, and we have made student-staff members available to assist them in these efforts. They are all doing an excellent job, and I believe all our students are receiving informative, clear, and consistent advice on their course curriculum and related issues.

We have also been in a phase of **hiring new faculty members**. Dr. Yuzhen Lu started with us in November 2020, and Dr. Nuwan Wijewardane started in March 2021. We have another member joining us in July 2021 and expect to have two more by fall 2021. It is an exciting time to bring in new people and ideas, and having a full slate of faculty will enable us to broaden our teaching and research portfolio and add additional electives and graduate courses for our students' interests.

While we have a large number of undergraduate students, we currently stand at **under 40 graduate students** and hope to see that number grow to 50 over the next few years. With the growing number of students we have, we are finding ourselves with inadequate teaching and research facilities and are contemplating the possibility of building expansion. We are also looking at multiple avenues of increasing resources to improve quality of instruction; to engage students more in high-impact learning activities like internships, international experiences, technical society activities, and national student competitions; and to dramatically extend the impact of our research and extension efforts for Mississippi and the nation.

My goal is for ABE to have a clearly defined focus on engineering for human well-being, which requires an adequate and safe supply of food, feed, and fiber; adequate and safe natural resources and environment; and advanced health care. Along these lines, I want to see ABE at Mississippi State recognized as an outstanding program in agricultural and biosystems engineering as well as biomedical engineering. In the future, you can expect to see more from me about how we plan to get there.

Alex Thomassen



ABE Creates Lifelong Friendships



Molly Leasure of Franklin, TN and Annie Brinda of Madison, AL are both 2017 graduates of the ABE program. Annie came to MSU because there were no schools in Alabama that offered the biomedical engineering major. Molly came to MSU for the scholarships and MSU's reputation as a phenomenal engineering school.

"I chose biomedical engineering because my high school in Madison, AL has a biomedical sciences program where I discovered the world of neural prosthetics which blew my mind as a high school student," Annie says.

When asked about her choice, Molly noted, "I first majored in biomedical engineering wanting to go to med school, but after taking some CAD classes in high school, I found the engineering aspect intriguing. I am lucky I chose a major with so many options because after an internship with an ophthalmologist, I realized med school was not for me!"

After many ABE classes together, Molly and Annie became fast-friends and decided to become roommates for the last two years of their undergraduate degrees. "Having a live-in study buddy made the major even more fun!" Molly notes. During their senior year, Molly and Annie were part of the same senior design group where they created a prototype for a neck brace to help physical therapy patients with cerebral palsy.

After graduation, the young women went their separate ways, and Molly began a job in industry; "I currently work as a validation engineer where I plan and execute tests on equipment and processes to assure regulatory standards for Lifecore Biomedical. We specialize in the production of sodium hyaluronate (NaHy) and work in contract development and manufacturing for companies like Johnson and Johnson and Abbvie." She knew her end goal was to work in industry and knows she can go back to school if the need arises.

Annie continued her education; "I am currently a Ph.D. candidate at the University of Minnesota. My research involves the optimization of deep brain stimulation which is a treatment for refractory movement disorders like Parkinson's disease." She knew she wanted a research scientist job and graduate school was the only way to get there.

Such different career plans should have taken them miles apart as they both pursued their passions. College friendships sometimes fall to the wayside after graduation when everyone moves away. This was not the case for Annie and Molly! Without even meaning to, both aspiring biomedical engineers ended up 15 miles apart in Minneapolis, Minnesota, where they still remain best friends.

To read more about our amazing alumni, visit abe.msstate.edu/alumni/.

Our Faculty

Welcome to ABE



Dr. Yuzhen Lu: Before arriving at Mississippi State, Dr. Yuzhen Lu, originally from China, obtained a B.S. in Facility Agriculture from Northwest A&F University, M.S. in Plant Nutrition from University of Chinese Academy of Sciences, and Ph.D. in Biosystems Engineering from Michigan State University.

