

Connections

University of Kentucky
Biosystems & Agricultural Engineering
College of Agriculture, Food and Environment/College of Engineering
Vol. 11, Fall 2018



BAE by the Numbers

November 20, 2018

Greetings Alumni and Friends:

Normally, our newsletter committee chair, Jian Shi (and previously, Carmen Agouridis), writes the welcome letter. This month, I'm taking over the responsibility so I can introduce two new initiatives, one that I hope will increase the transparency of the department, the other, one that I hope will engage alumni and current students.

First, to increase transparency, we are providing data about the department. "BAE by the Numbers" shows our strengths. It also highlights areas that need attention. Some of my favorite data: collaborative awards for both 2016 and 2017; the ratio of female/male full-time faculty; and the enrollment of female students in our department. On the to-do list: increase minority enrollment and the number of Extension fact sheets.

Second, to engage alumni and our current students, we are hosting an Academic Showcase at Spindletop Hall (see page 16 for information and the link to RSVP). We hope alumni, students, faculty/staff and their families will join us for a night of fun and honors.

In other news, I am pleased to announce that Tim Smith has accepted a new position in the department. Many of you know Tim from his years of service to the tractor team. He will now apply his engineering expertise to managing the shop.

You'll be receiving this newsletter sometime after Thanksgiving. I hope you and your family have a safe and happy holiday season.

Sincerely,
Mike Montross



Dr. Nokes Accepts Associate Dean Position

The UK College of Engineering has filled two vacant associate dean positions. Sue Nokes will become the college's first associate dean for faculty affairs and facilities and John Balk will become the next associate dean for research and graduate studies.

"I'm pleased that

Drs. Nokes and Balk have accepted my offers to serve as associate deans in such critical areas," said Dean Rudy Buchheit. "Both are well-respected, have excellent track records in teaching and research, and will provide tremendous leadership as we tackle our ambitious goals."

Sue Nokes is a professor in the Department of Biosystems and Agricultural Engineering, where she has taught since 1995. A native of northwestern Ohio, Nokes obtained her bachelor's and master's degrees in agricultural engineering from The Ohio State University and her Ph.D. in agricultural engineering from North Carolina State University. She began her career in the Climate Control Division of Ford Motor Company and later served as the energy conservation engineering for Fort Benjamin Harrison.

Nokes served as chair of the Department of Biosystems and Agricultural Engineering from 2011-2017. She has received several teaching awards, including ASABE's A.W. Farrall Young Educator Award in 2000 and the Provost's teaching award in 2012. Nokes has published over 60 peer reviewed articles and four book chapters and has received over \$10 million in grant awards from sources including the National Science Foundation, the U.S. Department of Agriculture and industrial support. Her research involves microbial bioprocessing and mathematical modeling of the microbial conversion of biomass into chemicals and fuels.

Nokes is a 31-year member of ASABE, the national professional society for Agricultural and Biological Engineers, and will serve as its president in 2019-2020. She was named an ASABE Fellow in 2016.



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BAE Connections is published twice a year by the University of Kentucky Biosystems and Agricultural Engineering Department, an Equal Opportunity Organization. The newsletter is produced by BAE in partnership with Alpha Epsilon. ©2018.

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Cover photo: Matt Barton

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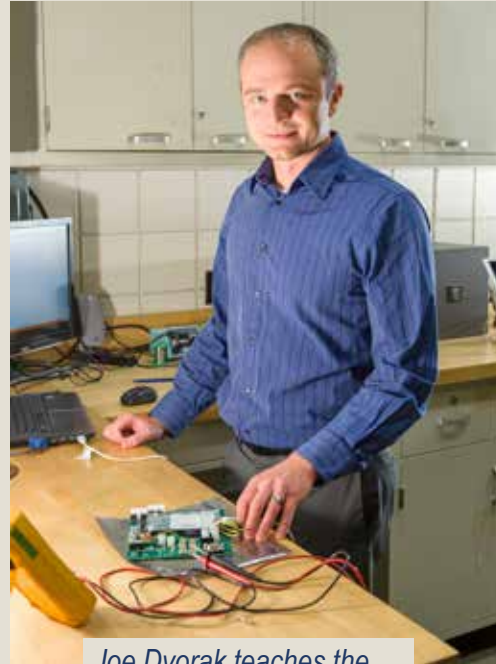
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BAE By the Numbers

