DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

UNIVERSITY OF ARKANSAS
College of Engineering
Biological & Agricultural Engineering

BIOLOGICAL AND AGRICULTURAL ENGINEERING
LIFE LINE

Fall 2020

OUR MISSION IS TO DEVELOP

SUSTAINABLE WATER, FOOD, ENERGY,

AND RELATED SYSTEMS THROUGH

INNOVATION IN TEACHING, RESEARCH,

EXTENSION, AND ECONOMIC

DEVELOPMENT VIA TECHNOLOGY TRANSFER.

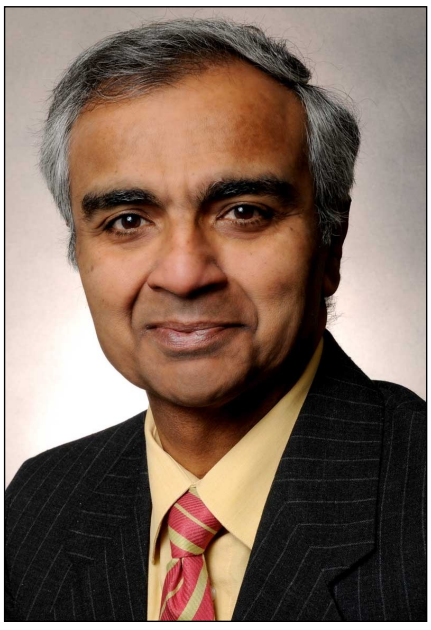
From the Department Head

Oh what a semester this fall has been- full of unexpected challenges, but classes were taught, students and clientele served, research progressed and stakeholders contacted. I am very proud of our team and pleased to share the highlights from our department during the last months. We successfully wrapped up the search for food systems engineering faculty who will begin in May. Our joint-appointment sustainability food engineer will join the university in January. Dr. Ebenezer Kwofie will come to us from McGill University and work across our department, chemical engineering and the food science department. The Accreditation Board for Engineering and Technology virtual review was successfully completed in late October with the official results of the visit to come in summer 2021. Dr. Tom Costello, our ABET coordinator prepared us for the visit extremely well.

Our enrollment stands at 146 undergraduates with sophomore, junior or senior standings, and 23 graduate students. We are excited that there are 12 senior design teams this fall who will complete their work in the spring term.

The College of Engineering's commencement on December 18 will see four B.S. and two M.S. graduates. In spite of the pandemic restrictions, we began the semester with a virtual welcome for our students in September. The virtual meeting of the Arkansas Section of the American Society of Agricultural and Biological Engineers (ASABE) in October recognized the Outstanding Senior in Biological Engineering at the U of A and as the Outstanding Engineer. .

Ms. Kristen Trinh was named the "Outstanding Senior" and Dr. Tim Burcham was recognized as the "Outstanding Engineer" at this event. We raised over $32,000 for the "50 for the Future" fundraising campaign. This was a college-wide effort with each program establishing a matching fund from our generous alumni. Students with unprecedented needs due to the pandemic were awarded these funds based on their application with a justification. Our heartfelt gratitude is extended to the donors and supporters of our programs and students. A fall virtual event of the Arkansas Academy of Biological and Agricultural Engineering (AABAE) on November 5 titled "*Brave Blue World: Racing to Solve Our Water Crisis*" featured presentations by Dr. Benjamin Runkle, of our department, Mr. Kyle Kruger of Garver and Mr. Steve Danforth, AP Innovations. We are thankful to AABAE for the financial support for scholarships and student services, and our alumni, friends and donors are worthy of our gratitude for their support and encouragement during these unprecedented times.



We deeply regret the loss of two of our dear alumni. Mr. Fred Fowlkes passed away on August 25 and Dr. Terry Siebenmorgen on November 22.

Please send us your news and updates, visit our website (www.bio-ag-engineering.uark.edu) and feel free to seek additional information. On behalf of the department, let me wish you a very happy holiday season and the very best in the new year.

