

2021

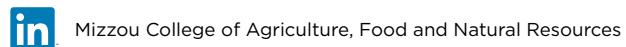
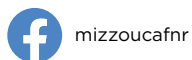


# ON THE DRIVE

**Biennial Report for the CAFNR Strategic Plan:  
Drive to Distinction**



College of Agriculture,  
Food & Natural Resources  
University of Missouri



 College of Agriculture,  
Food & Natural Resources  
University of Missouri

Biennial report compiled, written and edited  
by CAFNR Marketing & Communications  
Briefs on pages 7, 9, 11, 17 & 34 excerpted from  
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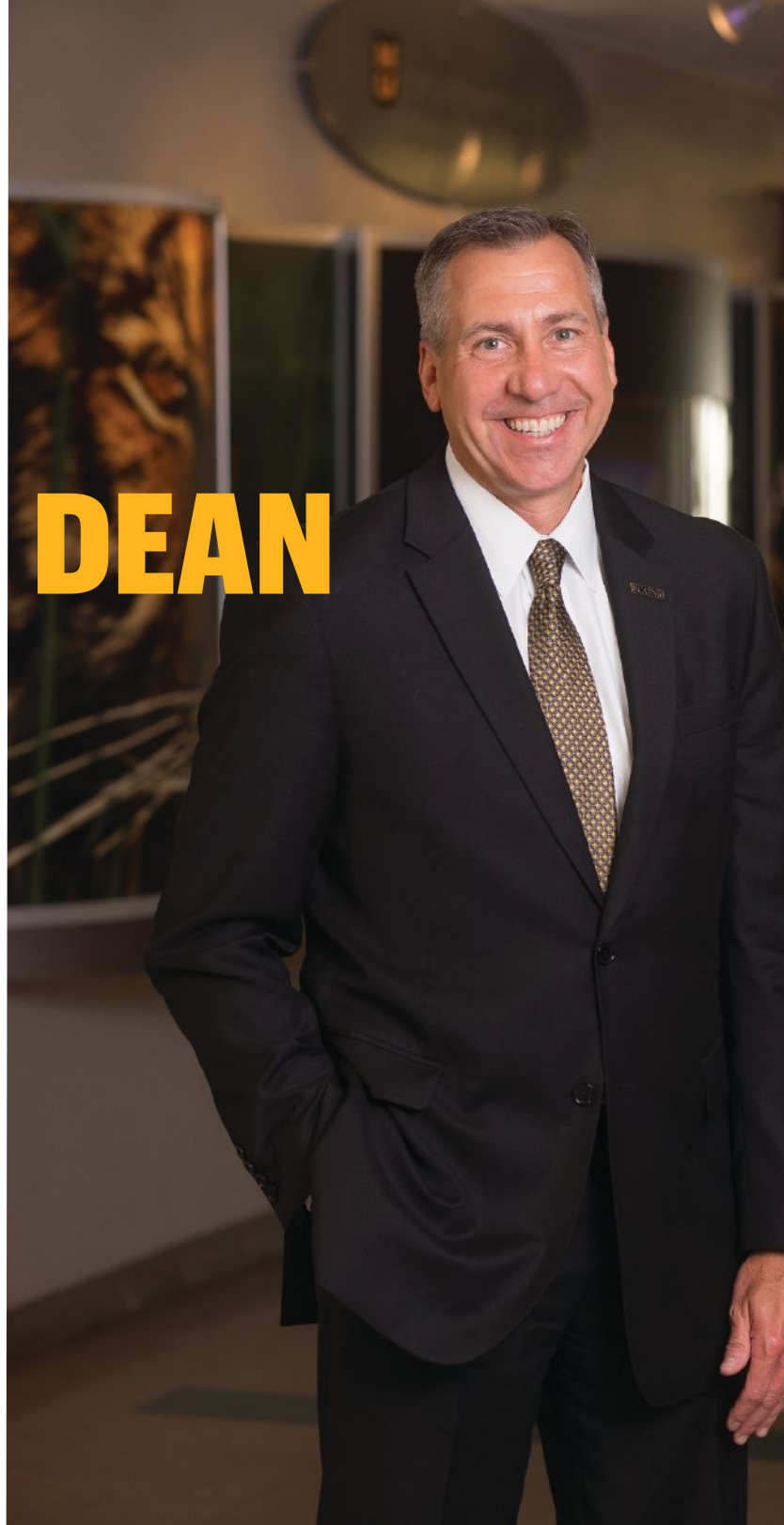
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# FROM THE DEAN



DRIVE to DISTINCTION

W

hen we started on our “Drive to Distinction” in spring 2019, it was impossible to have imagined what the next 30 months would bring. We knew our strategic plan would guide us and propel us forward as we implemented innovative activities and worked toward robust goals. Little did we know that almost exactly a year after launching, our world would change completely. When everything shut down for COVID precautions, we had to apply new ways of teaching, advising, performing hands-on learning, conducting research, educating Missourians, and much more.

I am proud to share that although there were setbacks on our “Drive to Distinction” due to pivots necessitated by the pandemic, identifying creative ways to conduct our work has made us even more driven to achieve excellence. Our “Drive to Distinction” has not been derailed! And we remain grateful for this robust map keeping us on the path.

We also have worked tirelessly over the past year to implement adaptations to keep us strong in a post-COVID world — initiatives we could not have anticipated at the time we wrote our strategic plan. These responses have included a restructuring of both our college academic organization and our research center network, for efficiencies and adeptness.

This report shows the progress made over the first two of the six years of our plan. Although some metrics have been challenged by the pandemic, we are proud of the progress made in many areas and are excited to showcase our steps forward.

Celebrating our college’s sesquicentennial was one initiative that looked decidedly different due to 2020’s restrictions. We were thrilled to kick off our 150th year on our Founding Day, Feb. 24, 2020, with many of you in attendance at Mizzou’s historic Jesse Hall Rotunda. Although other sesquicentennial events had to be postponed or cancelled, we know this was just another chapter in our storied history — showcasing resilience in the face of adversity!

I am eager to share the progress we have made over the past two years in this publication! Enjoy, and I encourage you to reach out to see how you can help us go farther and faster on our “Drive to Distinction.”

**CAFNR Proud,**



**Christopher R. Daubert**

**Vice Chancellor and Dean**

**College of Agriculture, Food and Natural Resources  
University of Missouri**

# ENSURING STUDENT Success

## GOALS:

Increase Access to Undergraduate Education Programs

Increase Graduation Rates and Ensure Successful Placement of Students

Cultivate Undergraduate Student Success

Require a Signature Experience as a Component of the Undergrad Degree Program (RISE)

Graduate Students Will Achieve Academic Success and Be Career Ready

Increase Access to Undergraduate Education Programs

### PERFORMANCE MEASURE:

ENROLL 650 NEW STUDENTS

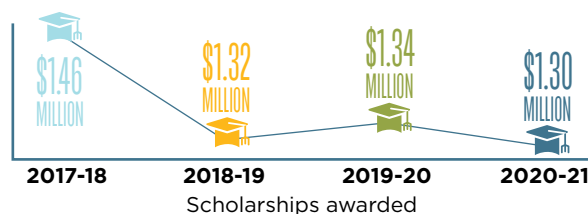
### ACTION ITEMS:

- ▶ Hosted CAFNR Visit Days for prospective and admitted students, as well as virtual CAFNR overviews and major-specific virtual events.
- ▶ Visited Missouri high schools and community colleges, interacting with more than 6,000 prospective students.
- ▶ Invited community college students from top feeder schools in Missouri to our Career Fair and provided additional degree program information to those students.
- ▶ Sent printed materials to over 10,000 high school seniors.



### PERFORMANCE MEASURE:

INCREASE SCHOLARSHIPS AWARDED ON AN ANNUAL BASIS TO \$2 MILLION



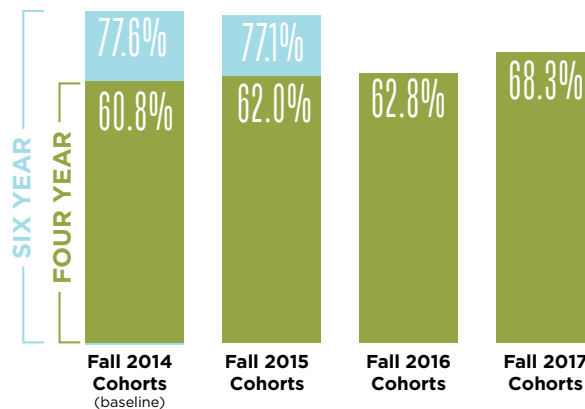
Increase Graduation Rates and Ensure Successful Placement of Students

### PERFORMANCE MEASURE:

GRADUATE 65% OF STUDENTS IN FOUR YEARS AND 75% IN SIX YEARS

### ACTION ITEMS:

- ▶ Streamlined the graduation plan approval process (all online).
- ▶ Actively working with students to complete within the 6-year time frame (dashboard to track student cohorts).
- ▶ Working to “recruit back” students (in good standing, who have left in the last 2 years with more than 70 hours earned) to complete their degree.