2016-2017 Annual Report

IMPACTS	
Referred journal articles	36
Other research articles	2
Patents	1
Interdisciplinary programming	2
Conference leadership roles	2
Extension fact sheets	3
Extension Success Stories	16
Extension contacts	15,014
Proposals submitted	61

AWARDS		
	Primary	Collaborative
2016	\$1,041,099	\$12,176,822
2017	\$1,908,557	\$4,919,230



Joe Dvorak teaches the required course, BAE 305 DC Circuits and Micro-electronics. Here, he is programming a machine control unit.

BAE By the Numbers, continued

FACULTY BY TITLE SERIES	
Regular faculty	11
Extension	7
Lecturer	1
Part-time instructors	6
Post-retirement	3
TOTAL	28

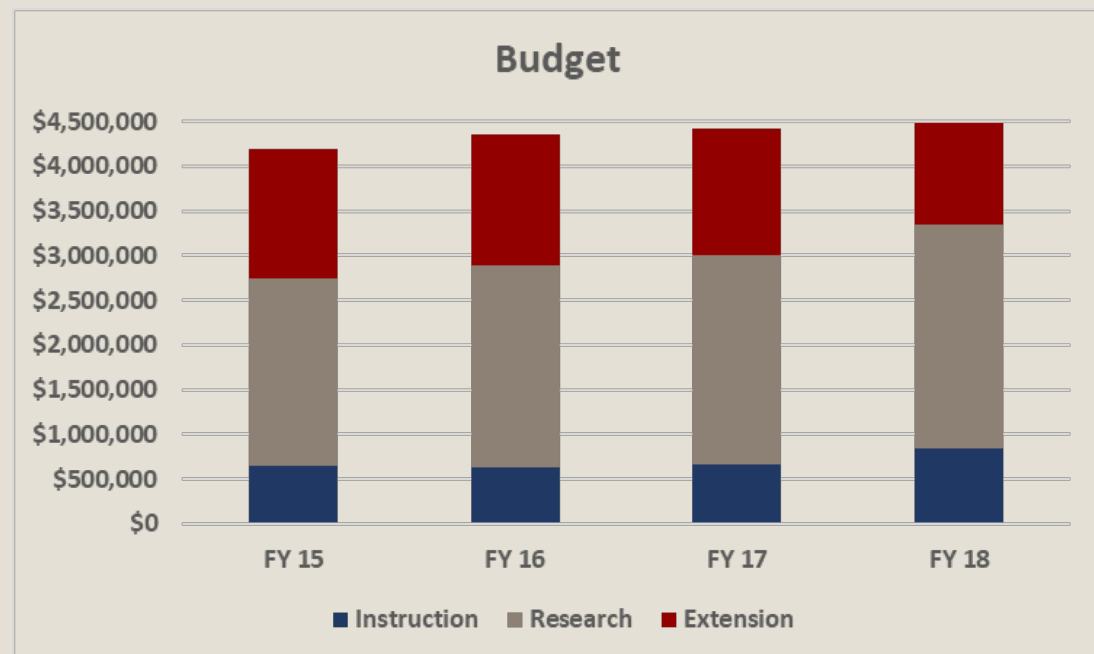
FULL-TIME FACULTY BY RACE	
African American	2
Asian	1
White	16

FULL-TIME FACULTY BY GENDER	
Female	5
Male	14

FULL-TIME FACULTY BY RANK	
Professor	8
Professor and Associate Dean	2
Associate	1
Assistant	7
Lecturer	1
TOTAL	19



Czarena Crofcheck teaches AEN/TSM 341 Brewing Science and Technology. Her course is one of the offerings in the 12-credit Distillation, Wine and Brewing Studies, a new certificate program in the College of Agriculture, Food and Environment.



