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 2022

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

This semester has gone by fast with eager students excited about returning to class in-person and following the masking regulations. Our faculty are keeping busy with teaching, mentoring, research, and extension responsibilities. We were successful in hiring a new Instructor to replace Dr. Ahmed Mahmoud who left us in May 2022. Matthew McVey joined us in August and immediately got busy teaching two courses while setting down in NW Arkansas. He joined us from Penn State University in Pennsylvania. It is exciting to have new faculty in the department to join our team to serve students and stakeholders.

Our department lost one of our faculty members. Dr Sammy Sadaka passed away on November 6, 2022. He will be greatly missed by the department.

Our enrollment stands at 72 undergraduates with sophomore, junior or senior standings, and sixteen graduate students. Nine graduates are in the Biological Engineering Program and seven graduates are in other multidisciplinary programs supported by our faculty. We have seven senior design teams this fall directed by Dr. Osborn, and they will be mentored by different faculty during the remaining academic year towards completion in the spring term. The College of Engineering's commencement on December 17 will see three B.S., one M.S. and one Ph.D. graduates. The semester began with a student welcome social outdoors in September. Dr. Marty Matlock generously hosted the event on his property. The virtual meeting of the Arkansas Section of the American Society of Agricultural and Biological Engineers (ASABE) in October recognized Emily Tappana as the Outstanding Senior in Biological Engineering at the U of A Dr. Chris Henry was recognized as the "*Outstanding Engineer*" at this event.

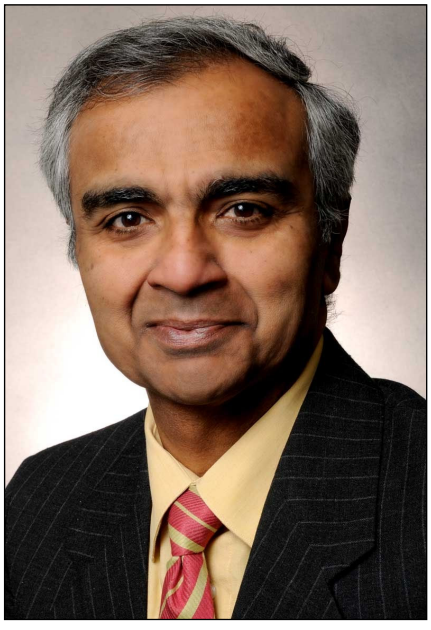
Some of the recent departmental recognitions are:

Dr. Jin-Woo Kim was named an IEEE Fellow for his contributions to nanoscale fabrication of bio/nano-hybrid materials.

Dr. Ben Runkle received a One-Million-dollar award to quantify Climate-Smart rice Production. Dr. Runkle is part of a group who received an $80 million award from the US Department of Agriculture's Climate Smart Agriculture Initiative.

Dr. Marty Matlock received the 2022 AEES Odum Award for Ecological Engineering Excellence.

It is wonderful to be a part of highly qualified and resolute team in our department at the University of Arkansas. Please send us your news and updates, visit our website www.bio-agengineering. uark.edu and feel free to seek additional information. On behalf of the department, let me wish you ***the very best in the New Year.***



Sincerely,
Lalit Verma, Ph.D., P.E.
Professor and Head

In Memory of: Sammy Sadaka

Sammy Saber Sadaka, 62, of Little Rock, Arkansas, passed away on November 6th, 2022. Sammy was born on November 18, 1959, to Saber Sadaka Sharoubim and Sarah Sultan in Alexandria, Egypt.

Sammy received a Bachelor's, Master's and PhD in Agricultural Engineering from Alexandria University and Dalhousie University. In 1995 he went on to marry Heba Soliman. They went on to have two children, Monica and Kyrilos.
Sammy was predeceased by his brother, Nabil; his father, Saber and his mother, Sarah. He is survived by his wife, Heba; his daughter, Monica; son, Kyrilos; his sisters, Itedale, Nadia, Izeis and his brother, George.

Sammy was very grounded in his faith and would spend his free time building the St. George Coptic Orthodox Church in Little Rock. Sammy spent his time learning new crafts to build new and better things for his church.

After his graduation and receiving his degrees, Sammy worked as an Associate Professor at Alexandria University. Sammy and Heba moved to the United States and started a family together. Sammy started his career in the United States in Ames, Iowa working at Iowa State University where he was a Scientist and an adjunct professor. Sammy and his family then moved to Little Rock, accepting a position at the University of Arkansas Cooperative Extension Services as an Assistant Professor.