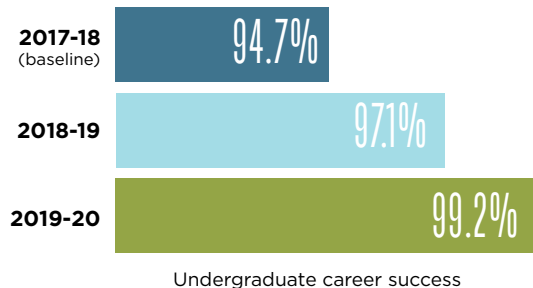


### PERFORMANCE MEASURE:

ENSURE THAT 95% OF DEGREE RECIPIENTS, UNDERGRADUATE AND GRADUATE, ACHIEVE CAREER SUCCESS WITHIN 6 MONTHS OF GRADUATION

### ACTION ITEMS:

- ▶ Promoted the CAFNR Student Development Plan to faculty and staff teaching entry-level courses involving career-readiness components.
- ▶ Encouraging student participation in our fall/spring career fairs and our industry tour programs.
- ▶ Recruiting new organizations and employers to participate in career-related activities/events on campus or virtually.
- ▶ Encouraging student participation in the Mizzou Mentoring Program.



## ENSURING STUDENT SUCCESS

(continued)

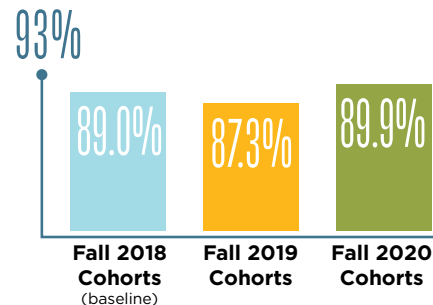
Cultivate  
Undergraduate  
Student  
Success

### PERFORMANCE MEASURE:

RETAIN 93% OF FIRST-YEAR STUDENTS

#### ACTION ITEMS:

- ▶ Set up a series of communications with students who are eligible, but have not registered for upcoming semester.
- ▶ Created easy to interpret, consistent advising sheets.
- ▶ Contacted students throughout the semester who have an early alert flag raised.



### RIISING TO THE OCCASION

We know CAFNR students always rise to the test, but now – it's official.

As part of CAFNR's Drive to Distinction, all undergraduate students will take part in a "signature experience" during their educational experience. This initiative is denoted as "RISE:" Research, International, Service learning, Experiential learning. (Of course, students don't have to stop at one – they are welcome to participate in as many signature experiences as they can fit into their college career!)

"RISE is another aspect of what we call 'The CAFNR Experience,'" said Bryan Garton, senior associate dean and director of academic programs. "We don't just offer a degree in CAFNR – it's the entire experience. RISE empowers CAFNR students to make the most of their time on campus and utilize CAFNR's unique, tailored resources."

Each degree program is developing and implementing multiple RISE experiences for students. Degree programs are working now to incorporate various RISE experiences into their curricula.

“We don't just  
offer a degree  
in CAFNR –  
it's the entire  
experience.”



Require a  
Signature  
Experience as a  
Component of the  
Undergrad Degree  
Program  
(RISE)

#### ACTION ITEMS:

- ▶ Created descriptions for each RISE component.
- ▶ **62.4% of graduates from FS18, SP19 and SS19 completed at least one RISE experience.**
- ▶ Offered 22 short-term and semester study abroad programs in 15 countries.

## A HISTORIC DEDICATION



On Feb. 24, 2021, the 151st anniversary of the founding of our college, CAFNR recognized Henry Kirklin, a celebrated Black farmer and educator, with the naming of the Henry Kirklin Plant Sciences Learning Laboratory, and the establishment of a scholarship for underrepresented minority students

studying plant sciences, in his honor.

Nearly a dozen of Kirklin's descendants were in virtual attendance as leadership of MU and CAFNR, along with city leaders, dedicated the lab, which recognizes the man believed to have been the first Black teacher at the University of Missouri.

A featured speaker at the event was Maya Puller, a senior in plant sciences, who shared the importance of recognizing Mr. Kirklin and his legacy in CAFNR.

"He paved the way for people who look like me," she said during the dedication ceremony. "He paved the way for people who are not Black, but are minorities, and have had a difference in education because of that. It is because of men and women like Mr. Kirklin, fighting for the rights to an education that was on par with that of their white counterparts, that I am able to walk the graduation stage this upcoming December and seek a higher education back in my home state of Texas."

Kirklin was born into slavery in 1858 on a farm east of Columbia and was freed by the age of 5. According to the State Historical Society of Missouri, Joseph Douglass, a local greenhouse and nursery owner with ties to MU, hired a teenaged Kirklin to work at his business, a job that eventually turned into a position at MU's horticulture department as a greenhouse supervisor and gardener. Kirklin's skills at managing plants were striking, and he was quickly given the role of teaching students practical gardening skills. During Kirklin's lifetime, the university prevented Black people from holding official teaching positions. Kirklin taught in an unofficial capacity in the horticulture department, where he educated students on pruning and grafting plants.



The new lab, in 3-35 Agriculture Building, features a series of digital displays that can be connected to microscopes to display detailed images of plant cells to the entire class, part of a suite of state-of-the-art technology that allows plant science and technology students to perform a variety of hands-on tasks without leaving the lab.

"One of the big strengths of our Plant Science and Technology program is the hands-on nature of our training, which provides students with the real-world experience necessary to prepare them for success after graduation," said CAFNR Vice Chancellor and Dean Christopher Daubert at the dedication. "Preparing students for the plant sciences workforce through hands-on learning opportunities sounds familiar, doesn't it? Mr. Kirklin truly was a precursor to what we aspire to do with our students with this new laboratory!"

Graduate Students Will Achieve Academic Success and Be Career Ready

### Graduate Student Enrollment





# ADVANCING RESEARCH & INNOVATION

## GOALS:

Cultivate a Culture  
of Research and Innovation  
Excellence

Increase Research,  
Innovation and Entrepreneurship

Cultivate Multidisciplinary  
Collaborations

Cultivate a Culture of Research and Innovation Excellence

### PERFORMANCE MEASURE:

INCREASE FACULTY AWARDS AND RECOGNITIONS BY 10% PER YEAR

University, national and international awards, fellowships and recognitions

Fall 2018 (baseline) 25

Fall 2019 21

### ACTION ITEMS:

- ▶ Established the CAFNR Research Council to guide the office's work.
- ▶ Created Research Digest bi-monthly newsletter to showcase research and innovation excellence.
- ▶ Established additional CAFNR awards including Distinguished Thesis/Dissertation Advisor Awards and Top 10 Researcher Awards to recognize faculty excellence.

## CULTIVATING A CULTURE OF COLLABORATION

In fall 2019, leaders from the University of Missouri, the University of Missouri System and the city of Columbia celebrated the opening of the new East Campus Plant Growth Facility with a ribbon-cutting. The state-of-the-art facility houses research greenhouses and cutting-edge, controlled-environment plant growth chambers.

At a time when about 11% of the world's population goes hungry each year, researchers from MU's colleges of Agriculture, Food and Natural Resources, Arts and Science, and Engineering intend to use the facility's more than 41,000 square feet to conduct plant research addressing issues such as global hunger and drought.



In addition to dedicated rooms for efficient processing and storage of plants collected from the field or one of the facility's many greenhouses, the facility also features some of the tallest plant growth chambers in the world, which provide a 12-foot growth height, enabling researchers to grow corn to maturity as well as evaluate root system development in realistic soil depths. From droughts to monsoons, the chambers enable researchers to simulate climate conditions from all over the world to study their impacts on crops.

"This facility is an incredible example of MU's collaborative approach to groundbreaking research," said MU President Mun Choi. "With cutting-edge tools and spaces at their disposal, researchers from several divisions on campus will work together to address global challenges and benefit Missouri's agricultural economy. Here is yet another demonstration of the UM System's commitment to making a positive impact on society through research."

## ADVANCING RESEARCH & INNOVATION

(continued)

Increase  
Research,  
Innovation and  
Entrepreneurship

### PERFORMANCE MEASURE:

DOUBLE INTELLECTUAL PROPERTY OUTPUTS  
(DISCLOSURES, PATENTS, TRADEMARKS) AND OUTCOMES  
(LICENSES, ROYALTY, START-UPS)

### ACTION ITEM:

Launched CAFNR Ag-celerator for Agricultural Technologies (CAAT) to promote translational research in the college. CAAT bridges the gap between academic research and industry by providing funding to research projects that could ultimately lead to commercialization of new technologies.