BAE By the Numbers, continued

2016-2017 Enrollment					
	Total	Female	Male	Minorities	African American
Bachelor's	195	89	106	18	2
Master's	13	5	8	0	0
Doctoral	10	1	9	1	0
Post-Doc	2	1	1	0	0
Total	220	96	124	19	2

Enrollment Five-Year Trend					
	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Bachelor's	120	144	168	203	195
Master's	22	23	22	14	13
Doctoral	9	4	10	10	10
Post-Doc	1	3	1	2	2
Total	152	174	201	229	220

2016-2017 Degrees Awarded					
	Total	Female	Male	Minorities	African American
Bachelor's	26	10	16	2	0
Master's	9	2	7	1	1
Doctoral	0	0	0	0	0
Total	35	12	23	3	1

Degrees Awarded Five-Year Trend					
	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Bachelor's	10	21	27	33	26
Master's	8	9	9	5	9
Doctoral	2	4	1	3	0
Total	20	34	37	41	35

BAE By the Numbers, continued

RECOGNITIONS		
Carmen Agouridis	Educational Aids Blue Ribbon Award, Publications-Short Category	ASABE
	Wethington Research Excellence Award	University of Kentucky
	Henry Mason Lutes Award for Outstanding Engineering Education	University of Kentucky
Czarena Crofcheck	Outstanding Biosystems and Agricultural Engineering Teacher	University of Kentucky
Bill Ford	Wethington Research Excellence Award	University of Kentucky
Josh Jackson	Wethington Research Excellence Award	University of Kentucky
	Superior Paper Award	ASABE
Sam McNeill	Wethington Research Excellence Award	University of Kentucky
	Presidential Citation for Service to the Society	ASABE
Sue Nokes	Wethington Research Excellence Award	University of Kentucky
	Superior Paper Award	ASABE
Mike Sama	Wethington Research Excellence Award	University of Kentucky
Jian Shi	Wethington Research Excellence Award	University of Kentucky

Mike Sama's lab (right) and his team of graduate research assistants (below) develop custom sensor systems deployed on unmanned aircraft systems.



From left, Felipe Pampolini, Chris Good, Aaron Turner, Saket Dasika, Ali Hamidisepehr, Mike Sama.

RESEARCH AREA: Bioenvironmental

Engineers in this area study surface water hydrology, groundwater hydrology, sediment transport, water quality, chemical rate and transport, waste management, reclamation of disturbed lands, site remediation, irrigation and drainage.



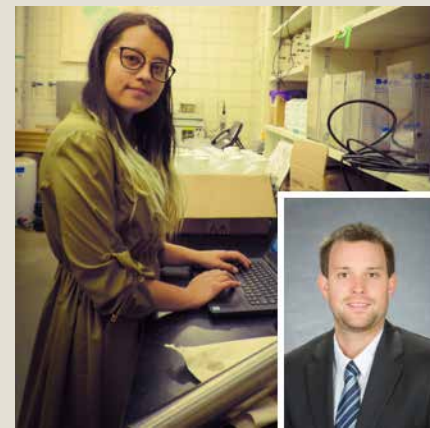
Carmen Agouridis

Extension Associate Professor



Dwayne Edwards

Professor



William Ford 3rd

Assistant Professor

RESEARCH AREA: Controlled Environment

Engineers in this area study heat and mass transfer, physics of plant and animal environments, biometeorology, structural design, air quality, heating, ventilation and air-conditioning design.



Donald Collier

Fellow and Presidential Member, ASHRAE, Professor, and Director of Graduate Studies