Later on, Sammy became an Associate Professor at the University. He was also an Associate Editor and Reviewer for the American Society of Agricultural and Biological Engineering Journal. Sammy was well known in his field, being invited to many national conferences where he received awards and recognition for his publications, services and work in his community.

Sammy was a loving and caring father and husband. He was a friend to many, and a spiritual example to all. He was a God-fearing man who served his Lord faithfully his whole life.

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Dr. Marty Matlock receives the 2022 AEES Odum Award for Ecological Engineering Excellence

During the June AEES meeting in Baltimore, Dr. Marty Matlock was awarded the 2022 AEES Odum Award. The Odum Award is the highest honor bestowed by AEES, named in recognition for two of the most influential figures in defining and pioneering the concepts and practices of Ecological Engineering, Howard T. and Eugene Odum. This award recognizes a lifetime of achievement and contributions during their career to research, education, and practice in the field of Ecological Engineering, which led to the development and growth of AEES.

Dr. Matlock is a Professor in the Biological and Agricultural Engineering Department at the University of Arkansas. He received his Ph.D. in Biosystems Engineering from Oklahoma State University, is a registered professional engineer, a Board-Certified Environmental Engineer, and a Certified Ecosystem Designer. He has authored over 50 peer reviewed manuscripts many of which are in the field of Ecological Engineering. He has also co-authored four books including *Ecological Engineering Design: Restoring and Conserving Ecosystem Services.* He served as AEES president in 2007-2008 and has continued to be active in the society, most recently spear-heading the concept and development of the our new AEES *Journal of Ecological Engineering Design*.

He has served numerous roles in the profession. Most recently, Dr. Matlock served as Senior Advisor to Secretary of Agriculture Tom Vilsack at USDA from 2021-2022. Prior to that he was Executive Director of the University of Arkansas Resiliency Center. In 2021, Dr. Matlock was elected to the National Academies of Science, Engineering and Medicine's Board of Agricultural and Natural Resources. Dr. Matlock is the recipient of the 2018 CAST-Borlaug Agriculture Communications Award, and more than 30 national and international design awards. He served as Chairman of the Cherokee Nation Environmental Protection Commission for 16 years and as sustainability science advisor for three environmental conservation organizations and more than a dozen food and agricultural product companies.

When asked about the award and the Odum legacy, Dr. Matlock had this to say: "My career was influenced very early by E.P. Odum and his brother, H.T. Odum. We used Fundamentals of Ecology by E.P. as our textbook in General Ecology at Oklahoma State University in 1983. The Odums presented ecology as an intimately interconnected dynamic system rather than a collection of components. This framework aligned with my Cherokee cultural understanding of communities of organisms in a common struggle to survive. The transformational heuristics of eco-holism that the Odums developed formed the basis of modern systems ecology and the essence of ecosystem design as practiced by ecological engineers. They demonstrated that the practice of Ecology could do more than document the decline, but rather was essential for protecting, conserving, and restoring ecosystem functions and resiliency. My research in ecosystem-based sustainability measures using life cycle assessment is directly derived from the concepts developed by the Odum brothers. My work as senior advisor for food systems resiliency at USDA was informed by their work on complexity theory. I am honored to be recognized as an Odum scholar."

Dr. Matlock joins previous winners of the award who include Dr. Bill Mitsch, Dr. Mark Brown, and Dr. Alex Horne.

Matlock joins Sec. of Agriculture Vilsack to Announce Meat and Poultry Grant Program Recipients

Marty Matlock, professor in the Department of Biological and Agricultural Engineering, was an invited guest of U.S. Secretary of Agriculture Tom Vilsack in Omaha, Nebraska on November 2 to announce the first-round awards the Meat and Poultry Expansion Program (MPEPP) as part of USDA's investment of $1 billion to expand U.S. meat and poultry processing. Matlock served as Senior Advisor to Secretary Vilsack from 2021-22 and was one of the chief architects of the MPEPP program which includes grants, guaranteed loans, workforce development, and technical assistance.