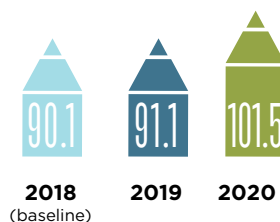
Total of patents issued,  
trademarks registered  
and disclosures submitted



### PERFORMANCE MEASURE:

INCREASE RESEARCH FTE BY 20%

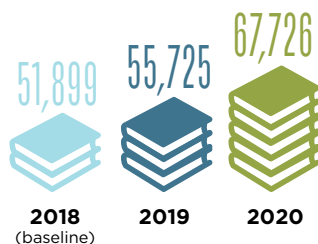
Research FTE



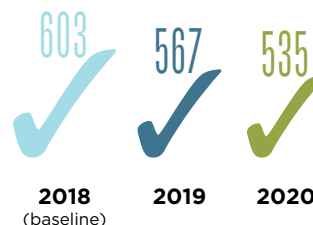
### PERFORMANCE MEASURE:

INCREASE PEER-REVIEWED PUBLICATIONS AND CITATIONS  
BY 10% PER YEAR

Refereed Citations



Refereed Publications





## AIDING DISEASE TREATMENT

Researchers in the College of Agriculture, Food and Natural Resources (CAFNR) received an \$8.6 million grant in summer 2019 from the National Institutes of Health to establish a new national research center. The Swine Somatic Cell Genome Editing Center will focus on aiding the development of biomedical treatments for human diseases such as cystic fibrosis.

The center will be tasked with creating protocols to evaluate the safety and efficacy of reagents, which are the tools researchers use to edit and repair disease-related genes. In supporting the translation of swine research into treatments for human diseases, the center's mission will align with the UM System's precision health initiative.

"As new gene-editing tools come down the pipeline, this center will develop more efficient processes to apply them to disease treatments," said Kevin Wells, co-lead researcher on the NIH grant and an associate professor of genetics in CAFNR's Division of Animal Sciences.

The new center will be an expansion of the NIH's Somatic Cell Gene Editing Consortium, which aims to develop quality gene-editing tools and make them available to researchers. With thousands of diseases known to have genetic causes, and amid the rapid rise of technologies that can precisely modify genes, MU's center — the first NIH-funded center of its kind — intends to create safe, more efficient and cost-effective processes to translate this knowledge and technology into real treatments.

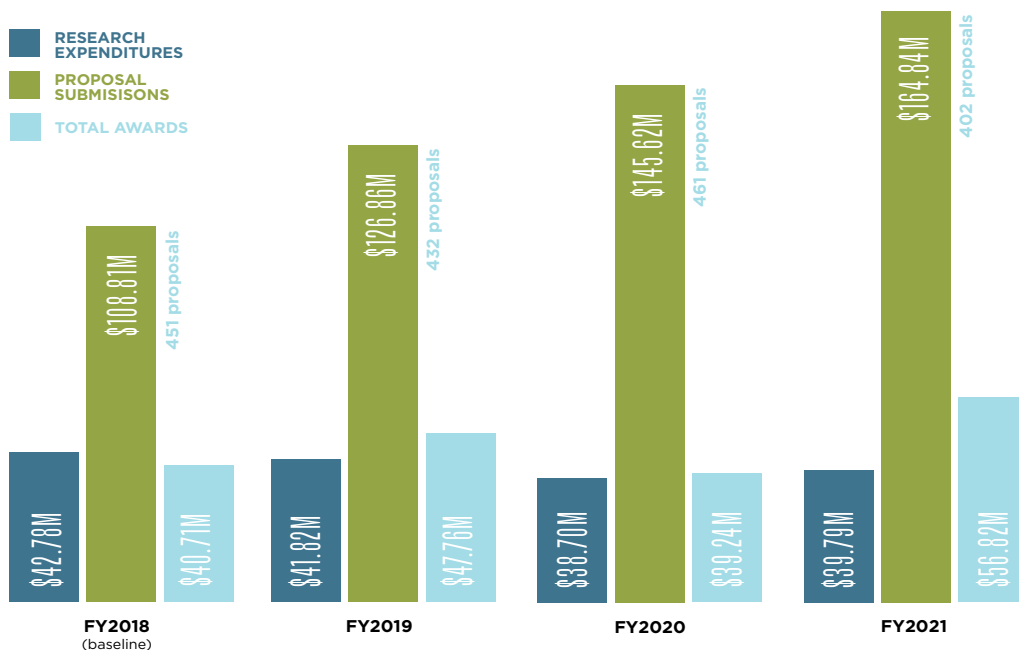
### Cultivate Multidisciplinary Collaborations

#### PERFORMANCE MEASURE:

PROMOTE INTER- AND TRANS-DISCIPLINARY AND MULTI-INSTITUTIONAL COLLABORATION TO INCREASE PROPOSAL SUBMISSIONS AND RESEARCH EXPENDITURES BY 10% PER YEAR

#### ACTION ITEMS:

- ▶ Hired a second grant writer to help with proposal submissions, particularly large interdisciplinary proposals.
- ▶ Launched CAFNR Research Day to provide programming on resource and funding opportunities.
- ▶ Launched "Joy of Discovery Seed Grant Program" to provide seed funding to support exceptional ideas that could lead to additional competitive funding. Funds are available to support 8-10 small grants per year based on an internal competition.



\* COVID-19 had a negative impact on 2020 metrics



# EmPOWERing

## GOALS:

Grow Missouri's Agricultural and Natural Resource Economy by Collaborating with Stakeholders to Create New, Science-Based Business Pipelines

Create Life-Long Learning Opportunities that Build Missouri's Agricultural Economy and Sustain its Natural Resources

Contribute to a Healthier Missouri by Sharing Science and Discoveries with our Communities

# MISSOURIANS

Grow Missouri's  
Agricultural and  
Natural Resource  
Economy by  
Collaborating with  
Stakeholders to Create  
New, Science-Based  
Business Pipelines

## PERFORMANCE MEASURE:

DOUBLE ECONOMIC IMPACT OF MISSOURI AGRICULTURE

## ACTION ITEMS:

- ▶ Partnered with Missouri Small Business Development Center (SBDC) to create the Missouri SBDC for Agriculture, Food and Forestry to provide Missouri's agricultural business owners and entrepreneurs with one-on-one assistance to grow or start their dream business.
- ▶ Created a Workforce Needs Assessment, which highlights the jobs that food, agriculture and forestry employers must fill over the next decade along with priority workforce challenges. Findings included:
  - ▶ *Missouri must encourage new workers to consider careers in food, agriculture and forestry.*
  - ▶ *Food, agriculture and forestry employers compete for both skilled and less-skilled workers.*
  - ▶ *Maintaining a competitive workforce requires continued training and education.*
  - ▶ *Greater use of automation and technology can alter workforce needs.*

By May 2020, Missouri  
SBDC for Agriculture,  
Food and Forestry  
had assisted

250 clients





### BOLD GOAL, BOLD FUTURE

**University of Missouri Extension's bold goal for a bold future takes the old adage "go big or go home" to another level.** What is the bold goal? Double the value of Missouri agriculture by 2030 while sustaining the state's natural resources.

"With agriculture already being Missouri's No. 1 industry, you might think there's no way we can double its value," said Rob Kallenbach, associate dean for Extension in the MU College of Agriculture, Food and Natural Resources (CAFNR). "But we can. Missouri agriculture has so much untapped potential, especially in new and value-added products and processing."

Not only does expanding Missouri's agricultural economy create more jobs, it strengthens small businesses, diversifies local communities, introduces new products and reduces food insecurity within the state, Kallenbach explained.

MU Extension and partners have begun to lay a foundation for achieving this "moonshot" goal. Some examples:

- ▶ Food, Beverage and Forest Product Manufacturing Initiative – Enhances value-added processing for Missouri commodities and expands food value chains on a regional and local level.
- ▶ Missouri Small Business Development Center for Agriculture, Food and Forestry – Assists farmers and agricultural business owners with strengthening established operations or developing new businesses.
- ▶ Show-Me-Cattle Feeders school – Teaches producers how to profitably finish more beef in state. The program leverages MU Extension's long-standing efforts from the Show-Me-Select Replacement Heifer program and Missouri Grazing Schools.
- ▶ Woodland Steward program supported by a public/private partnership dedicated to building and sustaining Missouri's \$11 billion forest industry.
- ▶ Pearls-of-Production conference – Offers leadership opportunities and hands-on training for women in agriculture.
- ▶ Integrated animal and crop production teams exploring digital technologies, advanced monitoring and real-world decision support.

"I think it's important to remind folks that registering for a course, calling a local county office for advice or signing up for services can greatly impact our progress toward our bold goal," Kallenbach said. "Together we're creating a stronger tomorrow for ourselves, our neighbors, our state and the agriculture industry."