Morgan Hayes

Extension Assistant Professor

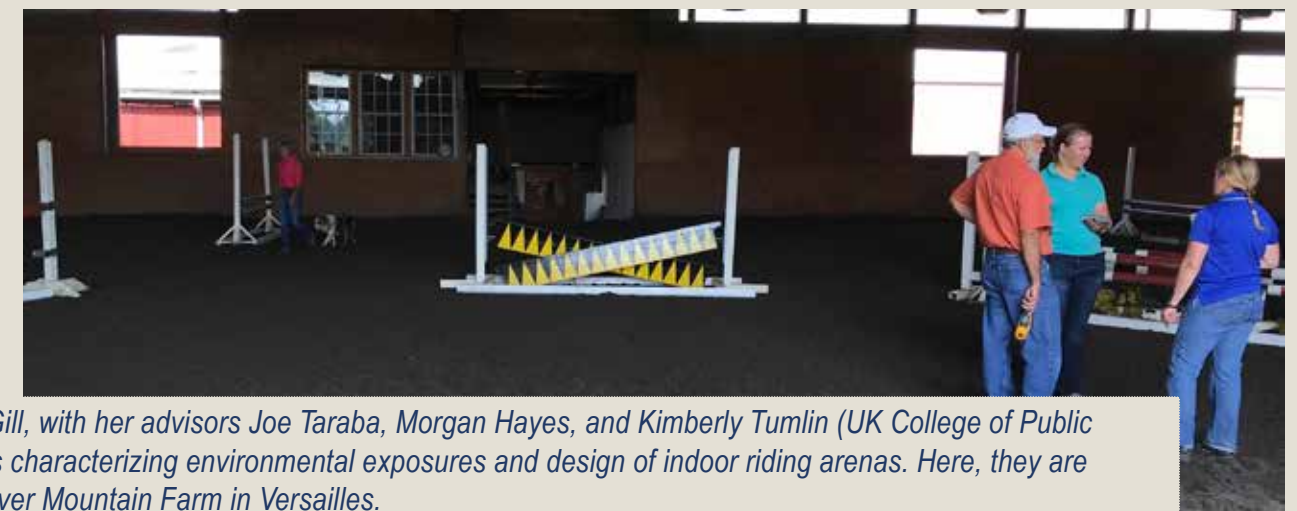


Joshua Jackson

Extension Assistant Professor



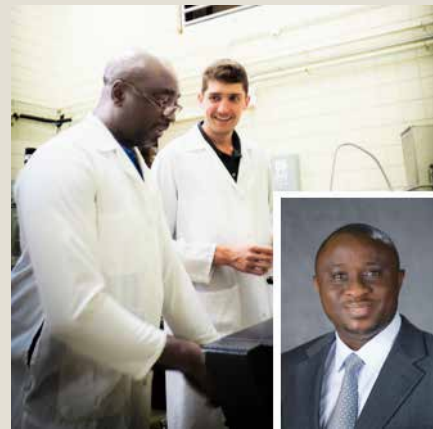
Graduate research assistant Morgan Gerlitz (left) and Carmen Agouridis measure flow rate using the flume in the hydrology lab.



Staci McGill, with her advisors Joe Taraba, Morgan Hayes, and Kimberly Tumlin (UK College of Public Health), is characterizing environmental exposures and design of indoor riding arenas. Here, they are visiting River Mountain Farm in Versailles.

RESEARCH AREA: Food and Bioprocessing

Engineers in this area receive extensive training in microbiology, biochemical engineering, heat and mass transfer, enzyme kinetics and fermentation, storage of biological products and materials handling.



Akinbode Adedeji

Assistant Professor Food Process Engineering



Czarena Crofcheck

Professor, Associate Dean for Academic Affairs, Lewis Honors College



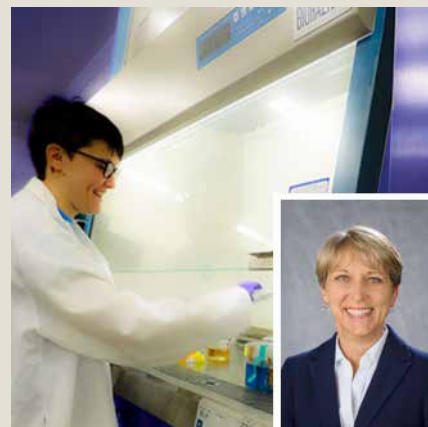
Samuel McNeill

Extension Professor



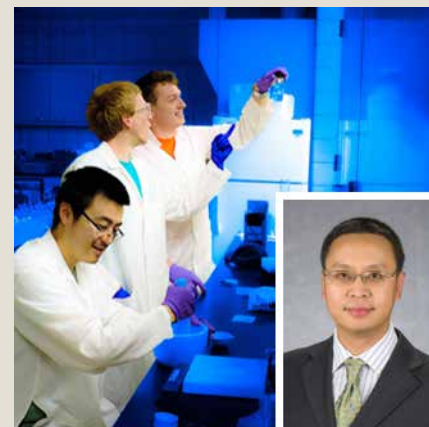
Michael Montross

Professor and Department Chair



Sue Nokes

Associate Dean for Faculty Affairs and Facilities, Professor



Jian Shi

Assistant Professor

RESEARCH AREA: Machine Systems Automation

Engineers in this area work with fundamental concepts including system dynamics, kinetics, automated controls, machine design, kinematics, fluid power, soil dynamics, plant-machine interactions and digital electronics.