After his Ph.D., he worked as a Post-Doctoral associate for the USDA ARS research unit at Michigan State and in the Department of Biological and Agricultural Engineering at North Carolina State. His research interests include optical imaging for food quality and quantity, high-throughput plant phenotyping, robotics, and artificial intelligence for precision agriculture. Dr. Lu says that his research requires, “problem-solving skills in data analysis and modeling, computer programming, and software-hardware integration.” He advises students with similar research interests to begin learning these skills now. For more information, visit Dr. Lu’s website at <https://www.yuzhenlu.com/>.



Dr. Nuwan Wijewardane, originally from Sri Lanka, envisioned his career in academia from the time he started his studies in Agricultural Technology and Management at

University of Peradeniya where he often tutored his classmates while earning his B.S. degree.

He completed his M.S. in Biological Systems Engineering, his Ph.D. in Biological Engineering, and worked as a Post-Doctoral associate under Dr. Yufeng Ge, all at the University of Nebraska-Lincoln. After accepting a faculty position at Mississippi State University, he said, “As a new faculty member, I hope to actively engage in teaching, mentoring students, and research to produce new knowledge to be disseminated.” Dr. Wijewardane intends to use advanced techniques like spectroscopy, machine learning, GIS, variable rate technologies and the “Internet of Things” (IoT) to conduct research in precision agriculture, in which plant and animal production can be equipped with new sensing technologies and smart systems to increase yield.

Awards

Dr. Simpson: Cover of MSU Alumnus magazine, featured in MSU’s Our People, Institute of Higher Learning Excellence in Diversity and Inclusion

Dr. Paz: Distinguished Alumnus by University of Philippines Los Baños Alumni Association

Dr. John Linhoss: Received MSU’s Community Engagement Award for collaboration with Habitat for Humanity on project titled “Hammers and Homework”

Dr. Lu: Featured in Good Fruit Grower magazine

Dr. Tagert: ASABE Educational Blue Ribbon for video collaboration ‘Soil Sensor Installation’, SARE Sustainable Agriculture Fellow

Examples of Faculty Service

Simpson:

- Society for Biomaterials
- President MS Acad. of Sciences
- MSU Honor Code Board

Lu:

- Guest editor of Foods Journal

Tagert:

- MS Assoc. of County Ag. Agents
- President MS Recycling Coalition
- NIH grant review panelist

Priddy:

- MSU Faculty senate
- MSU Academic Review Board

To:

- CALS Curriculum Committee

Elder:

- MSU Graduate Council
- NIH Grant Review Panelist

Chesser:

- Chair MSU Seed Tech. Short Course

Spotlight



Dr. Joel Paz, who joined the faculty in August 2009, felt right at home at MSU as soon as he stepped on campus for his interview with Dr. Thomas Cathcart. Having been involved in research and extension previously, teaching offered Dr. Paz the opportunity to make a positive impact and help shape a student’s future. He believes, “One of the best compliments a teacher can get is to see a student succeed in life.” In his spare time, Dr. Paz loves to watch Doctor Who, and the lockdown due to COVID-19 gave him the opportunity to learn to play the piano.

Dr. Filip To has been a faculty member for over 31 years. Dr. To loves working with students, teaching new things, sharing experiences, and offering them guidance. His favorite teaching memory is doing a hand stand in class to prove that he could do more than teach. His students, colleagues, and community have kept him at MSU and given him no reason to leave this home. He also loves making gadgets and cooking. Dr. To says, “My wife tells me that I make things up, but in my heart and mind, I’m an inventor and what else can an inventor do other than make things up?”



Dr. Steve Elder joined the faculty in August 1999 after experiencing the enthusiasm the faculty and department head had for the field. Dr. Elder most enjoys working with students individually or in groups in the lab. “Conducting orthopaedic research funded by NIH and the biomedical industry has been so rewarding in addition to my research collaborations with CVM faculty members and residents over the years,” he says. Outside of work, Dr. Elder has been able to maintain a healthy work-life balance in his position to support his 3 children as they grew up. His personal hobbies include running and tennis, sometimes with students.