"Since President Biden laid out a commitment at the start of this year, USDA has worked tirelessly to give farmers and ranchers a fair chance to compete in the marketplace, which in turn helps lower food costs for the American people," said Secretary of Agriculture Tom Vilsack. "By jumpstarting independent processing projects and increasing processing capacity, these investments create more opportunities for farmers and ranchers to get a fair price, while strengthening supply chains, delivering more food produced closer to home for families, expanding economic opportunity, and creating jobs in rural America."

The grants announced on Tuesday included $73 million in 21, $75 million for eight projects through the Meat and Poultry Intermediary Lending Program, as well as more than $75 million for four meat and poultry-related projects through the Food Supply Chain Guaranteed Loan program. The MPEPP program includes a total of up to $375 million to provide gap financing for independent processing plant projects that fill a demonstrated need for more diversified processing capacity. More information on the USDA programs can be found at USDA.GOV/Meat and USDA.GOV/Build-Back-Better.

Matlock invited to US Soybean Export Council discussion with China Ambassador on sustainable soybean production in the US.

Dr. Marty Matlock, professor in the Biological and Agricultural Engineering Department and research professor in the UA System Division of Agriculture was invited to join the United States Soybean Export Council (USSEC) on Friday, September 16 in St. Louis as they hosted Qin Gang, the China Ambassador to the U.S. They participated in a roundtable event focused on sustainable and climate smart agricultural practices that included USDA Acting Deputy Under Secretary Jason Hafemeister as well as Chinese delegates and leaders from the U.S. and China's food & agriculture industry. Matlock has worked with USSEC over the past 15 years to develop goals, metrics and assessment tools for sustainability, including soil resilience, water use efficiency, energy use, greenhouse gas emissions, biodiversity, land use impacts.

In response to discussion of the role of U.S. soybean producers in leading innovation in sustainable production Amb. Qin Gang commented: "Agriculture is a key contributor to China's green development. We (China and the U.S.) have a common responsibility to promote sustainable agriculture and food security for future generations. Our market will remain open, and we will continue to collaborate with U.S. farmers, companies and entities who want to advance green development of China's food and agriculture." Jim Sutter, CEO of USSEC, responded "We all have a responsibility to act for consumers, our children, and our grandchildren. "China is the world's leading soy consumer and the largest importer of US soy, supporting edible oil and soy food for people as well as feed for Chinese pork, egg, aquaculture, and poultry production. U.S. Soy has collaborated in China since 1982.

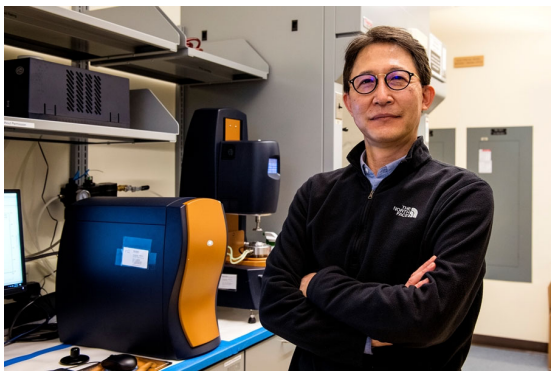
Arkansas Nanotech Researcher Jin-Woo Kim Named IEEE Fellow

IEEE elevated Kim to IEEE fellow status for his contributions to nanoscale fabrication of bio/nano-hybrid materials. The IEEE is a professional organization for the advancement of technology with more than 400,000 members in over 160 countries. Only about 5,000 members have been named IEEE fellows. Kim was among 311 senior members bestowed with the honor in 2022. "We congratulate Dr. Kim for his induction as fellow of IEEE," said Jean-François Meullenet, senior associate vice president for agriculture-research and director of the Arkansas Agricultural Experiment Station. "We know this is a very special honor for him and a great recognition for his breakthrough work in nanoscience. Well deserved."

"It is a prestigious honor and an important career achievement," said Lalit Verma, head of the Department of Biological and Agricultural Engineering. "Dr. Kim's research and development work and innovative technology will enhance the economic well-being and quality of life in Arkansas and the world."

Kim's contributions to nanotechnology have helped develop a method to treat cancer in collaboration with the U of A for Medical Sciences.

"I have found him to always be an innovative, deep thinker and someone with a special ability to think across disciplines as he collaborates on exciting work related to our cancer detection and drug delivery interests," said Robert J. Griffin, Ph.D., of the UAMS Department of Orthopedic Surgery. "His work on DNA-based nanoparticles was particularly fascinating as he was able to ingeniously use the natural properties of DNA to create multi-functional nanomaterials with exciting potential."