Create  
Life-Long Learning  
Opportunities that  
Build Missouri's  
Agricultural  
Economy and  
Sustain its Natural  
Resources

### PERFORMANCE MEASURE:

IMPROVE THE NATURAL RESOURCES STATE RANKING BY FIVE SPOTS (NATURAL RESOURCES INVENTORY FOR USDA)

Currently ranked 3rd to last in latest (2012) Natural Resource State Ranking for erosion rate on cultivated cropland (good indicator of environmental management, beyond just soil erosion).

### ACTION ITEMS:

- ▶ Emphasized no-till in Missouri since the 1980s to prevent soil damage/further damage to the soil. Decreased Missouri soil erosion by nearly 50% since that time.
- ▶ Partner with the Missouri Department of Natural Resources, providing science that guides soil practices across the state.

Contribute to a Healthier Missouri by Sharing Science and Discoveries with our Communities

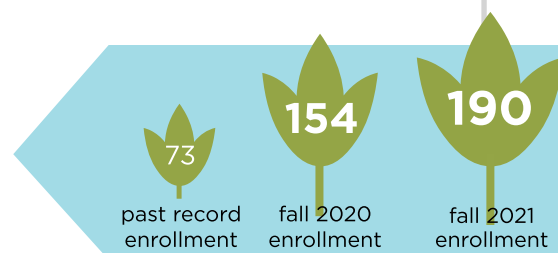
PIVOTS DUE TO COVID-19

### PERFORMANCE MEASURE:

INCREASE THE NUMBER OF PRODUCERS ENGAGED AT TRADITIONAL AND NON-TRADITIONAL FIELD DAYS AND WORKSHOPS BY 25%

#### ACTION ITEMS:

- ▶ Created rapid response teams and pivoted from in-person services to online learning and assistance to keep Missourians safe during the COVID-19 pandemic.
- ▶ Provided mail-in option for Pesticide Applicator Training — an example of accommodations made in areas where broadband access is a concern.
- ▶ Pivoted to online field days to reach individuals during a time of health precautions and travel restrictions.
- ▶ **Posted record enrollment in online and in-person Master Gardener and Master Naturalist programs. More than 2,800 active volunteers serve communities and landscapes across Missouri through these MU Extension programs.**
- ▶ Created Rural Vaccination Action Group to promote COVID-19 and flu precautions.
- ▶ Created MU Huerta Sostenible Familiar: MU Sembrador, one of the first all-Spanish horticulture webinar series offered to Spanish-speaking Missourians.
- ▶ Established MU Extension Translations Committee devoted to translating courses, website information and publications to languages spoken by Missourians across the state.



### PERFORMANCE MEASURE:

IMPROVE MISSOURI'S HEALTH RANKING FROM 40 TO 35 (UNITED HEALTH FOUNDATION RANKINGS)



### PERFORMANCE MEASURE:

ATTAIN A TOP 5 U.S. RANKING OF MEDIA PRESENCE FOR CAFNR PROGRAMS

#### ACTION ITEMS:

- ▶ Building a media monitoring dashboard to measure how CAFNR compares with peer programs.

## EMPOWERING MISSOURIANS

(continued)



### GOING VIRTUAL, STAYING CONNECTED

**From August to October, the University of Missouri College of Agriculture, Food and Natural Resources (CAFNR) Agricultural Research Centers showcase research projects and share demonstrations during its field day season.**

The COVID-19 pandemic forced the Research Centers to reevaluate how they would proceed with their in-person field day events. After discussions with advisory boards and health officials, the decision was made to host the 2020 field days virtually.

“Our field days bring research-based information to our stakeholders, which is a major part of our mission. The face-to-face interaction is a key focus and everyone enjoys the social atmosphere, the food and fellowship. So, this was an extremely tough decision,” said Shibu Jose, associate dean in the CAFNR Office of Research. “It was a decision, though, that we made with safety in mind.”

The Research Centers, which are spread throughout the state, decided to keep their virtual field day on the same day as in-person event – and post prerecorded video presentations on their respective Facebook pages and websites.

“It was teamwork at its best,” Jose said. “The superintendents and their staff, the speakers and the CAFNR communications team worked together to make the virtual field days a reality. This was an exciting opportunity, as we were able to feature some speakers who don’t normally attend our in-person events because of busy schedules or previous engagements.”

The virtual events also allowed a few Research Centers to connect with their audience in a new way, as well as get more Research Centers involved, Jose said. Altogether, video views of the virtual field days totaled 12,500 via YouTube and Facebook.

## A GRAND CELEBRATION

**The University of Missouri's College of Agriculture, Food and Natural Resources (CAFNR) celebrated the grand opening of the new Land of the Osages Research Center on Tuesday, Oct. 29, 2019.**

The center will further research in agroforestry, a sustainability-focused system that combines trees and shrubs with crops — and sometimes livestock — to be managed on the same piece of land as a single ecosystem.

Land of the Osages will be part of a network of centers throughout the state known collectively as the Agricultural Experiment Station (AES), and it is the first such center to open in more than 30 years. The grand opening featured an opening ceremony that paid tribute to the center's partnership with the Osage Nation. Chief Standing Bear and other representatives of the Osage Nation spoke at the opening ceremonies.

"CAFNR is so proud to be opening the Land of the Osages Research Center," said Christopher Daubert, vice chancellor and dean of CAFNR. "This center is funded by a donor's estate gift, and he wished to build a partnership between the Osage Nation and agroforestry, which is something CAFNR is thrilled to continue."

The more than 500 acres that make up the center were an estate gift from Doug Allen, who established MU's H.E. Garrett Endowed Chair Professorship in 2006 and passed away in 2017.

Future plans for the site include demonstration trials, internship opportunities and workshops to train local communities in agroforestry practices, all made possible through an endowment created by Allen. Along with educational kiosks to reflect on Osage Nation history, plans also include collaboration with the Osage Nation to develop research and training opportunities focusing on traditional ecological knowledge and its potential applications in modern agroforestry.





# SHOWCASING OUR Leadersh

## GOALS:

Enhance Visibility while Gaining Recognition as a National Leader in Agriculture, Food and Natural Resources

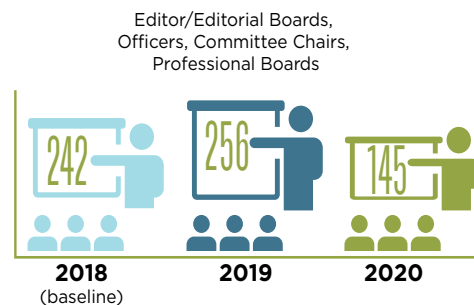
Build Greater Awareness of and Participation in CAFNR's Programs of Distinction and Grand Ideas and Effectively Communicate the Impact of these Initiatives

Develop Future Leaders for Agriculture, Food Systems and Natural Resources

Enhance  
Visibility  
while Gaining  
Recognition  
as a National  
Leader in  
Agriculture,  
Food and  
Natural  
Resources

#### PERFORMANCE MEASURE:

DOUBLE THE  
NUMBER OF FACULTY  
ENGAGEMENTS IN  
NATIONAL AND  
INTERNATIONAL  
LEADERSHIP ROLES

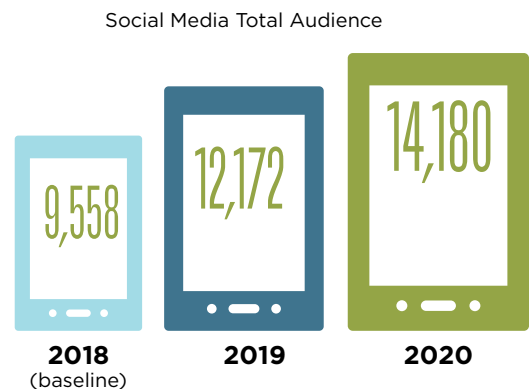


#### PERFORMANCE MEASURE:

DOUBLE THE REACH AND  
VIEWS OF CAFNR'S  
PRESENCE ON SOCIAL MEDIA

##### ACTION ITEMS:

- ▶ Launched a LinkedIn page for CAFNR to showcase research expertise and awards/honors among colleagues/peers in Winter 2021; followers are growing by an average of 100/month.
- ▶ Introduced a Student Success section of the website to promote student achievements and honors.



## SHOWCASING OUR LEADERSHIP

(continued)



**Thomas Spencer**, a Curators Distinguished Professor in the Division of Animal Sciences in the College of Agriculture, Food and Natural Resources (CAFNR) and vice chancellor for research and economic development at Mizzou, was elected in spring 2019 as a member of the National Academy of Sciences (NAS). Election to membership in the NAS is considered one of the highest honors a U.S. scientist can receive. Spencer and his lab study the development and function of the uterus and placenta. Spencer is the 10th University of Missouri professor to join the academy's ranks.