Sincerely,
Lalit Verma

Dr. Jin-Woo Kim Elected as IEEE Nanotechnology Vice President of conferences

The IEEE Nanotechnology Council (NTC) elected new officers at its Annual Administrative Committee Meeting, held virtually July 23 and 24. Representatives of the 23 IEEE Societies who are Council members gather annually to conduct Council business and elect officers. This year, three positions were up for election: President-elect for 2021 (President in 2021-22), VP for Conferences and VP for Finances (2021-22). Prof. Fabrizio Lombardi, International Test Conference (ITC) Endowed Chair at Northeastern University, Boston, was elected President-elect for 2020. **Jin-Woo Kim, Director of Bio/Nano Technology Group and Professor of Biological Engineering at the University of Arkansas**, was elected Vice President for Conferences 2021-2022. Malgorzata Chrzanowska-Jeske, Professor of ECE and Director of VLSI & Emerging Technology DA Laboratory at Portland State University, was re-elected Vicepresident for Finances 2021- 2022.

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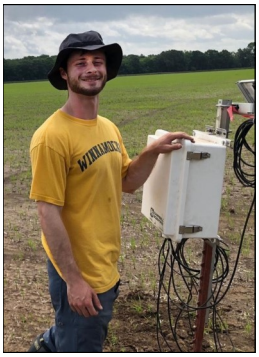
Undergraduate Thesis Nets Peer-Reviewed Publication



An honors thesis demonstrating farmers can significantly reduce water use while maintaining crop yields has earned a biological engineering senior a spot in a peer-reviewed journal.

The thesis was written by Sam Carroll, an Honors College Fellow who graduated in May. He was advised by Kieu Le, a teaching assistant professor of biological and agricultural engineering. The work appeared in the journal *Sustainability* in a special issue titled "Rethinking Agriculture to Meet Food, Fiber and Energy Demands."

Carroll is first author on the article, "Simulating Soybean-Rice Rotation and Irrigation Strategies in Arkansas, USA Using APEX." Le is corresponding author on the paper, which also includes authors Benjamin Runkle, associate professor of biological engineering, and postdoctoral researcher Beatriz Moreno-Garcia.

Carroll's work sought to validate an advanced crop model for Arkansas's unique agricultural setting and use it to demonstrate that farmers can reduce their water use by as much as approximately 20 percent without impacting their harvest yields. These modeled outcomes can guide future tests in experimental farm trials prior to becoming a formal recommendation to Arkansas farmers.

The research studied irrigation and crop rotation practices to help farmers save water while maintaining yields for rice and soybean. Arkansas accounts for 49 percent of the rice production area in the U.S., and is the 10th-largest producer of soybean in the country. Carroll's study modeled crop rotation.

College of Engineering Graduate Receives Tau Beta Pi Fellowship

A biological engineering graduate has been awarded a fellowship from a national engineering honor society to pursue her graduate studies.

Eleanor Henson was one of 30 engineering students nationally selected for a Tau Beta Pi Fellowship for 2020-21.

The fellowship, established in 1928, is Tau Beta Pi's "most important project for the advancement of engineering education and the profession," according to the organization.

Henson received her B.S. in biological engineering with honors, an environmental engineering concentration and a minor in sustainability.

As an undergraduate, Henson worked at the Arkansas Water Resources Center as a research assistant, which led to publishing an article in the *Journal of Agrosystems, Geosciences & the Environment* in August 2019 on phosphorus cycling in streambed sediments. She simultaneously conducted research as an Arkansas Department of Higher Education Student Undergraduate Research Fellow evaluating the hydrologic impact of an on-campus green roof. She was also selected as the College of Engineering Outstanding Senior for the class of 2020.

She was awarded a nationally competitive Fulbright Research Award in Canada and is pursuing her master's degree in environmental engineering at Colorado State University.

PhD Candidate Wins 1st place ASABE Boyd-Scott Graduate Research Award

Xinge Xi, PhD candidate, won first place in the ASABE 2020 Boyed-Scott Graduate Research Award, PhD Category, at the virtual ASABE 2020 Annual International Meeting, July 13-15.Her research paper title is “A Portable Biosensing Device with Magnetic Separation and Quantum Dot Bead Labeling for Simple, Rapid, and Quantitative Detection of *Salmonella* Typhimurium”.

