



---

# **BIOLOGICAL AND AGRICULTURAL ENGINEERING**

## ***LIFE LINE***

---

Spring 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

These are unprecedented times but it is gratifying to share news from our department in this new decade. Twenty six students in seven teams showcased their senior design projects virtually on April 30, mentored by Drs. Tom Costello, Ben Runkle, Yi Liang, Jun Zhu, Scott Osborn and Kieu Le.

Eleanor Henson was selected as the “Outstanding Graduating Senior” in Biological Engineering and was also selected as the College of Engineering “Outstanding Graduating Senior” for her extraordinary accomplishments. We have recently learned that she has also won the Fulbright Award to study in Canada.

Two of our graduating seniors, Eleanor Henson and Kira Simonson, were named “Seniors of Significance” by the UA Alumni Association.

Drs. Tom Costello, Jun Zhu and Kieu Le were recipients of department’s outstanding teaching, research and service to students awards on May 1. Linda Pate was recognized as our outstanding staff member.

Academy induction:

Four outstanding alumni were inducted virtually into the Arkansas Academy of Biological and Agricultural Engineering (AABAE) on April 24th. The Academy conducted their business followed by recognition of departmental scholarship winners and celebration of each of the graduating seniors. The four new inductees include:

- Mr. A. J. Kaufman, a partner at Hawkins-Weir Engineers in Little Rock. He is a 2007 graduate of our program and is a registered Professional Engineer in Arkansas.
- Ms. Leslie Massey is an Instructor with the First-Year Engineering Program at the University of Arkansas who graduated cum laude with a B.S. in Biological Engineering in 2006 and an M.S. in Environmental Engineering in 2008.
- Ms. Kathryn McCoy is a Project Manager at Garver in North Little Rock, Arkansas. She is 2009 graduate of our program and is a licensed Professional Engineer (PE) and a Certified Floodplain Manager (CFM).

Dr. Rebecca Logsdon Muenich, originally from Springdale, Arkansas, is an Assistant Professor in the School of Sustainable Engineering and the Built Environment at Arizona State University, who completed her B.S. in Biological Engineering from the University of Arkansas.

Mr. Richard Penn, Past president of the Arkansas Academy of Biological and Agricultural Engineering was honored as a “Distinguished Alumnus” and Mr. Rusty Tate was recognized as “Early Career Alumnus” of the UA College of Engineering.

We are pleased that the Carl Griffis Memorial Scholarship has reached the endowed level and the Joel Walker Memorial Scholarship has also grown, although it remains short of reaching the goal of being endowed.

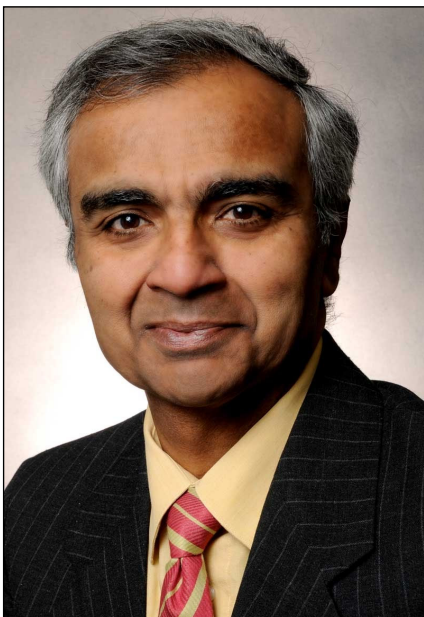
Plans are underway to gradually resume operations at the University and our department. Spring commencement was postponed until December and we hope to see most of our graduates to join in the celebrations. Our faculty and staff have done a superb job during this adversity by changing course mid-semester to conclude the academic year in a professional and positive manner. We conducted interviews for two faculty positions in March and April and have a commitment from our candidate of choice for the first tenure-track joint-appointment “signature hire” position to begin in August. The second position is being finalized at the moment.