By the Numbers

\$957,266.60 in Research Grants

22 Students in Undergraduate Research

16 Fellowship/Assistantship Funded Grad Students

8 Collaborations with Major Companies

Graduation Rate of Over **85%** for All Majors

AETB: **9.6%** Female & **90.4%** Male

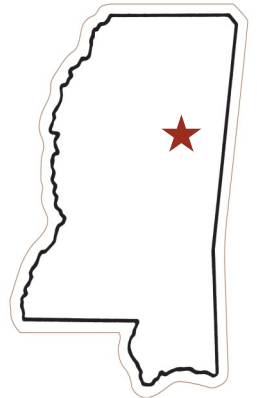
BE: **49.3%** Female & **50.7%** Male

BME: **56.4%** Female & **43.6%** Male

Collaborators



**Mississippi
State
University**



Where Do Our Students Go After Graduation?

2020 Graduation

114

Bachelor's (108)

AETB: 35
BE: 10
BE(BME conc.): 45
BME: 18

Master's (4)

AETB: 1
BE: 1
BME: 2

Ph.D. (2)

BE: 1
BME: 1

Current Enrollment

485

Bachelor's (445)

AETB: 96
BE: 26
BE(BME conc.): 52
BME: 271

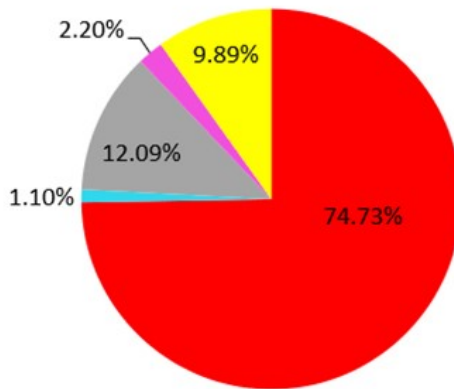
Master's (18)

AETB: 8
BE: 4
BME: 6

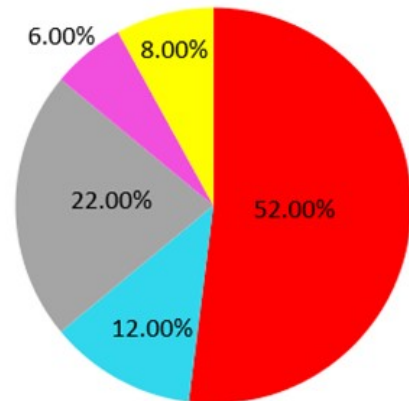
Ph.D. (22)

AETB: 5
BE: 9
BME: 8

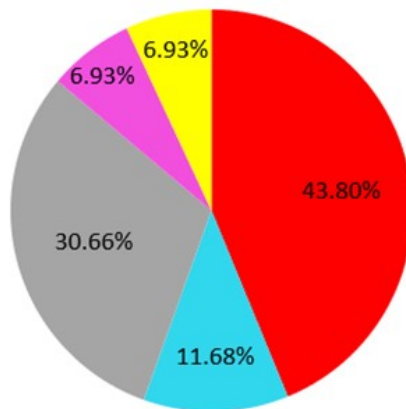
AETB Graduates



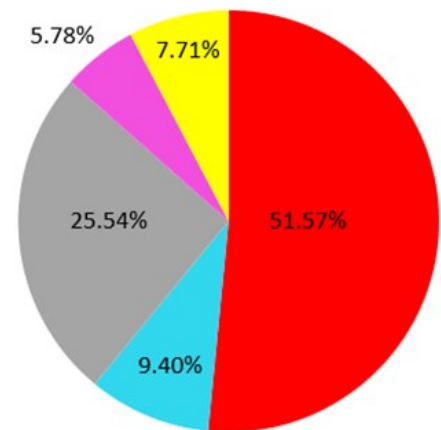
Biological Engineering Graduates



Biomedical Engineering Graduates



All Graduates



Industry
Med School
Grad School

Other
Other Professional Schools (Law, Dental, Optometry, Vet, Nursing, Physician's Assistant)

Our Students

Awards

2nd place in student poster competition : American Water Resources Association

Meredith Brock: Biological Engineering graduate student.

Mississippi Rural Dentists Scholarship Program

Alyssa Ware: junior Biomedical Engineering major.

Mississippi Rural Physicians Scholarship Program

Caleb McCreary: junior Biomedical Engineering major.