$1 Million awarded to quantify Climate-Smart rice production; project highlighted by USDA Secy. Vilsack's September Arkansas visit

Biological & Agricultural Engineering's Benjamin Runkle, associate professor, is part of a group who received an $80 million award from the US Department of Agriculture's Climate Smart Agriculture Initiative. The project is led by USA Rice and Ducks Unlimited, who will coordinate the development and implementation of a wide-ranging effort to reduce the greenhouse gas emissions associated with rice production. In this 5-year grant, Runkle's team will receive approx. $1 million to oversee measurement, monitoring, reporting, and verification, to help ensure that project goals are met and are well quantified.

Runkle noted that "this project is ambitious – it aims to impact approximately one-fifth of all rice acreage in the United States. Farmers will be incentivized to carry out conservation practices that save water, reduce greenhouse gas emissions, and maintain high harvest amounts. The project is also unique in its special attention to include historically underserved farmers, through partnership with the National Black Growers Council and others. The program will also fund infrastructure development for underserved farmers to create the enabling conditions for eventual implementation of conservation practices at their farms."

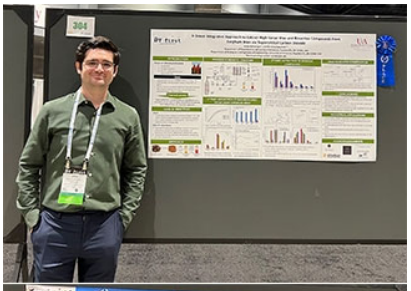
This grant was one of 70 announced this month that comprised a $2.8 billion investment in the creation of Partnerships for Climate Smart Commodities by the US Department of Agriculture. These awards were highlighted on Sept. 16 by a visit to the central Arkansas rice farm of Mark Isbell and family by US Secretary of Agriculture, Tom Vilsack. In addition to highlighting that this project scored the highest of all applicants, the Secretary hosted a panel for discussion. The panel included representatives from Ducks Unlimited, the National Black Growers Council, Tyson Foods, the Winrock Foundation, and the University of Arkansas VP for Agriculture, Deacue Fields III. Both Tyson and Winrock received other awards under this program. The panelists indicated the need to develop trusted labeling of goods as climate-smart, that are ground in good science and supported throughout the supply chain.

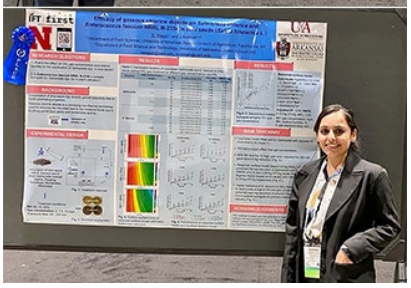
Runkle's portion of the grant will allow him to hire scientific personnel to guide project data collection, document the performance of the proposal, and report findings to the USDA and to the broader scientific community. He thinks that if the grant team is successful in its implementation, the project could spur spin-off activities to ensure a broader, lasting reduction of the climate impact of rice production through relatively small changes in field management practices. Because the project will be active in all six states where rice is produced in the U.S., the data collected will also help understanding of how to make effective changes to rice production under different management, soil, and climate conditions. Runkle noted that the project will build on his group's ongoing sustainability research at the Isbell family farm, and it will also use some of the expertise gained from his current NASA and NSF funded projects.

Sadaka received two awards from the American Society of Biological and Agricultural Engineering (ASABE 2022)

Sammy Sadaka, Associate Professor-Extension Engineer, Biological and Agricultural Engineering Department, received two awards during the American Society of Agricultural and Biological Engineers (ASABE) International Meeting 2022 held in Houston, TX. Several hundred Agricultural and Biosystems Engineers, from several countries, attended the meeting this year. Sammy received the first Award (Superior Paper Award) for his published manuscript entitled "Energy and Exergy Efficiencies of Fluidized and Fixed Bed Rice Drying," published in an ASABE journal. Sammy and his former Ph. D. student, Dr. Kaushik Luthra, co-authored the manuscript. His second award, "Outstanding Publication Reviewer," was awarded by the ASABE Refereed Publications committee for his dedicated and precious ASABE manuscript review.