Please send us your news and updates and check us out at [www.bio-agengineering.org](http://www.bio-agengineering.org).

uark.edu to learn about our programs, faculty, staff, and students. Your continued support of our programs is deeply appreciated.

Lalit R. Verma, Ph.D., P.E.

Professor and Department Head

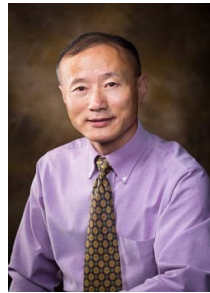


## Engineering Departments Honor Faculty

College of Engineering faculty and staff members were honored for their achievements in teaching, research and service during the 2019-20 academic year during the college's faculty and staff meeting May 1.

The awards for Biological and Agricultural engineering are:

- **Teaching:** Tom Costello, associate professor
- **Research:** Jun Zhu, professor
- **Service to Students:** Kieu Le, teaching assistant professor
- **Staff Excellence:** Linda Pate, departmental administrative manager



## Dr. Matlock receives 2020 Green GOOD Design Award

The team of UA Community Design Center + UA Resiliency Center + Urban Works is pleased to announce that its project *Wahiawa Value-Added Product Development Center* has been awarded a **2020 Green GOOD DESIGN Award** from the European Centre for Architecture Art Design and Urban Studies & The Chicago Athenaeum: Museum of Architecture and Design. All Awards are posted at both centers' websites and will be published in GOOD DESIGN Yearbook for 2020. Award recipients will be exhibited in Europe, United States, and South America.

## Engineering Dean's Excellence Awards Honor Faculty for Teaching, Research,



Benjamin Runkle, associate professor of biological and agricultural engineering, earned the Dean's Award for Excellence in Collaborative Faculty Research. Since 2017, Runkle's publication record includes 13 peer-reviewed journal articles, three other papers, two datasets and a book chapter — all of which were conducted collaboratively with at least one non-University of Arkansas co-author. His collaborators have included government researchers, faculty from other American universities and researchers from international institutions around the globe. Runkle's research grants have often been collaborative, including with U of A faculty. External collaborators include scientists from the University of Delaware, Cornell University and the USDA-Arkansas Research Station. U of A faculty collaborators have include Brian Haggard, Kelly Sullivan and Sara Nurre Pinkley. Since 2017, he has been awarded \$1.34 million in external funds and \$34,000 in internal funds.

## U of A Student Innovation Team Wins Graduate Division at 20th Annual Arkansas Governor's Cup



A University of Arkansas student innovation team seeking to end herbicide drift took the top prize in the graduate division of the 20th annual Arkansas Governor's Cup on Wednesday during a virtual awards ceremony.

"We see our solution adding great value to the agricultural sector not just in Arkansas, but in all states involved in soybean, cotton and corn farming," said Gurshagan Kandhola,

CelluDot's chief research and development officer.

"Our mission is to end the problem of drift with a biobased product that keeps herbicides at the target site of application, a win-win for farmers, agrochemical companies and the environment."

Kandhola added that guidance from Carol Reeves and Sarah Goforth in the [Office of Entrepreneurship and Innovation](#), as well as Jin-Woo Kim, a professor in the university's [Biological and Agricultural Engineering Department](#), were instrumental in CelluDot's journey.

Last month, 50 students representing 18 teams from eight Arkansas universities made virtual presentations to nearly 30 judges during the final round of competition.

Teams were judged in several areas, including identification of the problems in the marketplace and how their business ideas will solve them, demonstrations of customer discovery and validation to prove viability of ideas and revealing what was learned from customer research, identification of potential competitors in the marketplace, explanations of how marketing and distribution will be addressed, addressing possible critical risks to the businesses.