Provost Scholars

Taylor Stone: freshman Biological Engineering major.

Lucie LeBlanc: freshman Biomedical Engineering major.

Maggie Phillips: freshman Biomedical Engineering major.

1st place in 2021 Beltwide Cotton Conference Engineering-Systems Student-Paper Competition

Hussein Gharakhani: Biological Engineering Ph.D. student.

1st place in Biological Sciences and Engineering section of Undergraduate Research Symposium

Christine S. Grant: senior Biological Engineering major.

2020-2021 MSGCC NASA Fellowship Awardee

Meredith Brock: Biological Engineering graduate student.

Anna Marie Clay: Biomedical Engineering Ph.D. student.

Public Policy and International Affairs Summer Institute Junior Fellowship at Princeton University

Christopher Robinson: junior Biological Engineering student.

Student Involvement in Organizations

Freshman Year Navigators: program of upperclassmen guiding and mentoring Freshman students through their first year at MSU

Engineering Recruitment Leaders: Bagley College of Engineering group responsible for recruiting engineering students

Maroon VIP: MSU's student guide service for school groups, potential athletes, and other visiting groups

Pre-Medical Society: a student group used to guide students on their path to medical school with MCAT workshops, mock interviews, etc.

Biomedical Engineering Association of MSU(BEAM): ABE's student organization for biomedical engineers specializing in mentorship and networking with prospective professional schools and industry leaders

American Society of Ag. and Bio. Engineers (ASABE): ABE's student chapter bringing together both BE and AETB students for networking and industry talks

Graduate Student Association: MSU's student association for graduate students allowing for concerns to be addressed and interdisciplinary communication

Tau Beta Pi Engineering Honor Society: MSU's chapter of junior and senior engineering students in the top 10% of their class

Shackhous Honors College: MSU's honors college for the university's top students

College of Agriculture Ambassadors: student led group for the College of Ag. Specializing in recruiting students and serving as liaisons between departments

Montgomery Leadership Program: student led organization specializing in community engagement and mentorship

Spotlight



Cristina Griffith is a senior double major in AETB with an Enterprise Mgmt. concentration, and Agribusiness with a concentration in Production. She is also earning minors in Spanish and International Studies in Agriculture. Initially an Agribusiness major, her study abroad trip to Santa Marta, Columbia with Dr. Gina Rico and Dr. Sandra Guzmán led her to AETB. Cristina says, "My favorite part about being in multiple departments is the connections that are made between students and professors. I have learned so much from people with different backgrounds and passions." In addition to being an international presenter, she has completed numerous internships and is an undergrad. researcher with Dr. Wes Lowe and Dr. Jeff Johnson.



Raul Osorio is a Ph.D. student in Biological Engineering. Raul earned his B.S. in Environmental and Development Eng. at Zamorano University in Honduras and his M.S. in Natural Resources with a Forestry concentration from Kansas State. Originally from Quito, Ecuador, Raul came to MSU because of its reputation as an excellent engineering and research university. Regarding his career plans Raul says, "My mother is a university faculty member in Ecuador and I hope to one day follow in her footsteps. I would also like to experience working in an environmental conservation organization conducting restoration projects in underdeveloped countries." In addition to becoming involved on campus, Raul has excelled in his Ph.D. program and earned multiple recognitions for his oral presentations.



Jay Warren, a native of Gulfport, MS, is a senior in Biomedical Engineering. Jay was drawn to MSU because of its sense of community and welcoming atmosphere. After graduation, Jay has been accepted to attend UMMC in hopes of becoming a physician while still applying the novel healthcare delivery methods he has learned in BME. During his time at MSU, Jay has been named a Provost Scholar while being involved both on campus and in the community. This spring, Jay will defend his Honors Thesis on the development of a 3D-printed kartogenin-conjugated PLGA scaffold for use in cartilage regeneration. Jay has enjoyed his time in the department and says, "My favorite professor is Dr. Steve Elder, who has served as my research professor and mentor since my sophomore year. He has taught me to be a creative, effective researcher, and he has remained a valuable source of guidance and wisdom."