Joseph Dvorak

Assistant Professor, Director of Undergraduate Studies



Michael Sama

Assistant Professor



Timothy Stombaugh

Extension Professor



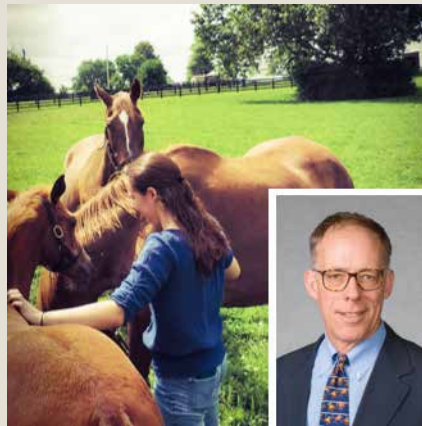
This summer, Mike Sama helped UK Ag Econ students test their sprayer drone by flying over spray cards and capturing the spray pattern.

ADDITIONAL AREAS: Engineering Education Animal Biomechanics Agricultural Safety and Health



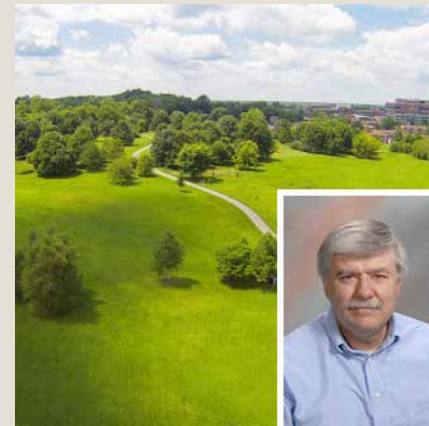
Alicia Modenbach

Lecturer, Student Services
Coordinator



Mick Peterson

Director of Equine Programs



Mark Purschwitz

Extension Professor



2018 RESEARCH UPDATES



Sama Using Unmanned Aerial Aircraft Systems for Weather, Livestock Research

Michael Sama is collaborating on a \$900,000 National Institute of Food and Agriculture grant for autonomous unmanned aerial robots for livestock health monitoring and a \$1,400,000 National Science Foundation award to study unmanned aerial aircraft systems for atmospheric physics.

Shi Receives \$500,000 Grant for Next-Generation Batteries

Jian Shi has been awarded \$500,000 from the National Institute of Food and Agriculture to study whether lignin, a component of cell walls in woody plants and stone fruits, can be efficiently extracted and processed with silicon nanoparticles to form composite materials for battery electrodes.

\$4.2 million
IN ACTIVE AWARDS BY BAE PRINCIPAL INVESTIGATORS

Student Spotlight: Ciara Pickering

Where are you in your career?

I am in the first semester of my master's program with a focus in Bioenvironmental Engineering. I have begun research for my master's thesis, which focuses on developing a sediment budget for a wetland in Huntington, West Virginia. Getting my bachelor's degree in Biosystems Engineering (Spring 2018) was one of the best decisions of my life. The degree is so diverse in the course work, research areas, faculty, and students that it really prepares students for different career paths. It is also a smaller department, so it's extremely easy for students to get involved in research and professional organizations.

How did your experience at UK prepare you for your career?

I spent two years as an officer of the ASABE Student Branch. Through that, I gained leadership skills and I made connections with industry professionals and other biosystems students across the country. I attended two of the Southeastern Rally conferences



and, this past year, we hosted the Southeastern Rally conference here in the UK BAE department. I also

spent two summers working in the department. I spent one summer working for Dr. Higgins and Lee Moser



implementing sustainable agricultural practices at farms around the state. The projects included rainwater harvesting off barn roofs, constructing mobile shade structures for livestock, and installing solar electric fences. I also worked with

Dr. Ford, investigating sediment dynamics of tile drain systems in agricultural fields in northern Ohio, and looking at stream nutrient dynamics in West Virginia. Assisting graduate students while I was an

undergraduate really helped prepare me for graduate school. I also had the opportunity to go to Germany with the department for a study abroad program. It was an amazing trip and opened my eyes to other cultures and to how industries operate abroad.