## Biological Engineering Senior Recognized as College of Engineering Outstanding Senior



Elle Henson was chosen as our 2020 outstanding senior. We have known Elle since her first year at the University. Dr. Ben Runkle first got to know Elle as a student in his study abroad course (Sustainability in the European Food System, in Belgium for May Intersession, 2017) and Dr. Brian Haggard got to know Elle as her honors research advisor in the First-Year Engineering Program. We have had numerous follow-up engagements, including a first-authored, peer-reviewed publication

with Dr. Brian Haggard based on her research in a REU program and her work on a research project under Dr. Ben Runkle's guidance but for which she successfully applied for SURF funding. She was also among the very highest ranked students in our senior capstone courses, Sustainable Watershed Engineering and Engineering Professionalism, and is currently performing very strongly in Dr. Ben Runkle's graduate-level, research-focused course.

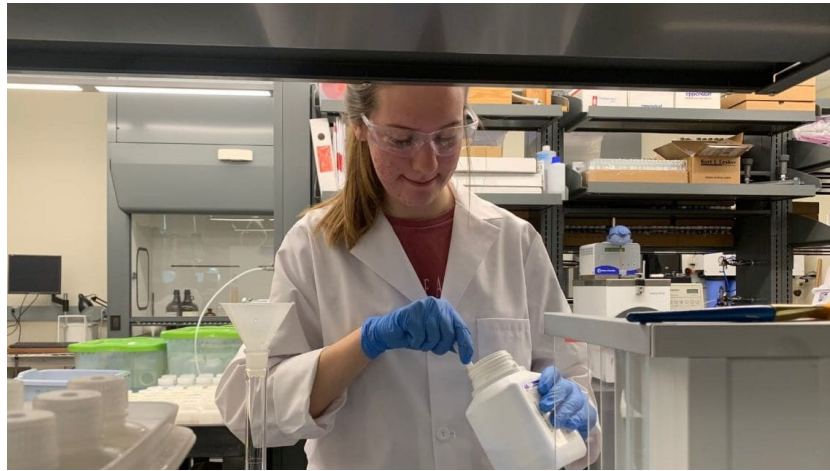
Elle earned this award because she is a fantastic student (illustrated by her near perfect GPA, numerous awards, research accomplishments, and bright future as a researcher), a superb citizen (illustrated by her service record with the food recovery program and being named one of the top 10 women Seniors of Significance in the entire University), and her tireless energy for doing the hard work pursuing the many opportunities this University presents to students that most neglect. She is also externally recognized and was awarded a Fulbright Scholarship to do graduate research in Canada.

Elle is an all-around wonderful human being – very ambitious, energetic, and smart – and we cannot imagine anyone being more qualified to be the College of Engineering Outstanding Senior. She has strong ability to perform graduate-level research at one of the many universities where she has already been accepted. She already has had research experience and is an excellent student with amazing character and has the high capacity and grit to finish any project. Elle has earned these strong relationships with all of our faculty not only because of her natural intellectual abilities, but because of her hard work to deliver results while always maintaining a humble, service heart that puts the needs of others before her own.

## Dr. Verma Surprised by Alumni Visit

Dr. Verma was surprised by two of our alumni. Dr. Chris Long, BS Biological Engineering 2003 (U of A), Ph.D. Biomedical Engineering 2009 (John Hopkins University of School of Medicine) MD, PhD, Biomedical/Medical Engineering 2011 (John Hopkins University of School of Medicine) working at Raleigh Radiology Vascular and interventional Radiologist in Raleigh, North Carolina and Tyler Gipson, 2004 BSE who is working as a Hydrologic Engineer with Southwestern Power Administration Tulsa Oklahoma area.

# Kendele Kramer Takes First Place In Honors Innovation at The University of Arkansas



Kendele Kramer took first place for “best overall research project” as part of the Honors Innovation Symposium in April – a great way to end her freshman year. Each year, about 40 students in the College of Engineering at the University of Arkansas team up with faculty mentors to conduct their research project during freshman year and present their findings to fellow students, faculty, and staff.