Taylor, Krier and Morrison Awarded Steele-Croxton Memorial Scholarships

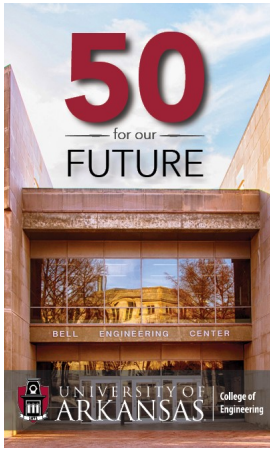
Three University of Arkansas students — Jacob "Jake" Taylor, Jake Krier and Machaela Morrison — have received Joe M. Steele & Hardy W. Croxton Memorial Scholarships for 2020-21.

Taylor is from Rogers and is pursuing a degree in civil engineering. Morrison is from West Fork and is focused on a degree in environmental, soil and water science. Krier, a previous winner, is from Fayetteville and is majoring in biological engineering.

Beaver Water District Board members donate board meeting attendance fees to the scholarship fund. These scholarships provide financial assistance to upperclassman or graduate students in the Departments of Civil Engineering, Biological and Agricultural Engineering or Crop, Soil and Environmental Sciences who have demonstrated interest in drinking water treatment, wastewater treatment, environmental or life sciences.

The fund is managed by the University of Arkansas Foundation. Donations may be made payable to the University of Arkansas Foundation Inc. — with Joe M. Steele & Hardy W. Croxton Memorial Scholarship in the memo line — and mailed to Gift Services, 300 University House, University of Arkansas, Fayetteville, AR 72701.

Engineering Drive Raises More Than $379,000 to Support Students



A two-day giving drive in the College of Engineering raised more than $379,000 to support students during COVID-19.

50 For Our Future saw more than 300 gifts to the College's eight departments, the interdisciplinary data science program and the National Society of Black Engineers U of A student chapter. Funds raised are already being used to support students as they navigate the academic year amid the realities of COVID-19.

John English, dean of the College of Engineering, thanked the community for making the drive a success.

"We're so grateful to all our supporters who joined in and made a gift during 50 For Our Future," he said. "Our alumni and friends have always been there for our students, and this historic year is no exception. Our programs will put these funds to excellent use to enhance the student experience in the College of Engineering during this unique academic year."

Bill Lansden, senior director of development and external relations, said the goal was to bring alumni together in support of today's students.

"The outpouring of support from our alumni was incredible," he said. "We set ambitious goals for each department and our alumni and friends responded just as we hoped they would — by coming together in support of our students. Money raised during 50 For Our Future is already being put to use to help our students, and that wouldn't have been possible without our outstanding alumni and friends."

Dr. Scott Osborn elected as Fellow of the Teaching Academy

Dr. Scott Osborn elected as a Fellow of the Teaching Academy, an honor recognizing his outstanding performance as a teacher at the University of Arkansas. This is a well deserved honor for Dr. Osborn's sustained excellence in classroom teaching and mentoring of Biological Engineering students.

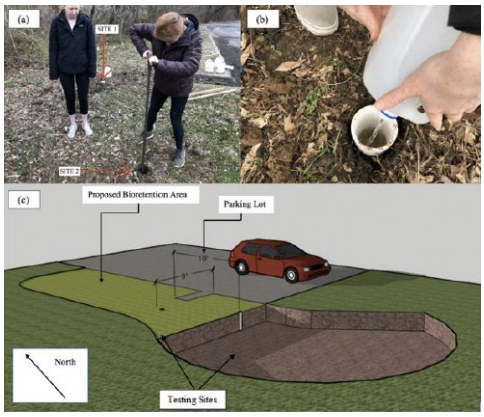
Dr. Runkle receives the Rising Teacher award by Arkansas Alumni Association