What advice would you give to current and future students?

My biggest piece of advice for prospective or current students is to get involved in the department, whether that's the professional organizations, research, or even just making connections with professors. I really encourage students to talk to their professors and develop a relationship because professors are such a valuable source of knowledge and connections. They can really help students get jobs or get into graduate school. (Plus everyone in this department is super nice and wants to help students!!!!)

What are your plans for the near and distance future?

When I graduate, I hope to work in the consulting industry on projects involving stream restoration or constructed wetland design.

Please tell us something about yourself we may not know.

I have fostered two service dogs in training, Minerva and Bastion (left), through 4-Paws for Ability. I enjoy running and pretty much live at Barnhart.



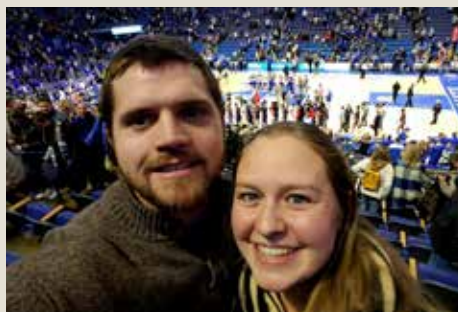
Alumni Spotlight: John Evans, Ph.D.

Where are you in your career?

I finished my Ph.D. from the University of Nebraska in Ag and Biosystems Engineering. I did research on grain harvest logistics with two former UK alumni, Joe Luck and Santosh Pitla, and got to collaborate with industry as well. I gained a lot of experience in academia as well as with working with a diverse group of researchers, industry, and farmers across eastern Nebraska and Iowa. I just got started at Purdue University at the beginning of November in the ABE department, where I have a research and teaching appointment. I am looking forward to getting my research program started, teaching and meeting students, and collaborating with other professors in the department.

How did your experience at UK prepare you for your career?

I am so grateful for my experience at UK, both as an undergrad and a master's student. I had the opportunity to be mentored by so many great individuals that it's hard to focus on just a few, unless you want a several page volume of the great faculty



and staff in the department. One activity in particular really shaped my career trajectory, Quarter Scale Tractor Team. I participated as a team member and team captain and helped bring home several top place

finishes. That activity helped develop my engineering skills. Not only was I putting to practical use the concepts I was learning in class, but I was also gaining skills by working with professors and advisors, helping younger students, working with a wide range of industry sponsors, and honing my presentation skills at the contest each year. I enjoyed it so much I went on to be an advisor during my master's and then Ph.D. work at Nebraska, whose team has had a first-place finish. I am a firm believer in how Quarter Scale turns concepts into practical applications for students.

What advice would you give to current and future students?

Diversification is very important. Try to meet a wide range of people and learn a diverse set of skills. This helps make you more "hireable" and provides more opportunities for networking, professional development, and personal growth. I experienced that by going to Nebraska for my Ph.D. I wanted an opportunity to pursue engineering in a location where agriculture operated on a different scale. Consequently, I was exposed to new technologies and methods. I also had the chance to work with agronomists, ag technologists, statisticians, and animal scientists. I really value what I learned from each of those individuals and would encourage everyone to broaden their horizons.

Were there any specific classes, activities, or people who made an impact on your education?

I previously talked about Quarter Scale but failed to mention all the great people involved in that project



and in the department. I owe a lot to two great mentors: Michael Sama and Tim Smith. Both were exceedingly patient as I learned new concepts, extraordinarily generous with their time and resources, as well as fun guys to interact with. They encouraged me to think like an engineer but also not to take myself too seriously. I hope to guide my students with the same energy and proficiency that they had.

What are your plans for the near and distance future?

For the near future, I plan on learning more about my new home in West Lafayette. I'm excited to learn about the town and campus and do some exploring of the area. Next summer I will be getting married, so I am excited to start that next chapter in life. Long term, I think we would like to find some land and do some farming on the side, and spend as much time as possible visiting our family farms.

Please tell us something about yourself we may not know.