Food Science Doctoral Students Arda Tuhanioglu, Surabhi Wason Win IFT Contests





Arda Tuhanioglu and Surabhi Wason, both graduate students in food science, won competition awards at the recent Institute of Food Technologists First Event and Expo in Chicago.

Tuhanioglu, a Ph.D. student advised by assistant professor Ali Ubeyitogullari, won the Sustainable Food Systems division oral contest.

Wason, a Ph.D. student advised by professor and head of the Department of Food Science Jeyam Subbiah, won the Non-Thermal Processing division oral competition.

Tuhanioglu's research is "A Green Integrated Approach to Extract High-Value and Bioactive Compounds from Sorghum Bran via Supercritical Carbon Dioxide."

Wason's research is "Efficacy of Gaseous Chlorine Dioxide on Salmonella Enterica and Enterococcus Faecium NRRL B-2354 in Chia Seeds."

Student Teams Land Top Prizes in Biological and Agricultural Engineering Design Competition

Two team projects from the U of A Biological and Agricultural Engineering program took first and second place in the American Society of Agricultural and Biological Engineers Gunlogson Environmental Design Student Competition.

The biological engineering Senior Capstone project coordinator is G. Scott Osborn.

The purpose of the society's open Gunlogson competition is to encourage undergraduate students to participate in the design of a relevant engineering project and to provide an arena of professional competition for environmentally and biologically related design projects.

The national society competition consists of two parts:

- Submission of a design report to be judged by an expert panel.
- Participation by the three teams earning the highest report scores in a presentation competition at the society's annual international meeting.

The first place team received $1,250, and the second place team received $1,000 at the society's Annual International Meeting in Houston on July 20.

Engineering Fellow Honored for Work Improving Environmental Outcomes for Rice Production

Postdoctoral fellow Beatriz Moreno-García was recognized Nov. 15 as the Field to Market: The Alliance for Sustainable Agriculture's 2022 Trusted Adviser of the Year for her outstanding leadership in supporting farmers' journeys of continuous improvement.

Providing valuable counsel to Arkansas farmers, Moreno-García champions sustainable solutions to reduce the environmental impact of rice production, working with farmers to help them try sustainable practices and monitor their improvements.

"I have always been concerned and worried about sustainability, especially in agriculture, because we have an increased global population, and if we continue to use natural resources as we are using them now, we won't be able to feed the world population in a few years," said Beatriz Moreno-García, a fellow in the Department of Biological and Agricultural Engineering.

That concept is what has driven Moreno-García throughout her education and into her career.

"I studied environmental sciences — I didn't study agronomy," remarks Moreno-García. "But there is, of course, a link between both because agriculture has an environmental impact."

Following her undergraduate environmental science studies at King Juan Carlos University in Madrid, Spain, Moreno-García completed a Ph.D. at the University of Zaragoza and Centro de Investigación y Tecnología Agroalimentaria de Aragón in Zaragoza, Spain, focusing on the use of organic fertilizers in rice production and their environmental impact, including greenhouse gas emissions.

She came to the U of A for her postdoctoral research and has been here ever since.

"I knew the University of Arkansas was working on the implementation of sustainable practices in rice, so I wanted to come here," she said. "Now, my work is focused on sustainable practices in rice, specifically focusing on water-saving practices."

When asked why she chose rice for her studies, her answer was clear — rice is an important crop for food consumption and has a lot of room for improvement in terms of environmental impact.

"Rice provides 20 percent of the calorie consumption in the world, so it's incredibly important," she explained. "But because of the way rice is grown, it has a high environmental impact and therefore a lot of areas to improve its sustainability."

Moreno-García's adviser, associate professor Benjamin Runkle, noted that this honor is a testament to her hard work, integrity and intellect.

"Beatriz combines scientific rigor, as evidenced in her research output, with a careful understanding of field, farm and farmer characteristics that require tailor-made sustainability guidance for each rice production setting," he said. "It is fantastic that Field to Market has recognized what we have long known: Beatriz is a gifted and trusted communicator with a strong grounding in contemporary scientific knowledge."

Congratulation to the Class of 2022!

Undergraduates:

Michael Janorschke

Juliana Newman

Noah Olson

Graduates:

Patrick Kuczwara

Prathamesh Bandekar

Scholarship Donation Opportunities

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

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Have a Happy New Year!