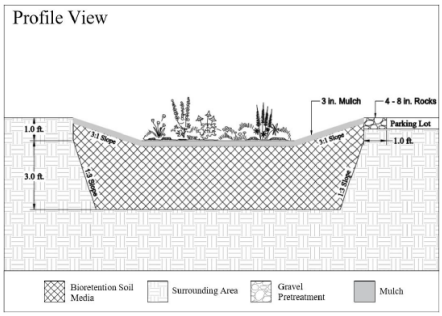
Runkle joined the U of A's Department of Biological and Agricultural engineering in 2014. He teaches courses in sustainable watershed engineering and modeling environmental biophysics — both senior-level courses in biological engineering. Runkle has:

- Been honored with mentoring awards in 2018, 2019 and 2020 from the Provost's Office and the Office of Nationally Competitive Awards.
- Mentored 2019 Razorback Classic Laura Gray and 2020 Razorback Classic Eleanor Henson
- Earned the 2019 Early Achievement in Engineering Education Award from the Biological and Agricultural Engineering Division of ASEE.

He received the CAREER award from the National Science Foundation in 2018 and has been acknowledged with departmental and college teaching and research awards.

Biological Engineering Students Earn National Honors for Research and Design



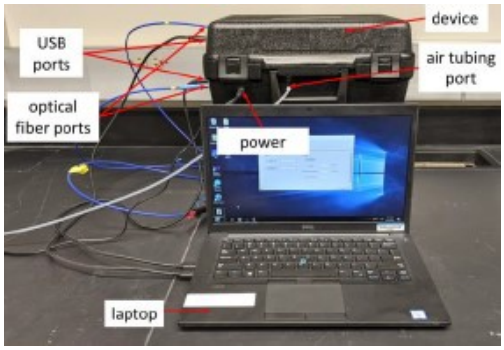


Biological engineering students took home top honors for their research and design work in two categories at a national conference.

A team of seniors earned first place for their project designing a bioretention cell for use by the city of Fayetteville to reduce flooding, treat parking lot runoff and improve the aesthetic of the nearby parking lot.

Team members Brynn Bodwell, Kanaan Hardaway, Kira Simonson and Clare Yurchak took home the top prize in the Gunlogson Environmental Student Design Open Competition hosted by the American Society of Agricultural and Biological Engineers.

The team is co-advised by Associate Professor Benjamin Runkle and Teaching Assistant Professor Kieu Le, both in the Department of Biological and Agricultural Engineering.Biological Engineering doctoral student Xinge Xi earned first place in the ASABE 2020 Boyd-Scott Graduate Research Award. Xi was honored for her work on an easy-to-use, portable device that can quickly detect the foodborne bacteria Salmonella in the field, as opposed to sending samples to a lab for processing.



Advised by Yanbin Li, distinguished professor and Tyson Endowed Chair in Biosensing Engineering, Xi converted a previously-developed biosensing method into a portable biosensing device for simple, rapid and quantitative detection of *Salmonella Typhimurium*.

Xi designed, built and tested the device as part of her winning submission. The device consisted of a microfluidic control module, a magnetic separation module and a fluorescent detection module, and was able to detect Salmonella even when other bacteria were present.

"Since traditional methods are time-consuming and laborious, novel methods are urgently needed for fast, sensitive, labor-saving, and cost-effective detection; moreover, it is also crucial to convert these methods into portable devices for in-field and on-site detection," Xi wrote.

Congratulation to the Class of 2020!

Undergraduates:

Nicholas Cross

Andrew McDaniel

Cade Prince

Hsi-Cheng Su

Graduates:

Andrew Shaw

America Sotero

Scholarship Donation Opportunities

Please accept my contribution to the following scholarship(s). My check for

$ _____ is enclosed.

Billy Bryan Scholarship Fund $ _____

Joel T. Walker Memorial Scholarship Fund $ _____

Carl L. Griffis Memorial Scholarship Fund $ _____

Biological and Agricultural Engineering General Scholarship Fund $ _____

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Enjoy the Holidays and
Happy New Year!