**Felix Fritschi**, C. Alice Donaldson Professor in Bioenergy Crop Physiology and Genetics in the Division of Plant Science and Technology, was named a 2020 Fellow of the American Society of Agronomy (ASA). Fellow is the highest recognition bestowed by the ASA – up to 0.3% of the society's active and emeritus members may be elected. Fritschi is also a Fellow of the Crop Science Society of America, for which he was elected in 2018.



**Shibu Jose**, associate dean in the CAFNR Office of Research, was named a 2020 Fellow of the American Association for the Advancement of Science (AAAS). Jose was named a Fellow “for distinguished contributions to agroforestry science, particularly in studying interspecific interactions for resources that define sustainability and ecosystem services of these integrated production systems.”

# RECI

Build Greater Awareness of and Participation in CAFNR's Programs of Distinction and Grand Ideas and Effectively Communicate the Impact of these Initiatives

### PERFORMANCE MEASURE:

DOUBLE THE NUMBER OF CAFNR'S PROGRAMS OF DISTINCTION

### ACTION ITEMS:

- ▶ Created research marketing videos focusing on the importance and success of our Programs of Distinction.
- ▶ Providing assistance to help other programs achieve Program of Distinction status.





In 2020, **Christopher Daubert**, vice chancellor and dean of the College of Agriculture, Food and Natural Resources, was named to the Missouri Food, Feed, Fiber, Fuel and Forest (MO-5) Consortium Leadership Circle by Missouri Lt. Gov. Mike Kehoe, to the board of trustees for the Council for Agricultural Science and Technology (CAST) and to the Institute of Food Technologists (IFT) Board of Directors.



**John Tummons**, assistant teaching professor and director of undergraduate studies for agricultural education and leadership, received the teaching and student engagement (TSE) United States Department of Agriculture (USDA) Food and Agriculture Sciences Excellence in Teaching Award in fall 2019. Seven CAFNR professors have been honored with this national award.



**Alba Argerich**, assistant professor in the School of Natural Resources, received the 2021 Provost's Outstanding Junior Faculty Teaching Award. This award recognizes junior faculty for superior teaching and advising on the MU campus. Argerich is an aquatic scientist interested in understanding the effects of land use on water quality and ecosystem integrity using experimental and modeling approaches.

# STUDENT ACCOLADES

Develop Future Leaders for Agriculture, Food Systems and Natural Resources

## PERFORMANCE MEASURE:

DOUBLE THE NUMBER OF STUDENTS ENGAGED IN NEW AND EXISTING CAFNR LEADERSHIP PROGRAMS

## ACTION ITEMS:

- ▶ Researchers in our Ag Education and Leadership program are tracking leadership competencies, attitudes and beliefs among CAFNR students as part of an ongoing study.
- ▶ A national portrait of leadership coursework by researchers in our Ag Education and Leadership program found CAFNR's program to be well rounded and forward thinking.

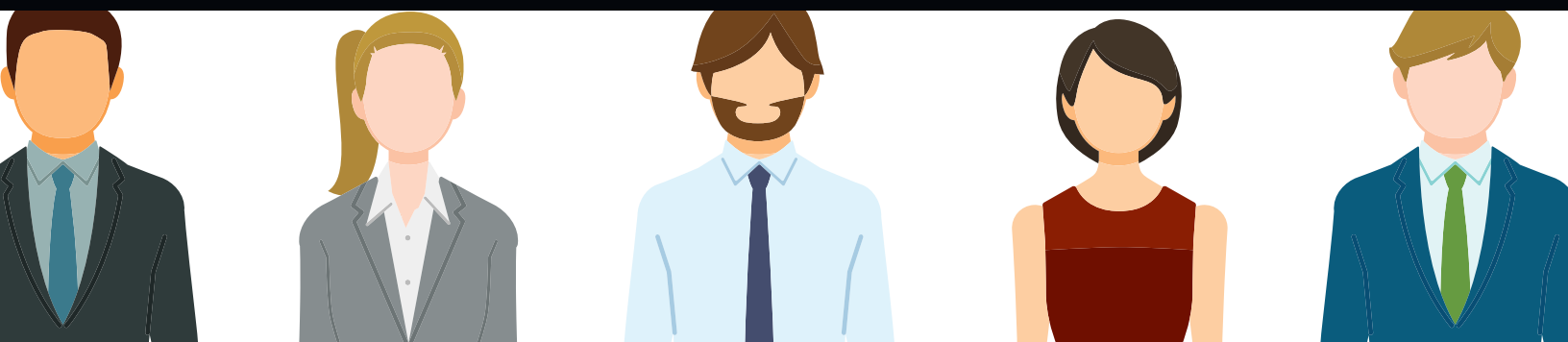


State FFA officers enrolled in CAFNR:

<b>2018-19</b>	<b>12</b> (of 16)
<b>2019-20</b>	<b>8</b> (of 16)
<b>2020-21</b>	<b>8</b> (of 16)
<b>2021-22</b>	<b>13</b> (of 16)



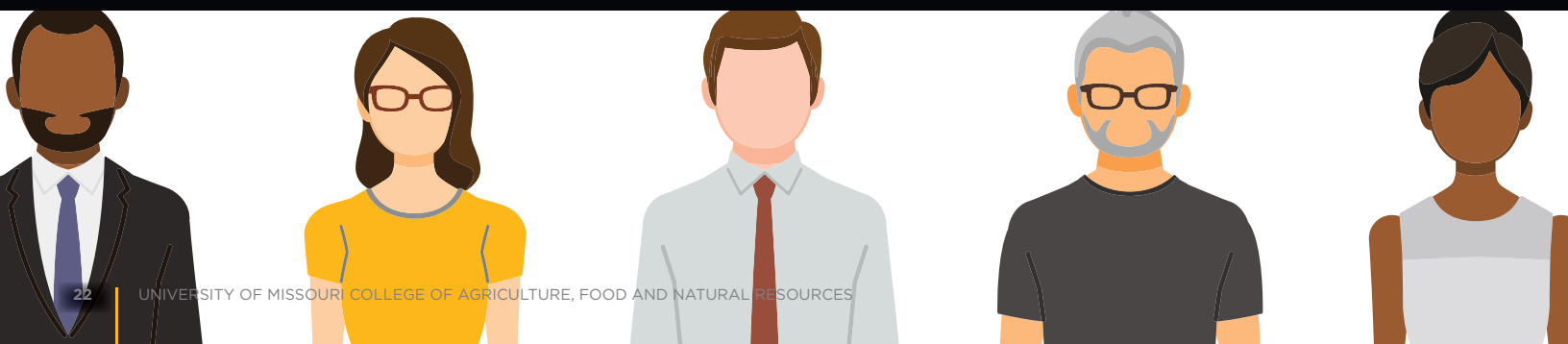
**CULTIVATING A**



**DIVERSE AND**



**INCLUSIVE COMMUNITY**



# GOALS:

Establish a Culture of Acceptance and Inclusivity Among Everyone in the CAFNR Community

Recruit and Retain a Diverse and Inclusive Student Body

Cultivate a More Diverse Faculty, Staff and Administration



Establish a Culture of Acceptance and Inclusivity Among Everyone in the CAFNR Community

## **PERFORMANCE MEASURE:**

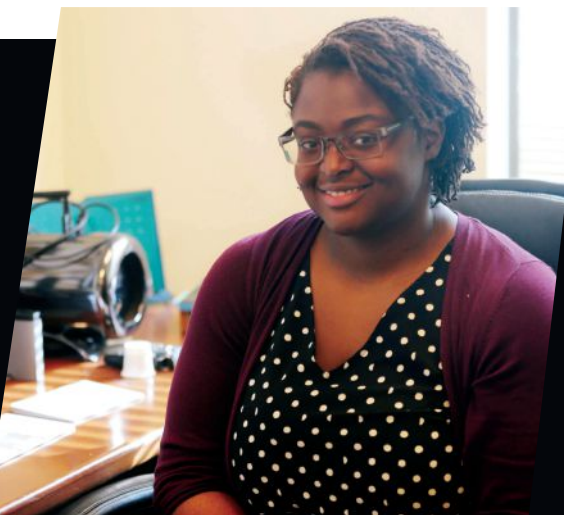
DOUBLE THE NUMBER OF OPPORTUNITIES FOR CAFNR COMMUNITY TO ENGAGE IN DIVERSITY AND INCLUSIVITY EVENTS AND ACTIVITIES

## ACTION ITEMS:

- ▶ Developed a student peer mentoring program, COMPASS, for first-year, underrepresented minority students to engage with current students.
- ▶ Promoted CAFNR Connections, an opportunity for students of color in CAFNR to convene.
- ▶ Assisting student clubs and organizations that foster the ideals of Inclusivity, Diversity, Equity and Compassion (IDEC) by providing financial support for professional development programs, educational programs and/or promotional events, leadership development programs, honorariums and travel for speakers/educators, and travel to conferences.