Kendele entered the engineering program as part of the Biomedical department. However, after hearing Dr. Brian Haggard (professor in Biological and Agricultural Engineering and director of Arkansas Water Resource Center) pitch a project during class last fall, Kendele decided to switch departments and take on a project about harmful algal blooms (“HABs”) in Lake Fayetteville.

Check out the full article at: <https://watercurrents.uark.edu/kendele-kramer-takes-first-place-in-honors-innovation-symposium-at-the-university-of-arkansas/>

# 2020 Arkansas Academy of Biological and Agricultural Engineering Inductees

---



## AJ Kauffman

A. J. Kaufman is a partner at Hawkins-Weir Engineers working out of their Little Rock office. He is a native Arkansan, having grown up in McGehee and attended high school at Subiaco Academy. He has been responsible for the planning, design, and contract administration on multiple water and wastewater projects throughout the state. He is a 2007 graduate of the University of Arkansas with a B.S. in Biological Engineering and is a registered professional engineer in Arkansas.

---

## Leslie Massey

Leslie Massey is an instructor with the First-Year Engineering Program at the University of Arkansas. She grew up in Fort Smith and moved to Fayetteville to attend the University of Arkansas, where she graduated cum laude with a B.S. in Biological Engineering in 2006 and an M.S. in Environmental Engineering in 2008. Massey teaches the Introduction to Engineering course sequence for first-year engineering students and is the course coordinator for the Honors Innovation Experience. Her interests and research center around academic success in engineering study, and she is currently working on her certification as an academic life coach. In 2018, she received the Five-year Service Award for dedicated service to the First-Year Engineering Program. She is an active volunteer with FIRST LEGO League and was named Outstanding Volunteer for FIRST LEGO League Arkansas in 2018.

---



## 2020 Arkansas Academy of Biological and Agricultural Engineering Inductees



---

### **Rebecca Meunich**

Becca Logsdon Muenich is originally from Springdale. Influenced by the rapidly-changing ecosystems of Northwest Arkansas, she pursued her B.S. in biological engineering from the University of Arkansas, along with minors in mathematics and geology. She completed an M.S. and Ph.D. in agricultural & biological engineering at Purdue University, where her focus was on quantifying ecosystem service trade-offs in agricultural systems. She joined Arizona State University as an assistant professor in the School of Sustainable Engineering and the Built Environment in the fall of 2017, where her research focus has been on applying and advancing environmental modeling and analysis methods to evaluate trade-offs and identify solutions at the food-energy-water nexus.

---



### **Kathryn McCoy**

Kathryn McCoy is a hydraulic engineer with almost nine years of experience as a consulting engineer. Her main areas of expertise are hydrologic and hydraulic (H&H) modeling and analysis. McCoy is a project manager at Garver in North Little Rock, and currently manages the H&H components of several projects, including hydraulic bridge and roadway analyses for both departments of transportation and municipalities, drainage and flood studies, FEMA application projects, stormwater drainage studies and airport drainage studies. She has worked on several projects involving one- and two-dimensional hydraulic analysis of streams and complex drainage systems. Project types have ranged from bridge and roadway projects to drainage studies to dam breach analyses. She has extensive experience working on FEMA-related projects, including detailed stream studies and Letters of Map Revision (LOMRs).

# Biological and Agricultural Engineering Scholarship Recipients

## Arkansas Academy of Biological and Agricultural Engineering Scholarship

Brynn Bodwell  
Cady Rosenbaum

## Biological & Agricultural Engineering Scholarship

Wesley Jones  
Clare Yurchak

## Billy B. & Mildred V. Bryan Scholarship

Isabel Arrocha Cordovez  
Lillian Glaeser  
Kanaan Hardaway

## Division of Agriculture

Kanaan Hardaway  
Megan Doty

## J.A. Riggs Tractor Scholarship

Isaac Bertels  
Tatiana Castillo Hernandez

## John W. & Trannye Odom White Scholarship

Amanda Bogart

## Mike & Yvonne Jones AABAE Scholarship

McKenzie Gillit  
Clare Yurchak

## Xzin McNeal Endowed Scholarship

Juan Arguijo  
Kaden Belcher  
Brynn Bodwell  
Amanda Bogart  
Evan Byrd  
Tatiana Castillo Hernandez  
Harrison Davis  
Haley Ellis  
McKenzie Gilit  
Lilian Glaeser  
Daisy Mota  
Alexie Pope  
Cady Rosenbaum  
Anthony Siebenmorgen  
Charles Whitten