Over the past couple years I've run over 15 different half marathons, quite a few 5k's and several relay races. In October I ran the Bourbon Chase, a 200-mile-long relay race, with some friends from UK. I hope to add more half marathons in the state of Indiana, and maybe even tackle a marathon in the near future.

Academic Showcase

Please join the Department of Biosystems and Agricultural Engineering as we honor students, alumni, and friends.

April 25, 2019 | 5:30-8pm | Spindletop Hall

5:30-6:00 Check In and Photos
6:00-7:00 Reception and Showcase
7:15 Program

Register at
www.uky.edu/bae/events
or <https://bit.ly/2QKSQiv>

Thank You to Our Generous Supporters

As 2018 comes to an end, it is clear the Department of Biosystems and Agricultural Engineering has much to celebrate. Our successes would not be possible without the hard work of our outstanding students, faculty, and staff. Gifts from alumni and friends support these individuals as they continue their good work. We hope you will join the generous donors who contribute to our accomplishments each year. Gifts can be made online to the Biosystems and Agricultural Engineering Enrichment Fund at ca.uky.edu/give or through the Office of Philanthropy and Alumni at 859-257-3814.

American Society of Agriculture & Biological Engineers

Rodney J. Andrews, Ph.D.

Dr. Amy Barton

Dr. David Barton

Mr. Mark E. Fiedeldey

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Dr. Sidney A. Thompson

Ms. Julia L. Tolliver

UK AG and HES Alumni Association

Dr. Philip W. Westerman



BAE's Alumni Advisory Board meets twice a year, in the spring and fall. The group offers valuable feedback on the department's academic, extension, outreach, and research programs.

2018-2019 Members

Allen Patton

Brittany Adam

Doug Mynear

Ellie Hawes

Laud Azu

Maridely Loyselle

Nick Coleman

Pamela Pabian

Rachel Lindsay Norton

Richard Schultz

Joe Stevens Receives Chateaubriand Award



In August, Joe Stevens, a doctoral candidate in Jian Shi's lab, received a prestigious Chateaubriand/MOPGA fellowship. Stevens was one of 30 recipients nationwide. The fellowship will sponsor his nine-month research project at the Laboratoire d'Ingénierie des Systèmes Biologiques et des Procédés (LISBP), French National Institute for Applied Sciences (INSA). Read more at <https://www.chateaubriand-fellowship.org/>.



Stevens, left, confers with Jian Shi in the chemistry lab.

Postharvest Grain Loss Group From Nigeria Visits Lexington



Dr. Mobolaji Omobowale, Dr. Adeola Ala, Dr. Samuel Nwaubani and Grace Otitodun visited the University of Kentucky from Nigeria. They have been working with Dr. Sam McNeill to reduce post-harvest losses in Nigeria under the USDA-FAS-Nigeria commodity handling and storage project.

Group photo, left to right: Olufemi Adetola (research scholar under Dr. Adedeji; faculty at Federal University of Technology Akure, Nigeria); BAE Extension Professor Sam McNeill; Felix Akharume (PhD student under Dr. Adedeji); Michael Omodara (PhD student



Ag Engineering Showcase & Workshop

MARK YOUR CALENDAR NOW FOR MARCH 8, 2019



under Drs. Montross & McNeill; research engineer at Nigerian Stored Products Research Institute (NSPRI)); Adeola Ala (entomologist; faculty at the Department of Zoology University of Ibadan, Nigeria); Samuel Nwaubani (entomologist; research scientist at NSPRI, Nigeria); BAE Assistant Professor Adedeji; Grace Otitodun (entomologist; research scientist at NSPRI, Nigeria); Mobolaji Omobowale (agricultural engineer; faculty in the Department of Agricultural and Environmental Engineering, University of Ibadan, Nigeria); BAE Department Chair Mike Montross; Rilwan Oyetunji (PhD student under Dr. Nokes); Francis Agbali (PhD student under Dr. Adedeji).



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Upcoming Events

Holiday Breakfast, December 20

National Farm Machinery Show, Louisville Expo Center, February 13-16

Ag Engineering Showcase, CE Barnhart Building, March 8

Academic Showcase, Spindletop Hall, April 25

Alumni Advisory Board Meeting and ASABE Kentucky Section Meeting, April 26



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