## CULTIVATING A DIVERSE AND INCLUSIVE COMMUNITY

(continued)



### BECOMING A MORE INCLUSIVE COLLEGE

**Samniqueka Halsey** has always had a passion for establishing and building a culture of acceptance, equity and inclusivity.

That passion made her the perfect fit as the first CAFNR Faculty Fellow for Inclusivity, Diversity and Equity.

Halsey joined CAFNR in 2019 as an assistant professor in the School of Natural Resources, joining Mizzou from the Illinois Natural History Survey/Prairie Research Institute, where she served as a postdoctoral associate. She earned her bachelor's degree from Northeastern Illinois University; her master's degree from Chicago State University; and her PhD from the University of Illinois Urbana-Champaign.

Halsey's research interests include computational ecology, long-term data sets, geographic information systems and remote sensing, biodiversity conservation, and emerging wildlife diseases. She uses computational approaches to understand the mechanisms involved in the patterns we see in nature. Most of her work involves using modeling approaches to delineate how spatial and temporal changes in ecological interactions influence a focal species.

Recruit and Retain a Diverse and Inclusive Student Body

#### PERFORMANCE MEASURE:

INCREASE ETHNIC/MINORITY ENROLLMENT REPRESENTATION TO REFLECT STATE DEMOGRAPHICS

#### Underrepresented Minority Students



#### ACTION ITEMS:

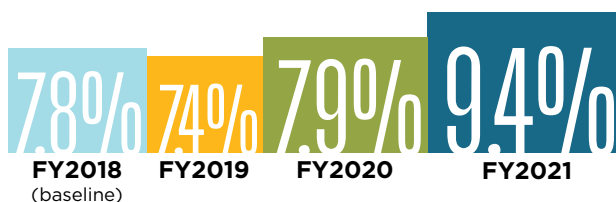
- ▶ Updated division performance scorecards to reflect minority student representation.
- ▶ Pursuing new recruitment opportunities in urban/suburban centers, reflecting the state's population.

Cultivate a More Diverse Faculty, Staff and Administration

#### PERFORMANCE MEASURE:

DOUBLE DIVERSITY REPRESENTATION ACROSS FACULTY, STAFF AND ADMINISTRATION

#### Underrepresented Minority Faculty/Staff



#### ACTION ITEMS:

- ▶ Piloted a program for all faculty in SNR to complete 4-week diversity course.
- ▶ Requiring faculty applicants to provide diversity statement.

As the Faculty Fellow for Inclusivity, Diversity and Equity, Halsey develops and implements strategies to help CAFNR become a more compassionate, diverse, inclusive and equitable community for all students, faculty, and staff across the college. She also keeps CAFNR closely engaged with the MU Division of Inclusion, Diversity and Equity, and chairs CAFNR's Inclusivity and Diversity Committee (CIDC).

"I'm not trying to change the world in one day," Halsey said. "I believe in progress, not perfection. Like a weightlifter, I want to use steady progress to get stronger each day."

"People underestimate the power of seeing someone who looks like them in a position of power," Halsey said. "I recently had a student come up to me and thank me for being a professor because she had never had a Black professor before. I know how

“  
People underestimate the  
power of seeing someone  
who looks like them in a  
position of power.  
”

powerful it is to see someone who looks like you doing something at such a high level. I'm excited for this role and to help CAFNR become a more inclusive college."

#### **COMPASS (CAFNR'S OPPORTUNITY FOR MINORITIES: PROMOTING AND ACHIEVING STUDENT SUCCESS),**

a peer-mentoring group to promote academic success, persistence and successful graduation of participating students, was launched in CAFNR during the Fall 2020 semester.

The program runs for eight weeks during the beginning of each fall semester, with a three-to-five-hour weekly commitment for the student participants. In fall 2020, the entire program was done virtually due to the COVID-19 pandemic.

"The focus of the program is to help incoming underrepresented minority students build a network with existing underrepresented minority students to learn more about academics, social life and off-campus resources," said Samniqueka Halsey, CAFNR's Faculty Fellow for Inclusivity, Diversity and Equity and assistant professor in the School of Natural Resources.

COMPASS offers underrepresented students in CAFNR various opportunities, through activities, workshops and presentations, as well as the chance to connect with other underrepresented students.

The hope is that mentees in the program build self-esteem and enhance their self-motivation, self-discipline and goal setting.

"Transitioning to life at Mizzou can be confusing and challenging for many students," Halsey said. "We aim to provide mentees with the support they may need to adjust to life within CAFNR and MU. By engaging in meaningful interactions with a positive mentor, you can sustain your motivation and increase your academic performance."

Mentors in the program develop leadership skills and community-building skills.

"Mentoring consists of focused and selected activities that seek to enhance and enrich students' opportunities to persist at Mizzou, to be academically successful and career ready upon graduation," Halsey said. "As a mentor, we will pair you with incoming students, giving you the opportunity to listen, understand and encourage students to use all resources available to achieve academic success. You will function as coaches, friends and, most of all, as positive role models."

# CHAMPIONING Global Citizenship & ENGAGEMENT





# GOALS:

Empower CAFNR to Engage Globally

Spearhead Collaborative Education and Training Programs with Communities Around the World

Engage with Partners Around the World on Global Issues and Challenges

## CHAMPIONING GLOBAL CITIZENSHIP AND ENGAGEMENT

(continued)

Empower  
CAFNR to  
Engage  
Globally

### PERFORMANCE MEASURE:

INCREASE INTERNATIONAL ENGAGEMENT LEARNING OPPORTUNITIES FOR STUDENTS BY 10% PER YEAR

#### ACTION ITEMS:

- ▶ Added five collaborative research projects between MU and the University of the Western Cape and the University of KwaZulu-Natal. This doubled the number of CAFNR faculty and students who will engage in this international learning opportunity.
- ▶ Enabled scholarship funding for students to attend the World Food Prize annually.
- ▶ Provided administrative and programming leadership for both Africa Hub and the Deaton Scholars Program, which engaged approximately 200 MU students in learning activities in international engagement each year.

2019 (baseline)	2020*	2021
4	1	5

Students participating in study abroad, Deaton Scholars and Africa Hub, per academic year

2018-19 (baseline)	2019-20*	2020-21*
380	230	100

\*COVID-19 had a negative impact on 2020 metrics

Spearhead  
Collaborative  
Education  
and Training  
Programs with  
Communities  
Around the  
World

### PERFORMANCE MEASURE:

DOUBLE CAFNR'S GLOBAL EDUCATION AND TRAINING PROGRAMS PORTFOLIO

- Leading **two global projects** for Sanitary/Phytosanitary Capacity Building and Trade Facilitation in East and West Africa, as well as Food Safety Improvement for West Africa and Harmonization of Maximum Residue Levels for the African continent.
- Teamed with the Strategic Communications Office of the School of Journalism and the College of Education Information Experience Laboratory to provide **multiple education and training programs** for food safety regulators and policy makers in China and the African continent.



### PERFORMANCE MEASURE:

INCREASE SUBMISSIONS OF COLLABORATIVE INTERNATIONAL EDUCATION AND RESEARCH GRANT PROPOSALS BY 10% PER YEAR

- From 2018-2020, CAFNR International Programs has obtained grant funding totaling \$6.1 million, with a 20% increase in funding from 2019 to 2020.

Awards by start date, per calendar year		
2018 (baseline)	2019	2020
\$1,234,345	\$2,192,327	\$2,714,819

- Proposal success has been increasing since the 2018 baseline year.

CAFNR International Program's grant success rate	67%	79%	74%
	16 of 24 in 2018	15 of 19 in 2019	14 of 19 in 2020
	(baseline)		

- In 2020, CIP engaged the faculty to participate in preproposals for Cochran and Scientific Exchange Fellows.

Borlaug, Cochran and Scientific Exchange Fellows				
2018 (baseline)	2019	2020	2021	2022
5	4	3	0	20

## ENGAGING INTERNATIONALLY

**The University of Missouri College of Agriculture, Food and Natural Resources (CAFNR) International Programs (CIP) team provides technical assistance to international partners and facilitates global engagement for faculty and students across the college.**

Recently, CIP developed an International Engagement Program, with a focus on connecting international graduate students with their peers.

“Everybody in the CAFNR International Programs office understands what it is like to be away from family and to be in a new or strange environment, so we wanted to make sure that all of our international graduate students were getting the support they needed to feel like their time at MU was a highlight of their lives and something they could remember fondly,” said Kerry Clark, CIP director and assistant research professor of rural sociology. “Many of those students already mentor each other within academic programs, but the International Engagement Program will also give them opportunities to meet students outside of their own disciplines or nationalities, thus enriching everyone with new ideas, viewpoints and experiences.”

Clark said outings that allow students to get to know each other on a more personal level are very important.