## Joe Steele & Hardy Croxton Scholarship

Jake Krier

## Class of 2020 Senior Design Projects

### Design of a Bio-Retention Cell for Walker Park



**STUDENT TEAM:** Brynn Bodwell, Kanaan Hardaway, Kira Simonson, Clare Yurchak

**FACULTY MENTOR:** Dr. Kieu Le and Dr. Benjamin Runkle, P.E.

The City of Fayetteville has identified the northern parking lot of Walker Park as requiring low-impact development to retain and treat storm water runoff before it drains into the adjacent Spout Spring Branch Creek. This group designed a bio-retention cell at the southwestern corner of the parking lot to have a significant impact on storm water infiltration. They recommended a Level 1 bio-retention



# Class of 2020 Senior Design Projects

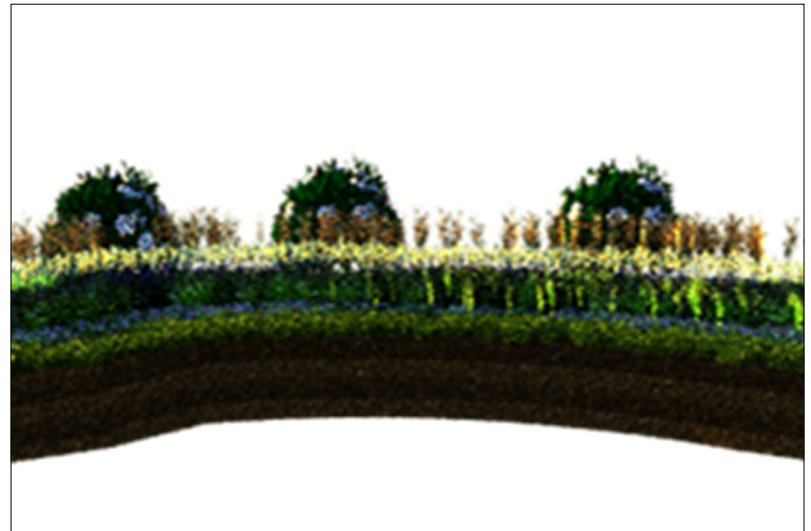
---

## West-Side Wastewater Treatment Plant: LID System Design

**STUDENT TEAM:** Garrett Lampson, Isabel Arrocha, Julie Halveland, and Eleanor Henson

**FACULTY MENTOR:** Dr. Kieu Le and Dr. Benjamin Runkle, P.E.

The City of Fayetteville's West-Side Wastewater Treatment Plant (WWTP) Facility, operated and managed by Jacobs Engineering, serves as a client. This facility aims to reduce all storm water runoff from the property to ensure operators do not have to worry about non-point source storm water regulations and can instead focus on the point-source regulations from a WWTP. The current rain gardens and bio-swales at the WWTP were designed without disturbing the existing soil. The team's designed bio-swale is situated on the northwest edge of the property, near to the plant's discharge into Goose Creek.



## Design of an Educational Solar Charging Station

**STUDENT TEAM:** Conlee Hale, Andrew McDaniel, Joshua Niccum and Danielle Springer

**FACULTY MENTOR:** Dr. Jun Zhu, P.E.

The City of Fayetteville's Energy Action Plan shows a clear path for the city running on 100% renewable energy and expresses desire to educate the public to encourage them to do the same. The city recently installed a solar array farm that can generate 66% of the energy consumed by the government. This City thought that an educational solar charging station, for cell phone charging, would have educational potential to show the difference in power supplied from a single axis tracking panel, like those the city is using, and a stationary panel, like those someone could install on their roof. The team designed a two panel charging station, with an educational and energy monitoring component, to be installed at Wilson Park--one of the busiest parks in the city.