Lindsey Saunders, projects manager for CIP, added that many CAFNR international students don’t always have a local support system in place. It can be even tougher for graduate students, who are generally busy with their research projects as they work toward their degree. The hope is that the group will help connect students and give them that support system.

Miguel Salceda, a graduate student in the School of Natural Resources, said that learning more about other cultures is a key part of the graduate student experience.

“As a graduate student, our lives can become intensely focused on getting work done to get the desired degree, which causes stress and limits the international experiences in the United States,” he said. “Also, life is complex and requires several factors to be fulfilled to get to the state called ‘happiness.’ Having the opportunity to chat and know other graduate students is great because it opens your mind to different cultures and beliefs. Besides, participating in extra-curricular activities contributes to our physical and spiritual health. I consider this group an excellent initiative, and I am glad Dr. Clark is doing it!”

Engage with  
Partners  
Around the  
World on  
Global Issues  
and Challenges

### PERFORMANCE MEASURE:

GROW EXTRAMURAL FUNDING TO A LEVEL THAT ENSURES CAFNR INTERNATIONAL PROGRAMS (CIP) IS SELF-SUSTAINING

### ACTION ITEMS:

- ▶ Led discussion for research and education collaborations with universities in Iraq, Morocco and Nigeria, as well as engaging with partners in Senegal and Kenya on development of food safety labs.
- ▶ Continuing to lead the University of Missouri Assistance Program (UMAP), an international NGO registered in Ghana.
- ▶ Collaborating with the University of Saskatchewan on the TEDMAG project, which is increasing business orientation of Extension in Ghana.
- ▶ Partnered with the University of Nebraska and North Carolina State University and promoted the consortium capacity with two major USAID contractors.
- ▶ Signed partnership with China Agricultural University to form “MU-CAU Joint Center for Water, Plants and the Environment.”

CIP salary budgeted from grants and projects





# Programs of DISTINCTION



## FOOD AND AGRICULTURAL POLICY RESEARCH INSTITUTE

The Food and Agricultural Policy Research Institute (FAPRI) provides analysis of issues related to agricultural markets and policies to Congress, other public and private decision makers, other scientists and the general public. In the spring of 2020, this included prospective analysis of how the coronavirus pandemic might affect agricultural commodity markets and farm income. This analysis and subsequent updates informed policy makers as they weighed federal assistance to the sector, as well as providing information useful to farmers, lenders and other stakeholders.

**Current Grant Funding:**

**\$3.5 MILLION**

FAPRI analysts also looked at a wide range of other issues in 2020, including the impacts of the Phase 1 trade agreement between the United States and China, the implications of Brexit for agricultural markets, the consequences of biofuel policy options, and the impact of federal ad hoc support measures on farm finances. FAPRI researchers were cited by national and international media such as the New York Times, Wall Street Journal, VICE News, and the Financial Times as well as farm and local media.



*FAPRI Associate Director Seth Meyer was selected to serve as USDA's Chief Economist. Dr. Meyer will be on extended research leave from MU to serve at USDA.*

- 6 publications in refereed journals and 23 other publications
- 50 presentations to a wide range of audiences
- International work included collaborative research related to agricultural markets and policies with researchers in Ireland, the United Kingdom, South Africa and at the Organization for Economic Cooperation and Development (OECD) in Paris

## INTERDISCIPLINARY PLANT GROUP

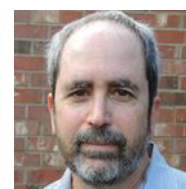
The Interdisciplinary Plant Group (IPG) is a community of MU faculty, students, postdoctoral fellows and professionals pursuing novel, creative and transformative ideas in the field of plant biology. It comprises 53 faculty-led teams (plus 13 emeritus members) from multiple units, colleges and the USDA. Several new members have joined recently, expanding the interdisciplinary interests of the group. In 2021 the group celebrates its 40th anniversary.

**Current Grant Funding:**

**\$17.8 MILLION**

*Three IPG faculty were included in the "Web of Science" Highly Cited Researchers list for 2021: (Top to bottom at right) Ron Mittler, Bing Yang and Shuqun Zhang.*

- Hosted the "11th Symposium of the International Society for Root Research," May 24-28, 2021. Bob Sharp was chair of Organizing Committee and Felix Fritsch served as chair of the International Program Committee. The symposium included more than 700 participants from 52 countries
- International engagement in South Africa, China, Brazil, Belgium and South Korea
- The IPG's 36th annual symposium, "Plant Signaling in Biotic and Abiotic Stress," produced a Special Issue of the Journal of Experimental Biology (Scott Peck and Ron Mittler, Editors)
- In 2020, IPG faculty received 5 national/international awards and 9 from MU, the UM System and CAFNR



## PROGRAMS OF DISTINCTION

(continued)

### INTERDISCIPLINARY REPRODUCTION AND HEALTH GROUP

Challenges to efficient reproduction occur in all species and are prevalent in farm animals, humans and endangered species in the wild. In agriculture, reproductive efficiency is the most important factor affecting farm profitability. The IRHG addresses grand challenges in science and society, contributes to economic development of Missouri and the nation, and aligns with CAFNR's strategic plan. Focus areas of research and training in the IRHG are integrative, multidisciplinary, and encompass domestic animals, humans, laboratory animals, aquatic species and wildlife. Areas of expertise

**Current Grant Funding:**

**\$18.4 MILLION**

include applied reproduction, assisted reproduction techniques, contraception, developmental biology, endocrinology, epigenetics, genomics, gamete biology, genetic engineering, gonadal function, pregnancy, stem-cell biology, systems biology, and toxicology.

*R. Michael Roberts (top) and Thomas Spencer (bottom), are Distinguished Fellows, Society for the Study of Reproduction.*



- Approximately 60 faculty members located primarily in CAFNR Animal Sciences, the College of Veterinary Medicine, and the School of Medicine (OB-GYN)
- 69 research publications in 2020

### MU FORAGE-LIVESTOCK GROUP

The group works to increase scientific discovery, dissemination and application of science in forage-livestock agriculture. The interdisciplinary programs include management-intensive grazing, fescue toxicosis, winter feeding systems, animal nutritional management, precision grazing and dairy grazing systems. The most documented impact from Forage-Livestock Group is from the Missouri Grazing Schools. Each year, these schools increase the state economy by \$125 million.

**Current Grant Funding:**

**\$2 MILLION**

*Team member Craig Payne is the current president of the Academy of Veterinary Consultants.*



- 20 peer-reviewed journals; 3 book chapters
- 59 presentations
- 4 national honors for faculty, staff and students
- International engagement in Cambodia and Sierra Leone

### MU LIVESTOCK ENGINEERING TEAM

The program continues to receive national and international attention. Genetically modified animals continue to impact both preclinical medicine by the development of new models to develop treatments and therapies for human disease, and agriculture by developing models to study physiology and prevent diseases (mainly pigs). The MULE Team continues to acquire significant resources (shared by only five faculty members) to meet these goals. The British Broadcasting Corporation visited in February 2021 for a story about PRRSV-resistant pigs.

**Current Grant Funding:**

**OVER \$30 MILLION**



*Randy Prather was part of the international organizing committee for the 11th International Conference on Pig Reproduction and Swine in Biomedical Research.*

- 27 journal papers
- 1 US patent; 2 patent applications
- 6 presentations
- 6 national graduate student honors
- International engagement in South Korea and Chile



The Show-Me-Select® Replacement Heifer Program is an on-farm beef heifer development and marketing program supported by beef cattle Extension faculty in the Division of Animal Sciences. Show-Me-Select exemplifies the “benchtop to barnyard” success of our Division of Animal Sciences in linking fundamental basic science with translational research and Extension efforts.

## SHOW-ME-SELECT REPLACEMENT HEIFER PROGRAM

**Current Grant Funding:**

**\$4.1 MILLION**

The Show-Me-Select program

continued to make new and exciting strides in producer education and technology transfer in 2020, including requiring the use of genomic technologies for sire selection, increases in the adoption of advance productive technologies like artificial insemination and continued increases in the use of ultrasound for pregnancy determination.



*Dave Patterson was named American Society of Animal Science Extension Fellow.*

- **4 publications; 5 presentations**
- **4,390 heifers enrolled in the program (2% increase from 2019)**
- **1,698 heifers marketed through official sanctioned sales (13% increase from 2019)**
- **\$3,250,405 in gross sales of heifers marketed through sanctioned sales (21% increase from 2019)**
- **> \$20,000 in revenue generation from enrollment and tagging fees (now in direct support of MU Extension Regional Livestock Field Specialist salaries)**
- **New region added to the program (Central Missouri) with a first-time sanctioned sale held successfully in Vienna, Missouri**

## PROGRAMS OF DISTINCTION

(continued)

### UNIVERSITY OF MISSOURI CENTER FOR AGROFORESTRY

#### Current Grant Funding:

**\$9.1 MILLION**

Despite the challenges of dealing with the COVID-19 pandemic in 2020, the University of Missouri Center for Agroforestry (UMCA) experienced another year of strong growth across all mission areas of research, teaching, outreach and economic development. The outreach efforts have navigated effectively to virtual formats, with the launching of a new YouTube Channel (Mizzou Agroforestry) for sharing field days, workshops and webinars. UMCA remains highly committed to IDEC as evidenced by the development of a new course first offered in Fall 2020, "Diversity, Equity, and Inclusion in Agroforestry," and by the continued partnership with the Osage Nation that most recently involved the design of a new community orchard established through CARES funding. UMCA's total grant funding is from the seven core faculty across all active projects.