# Design of Photovoltaic Power System for the Beaver Water District's Headquarters Building

---

**STUDENT TEAM:** Patrick Comer, Wesley Jones and Elizabeth Topping

**FACULTY MENTOR:** Dr. Yi Liang

Besides providing high quality drinking water, Beaver Water District (BWD) is interested in stepping up their stewardship by adding renewable energy generation capacity to their headquarter buildings. The team evaluated several renewable energy alternatives and designed a 185 kW stationary PV array system with net metering capability to the power grid. If implemented, the proposed solar array system would allow BWD headquarter be completely powered by renewable energy.



---

## Carbon Footprint Reduction for a Cidery



**STUDENT TEAM:** David Ferber, Mei Pentecost, Cady Rosenbaum and Tony Siebenmorgen

**FACULTY MENTOR:** Dr. G. Scott Osborn, P.E.

The team worked with Black Apple Crossing, a local cidery in Springdale, Arkansas, to design methods for reducing their carbon dioxide emissions produced through the fermentation process of their cider. The goal was to model a system that would capture the fermentation gas emissions and store them for later uses. These uses include recycling the carbon dioxide to utilize in the carbonation of the cider and selling the collected carbon dioxide to third parties.

---

## Class of 2020 Senior Design Projects

---

### Design of Hydroponic Plant Growth Chamber as a Recruiting Demonstration for Biological Engineering



**STUDENT TEAM:** Samuel Carroll, Nicholas Cross and Mike Gasasu

**FACULTY MENTOR:** Dr. Thomas Costello, P.E.

The Biological Engineering program at the University of Arkansas has requested the design of an interactive plant growth demonstration display to help inform visitors about the skills and subject matter of the biological engineer. The team focused on the design of the basic life support systems needed to grow herbs in an enclosed hydroponic system. This included systems for ventilation, lighting and nutrient/water management. Design decisions were partially based on the desire to make the unit hands-on, interactive and dynamic.

### Design of On-Farm Surface Water Storage Options for Irrigating A Commercial Rice Seed Research Farm

**STUDENT TEAM:** Emily Cumiskey, Joseph Mathis, Cade Prince and Seth Smith

**FACULTY MENTOR:** Dr. Thomas Costello, P.E.

RiceTec, Inc. is a leading source of high-yielding, rice seeds that farmers utilize all over the world. Their research farm, has a history of relying on irrigation water supplied by a local water district. Suburban sprawl has created a demand to meet the growing needs for municipal drinking water systems. This challenge is threatening to eliminate the irrigation water supply that RiceTec depends upon. The team explored options for on-farm storage of surface water to see if this would be a viable and sustainable source to irrigate the research plots into the future.





## Congratulations to the Class of 2020!

### Undergraduates:

Isabel V. Arrocha C.

Brynn Bodwell

Samuel Carroll

Patrick Comer

Nicholas Cross

Emily Cumiskey

David Ferber

Mike Gasasu

Conlee Hale

Julie Halveland

Kanaan Hardaway

Elle Henson

Wesley Jones

John Garrett Lampson

Andrew McDaniel

Joseph Mathis

Joshua Niccum

Mei Pentecost

Cade Prince

Cady Rosenbaum

Anthony Siebenmorgen

Kira Simonson

Seth Smith

Danielle Springer

Elizabeth Topping

Clare Yurchak

# 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 \$ \_\_\_\_\_

Biological and Agricultural Engineering Student Support Fund \$ \_\_\_\_\_

NAME: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

ADDRESS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

REMIT PAYMENT TO:

Dept. of Biological & Agricultural Engineering

203 Engineering Hall

University of Arkansas