*Chung-Ho Lin was elected to the rank of Senior Member of the National Academy of Inventors (NAI).*

- **53 publications (averaging 8 per FTE)**
- **12 presentations**
- **Faculty offer courses for the online Agroforestry MS (18 students currently) and Certificate (9 students), many of whom are international students**
- **International work included hosting visiting scholar from Brazil and plans to co-host (with Laval University) the World Congress on Agroforestry in Quebec City in 2022**



### A DIRTY JOB: ANALYZING WASTEWATER TO UNDERSTAND THE SPREAD OF COVID-19

In summer 2020, two University of Missouri professors, Marc Johnson (pictured at right) and Chung-Ho Lin (pictured bottom left), started detecting remnants of the virus that causes COVID-19 in samples of wastewater collected across Missouri. Now, even with the introduction of the COVID-19 vaccines, they predict they'll still be searching for SARS-CoV-2 in Missouri wastewater in the years to come.



Johnson is a professor of molecular microbiology and immunology at the School of Medicine and investigator in the Christopher S. Bond Life Sciences Center. Lin is a research associate professor and lead scientist in the bioremediation program at the MU Center for Agroforestry in the College of Agriculture, Food and Natural Resources (CAFNR).

Johnson and Lin had never worked together on a project until a leader from the Missouri Department of Health and Senior Services, or Missouri DHSS, called Johnson early on in the COVID-19 pandemic. The state wanted to see if anyone at MU could help them analyze samples of wastewater from across the state of Missouri for the presence of SARS-CoV-2, or the novel coronavirus, in places where people are connected to a centralized wastewater treatment system.

After he was approached, Johnson sent an email to about 10 other MU scientists in search of collaborators who had the expertise to analyze wastewater samples. The next day, he organized a video conference call with those who responded. Also on that call was Lin, who eagerly offered to dedicate his lab to the research effort. Lin had been analyzing wastewater for a couple of years, but he had never worked with viruses before.

"It was a kind of an interesting adventure, and also challenging," Lin said.

Since May 2020, Johnson and Lin have provided valuable data for the Coronavirus Sewershed Surveillance Project, a partnership among MU, the Missouri DHSS, and the Missouri Department of Natural Resources. As of January 2021, they had tested more than 2,000 samples, and Johnson believes their findings indicate this type of testing can be useful as an early indicator of a rise in the numbers of COVID-19 cases in a community.

# GRAND IDEAS

Complementing the Programs of Distinction, CAFNR pursues Grand Ideas. These initiatives will focus on solving big societal problems and will bring distinction to CAFNR.

- ▶ Center for Genomics Reproduction and Health Innovation
- ▶ Healthy Ecosystems for Life on the Planet (HELP)
- ▶ Precision Foods for Health (PFH)
- ▶ Precision Models for Health (PMH)
- ▶ Show-Me-State Food, Beverage and Forest Products Manufacturing Initiative
- ▶ Smart Farms, Smart Agriculture: The Digital Age of Farming
- ▶ University of Missouri Institute for Plant Sciences (U-MIPS)

## SHOW-ME-STATE FOOD, BEVERAGE AND FOREST PRODUCTS MANUFACTURING INITIATIVE

Christopher Daubert, vice chancellor and dean of the College of Agriculture, Food and Natural Resources, has been named to the Missouri Food, Feed, Fiber, Fuel and Forest (MO-5) Consortium Leadership Circle by Missouri Lt. Gov. Mike Kehoe.

MO-5 is an initiative of the Show-Me-State Food, Beverage and Forest Products Manufacturing Task Force, established in 2019 with a focus on enhancing value-added processing in Missouri. Dean Daubert also served on the task force.

The vision for MO-5 is a hybrid public-private-university structure nimble enough to respond quickly to growth opportunities for existing Missouri agribusinesses, or attract new enterprises to the state. The consortium will consist of representatives of agriculture organizations, state agencies, academic institutions and private companies.

The MO-5 Leadership Circle will identify and develop a plan of action for each recommended area of focus, which includes identifying additional research needs, potential partners, legislative or regulatory hurdles and funding opportunities.

### CENTER FOR REGENERATIVE AGRICULTURE

The University of Missouri College of Agriculture, Food and Natural Resources (CAFNR) is going to dive deeper into regenerative agriculture by forming a new Center for Regenerative Agriculture.

While there is no single definition for regenerative agriculture, some key elements of the practice include increasing soil health and biodiversity, integrating a mix of conservation practices, and contributing to

overall sustainability and profitability on working farms and ranches.

“  
Regenerative  
agriculture has  
broad benefits  
for consumers,  
the environment  
and conservation.”

“We have been fortunate to obtain external funding to support the center, which will foster faculty and student collaboration across the entire college and will support key aspects of our strategic plan for CAFNR,” said CAFNR Vice Chancellor and Dean Christopher Daubert. “As with

other academic centers in CAFNR, this new center will create the opportunity to enhance our research, education and Extension impacts in agriculture and food systems, and create a focal point for efforts in the area of regenerative agriculture.”

An initial start-up grant to help the center get established and hire a program manager is coming from the Missouri Department of Conservation.

“This partnership provides an incredible opportunity to collaborate with agricultural producers in Missouri,”

said Missouri Department of Conservation Director Sara Parker Pauley. “Regenerative agriculture also has broad benefits for consumers, the environment and conservation, and helps our agricultural products stay competitive and a coveted commodity in markets where food produced through sustainable farming practices is preferred.”

Complementary funding on cover crops and soil health that supports work related to the center is coming from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), the Missouri Department of Natural Resources, the Walton Family Foundation, and the Foundation for Food and Agriculture Research.

Rob Myers, adjunct associate professor in the Division of Plant Science and Technology, will serve as the faculty director for the center. Kelly Wilson serves as assistant director, and Joe LaRose as Extension specialist.

Shibu Jose, associate dean in the CAFNR Office of Research, said the new center will support one of CAFNR’s Grand Ideas, **Healthy Ecosystems for Life on the Planet (HELP)**, identified in the CAFNR Strategic Plan.

“We are in the process of implementing our strategic plan and the new center is a major step forward in making one of the Grand Ideas, HELP, a reality,” Jose said. “Regenerative agriculture has become a major focal point for many people working in agriculture, including major food and agriculture companies. For example, Cargill recently announced a national goal of having 10 million acres of U.S. farmland using regenerative agriculture practices by 2030. Major food companies such as General Mills and Walmart Inc. have also been supporting regenerative agriculture as a priority for their efforts to address sustainability in their supply chains.”

Visit the center’s website at [cra.missouri.edu](http://cra.missouri.edu).

## SMART FARMS, SMART AGRICULTURE: THE DIGITAL AGE OF FARMING

The digital age of agriculture is here. Technologies like robotics, drones, sound-and-sight monitors, artificial intelligence, micro-meter global positioning, precision genetics, advanced weather systems, and big data analytics bring opportunity to rural Missouri. Opportunities enhance efficiency, improve product quality and conserve natural resources.

The farm-of-the-future rests on appropriate use of digital technologies. Despite the promises, many digital technologies need real-world — on-farm — verification. The technologies need to be proven for economic returns, utility and/or practicality. In short, somebody needs to test the gadgets, authenticate the data and make sure Missouri's farmers capture real value.

MU researchers and educators have the know-how and unbiased perspective to evaluate agricultural technology. As leaders in precision agriculture, MU wants to partner with other agencies, industry and farmers to foster agricultural technology development.

MU is uniquely positioned to lead the charge on smart-farm technology. The Missouri Agricultural Experiment Station and MU Extension have centers across Missouri, extending the college's research to more than 14,500 acres to meet the regional research and demonstration needs of agricultural producers



and natural resource managers. Furthermore, MU Extension educates Missourians in all 114 counties with research and hands-on training. Investments allow MU Extension specialists to bring innovative farm technology to Missourians as already well-trusted, reliable messengers.

Recent projects include:

- ▶ The Precision and Automated Agriculture Lab (PAAL) in the CAFNR Division of Plant Science and Technology studies yield estimation of soybean breeding lines under drought stress using unmanned aerial vehicle-based imagery and convolutional neural network.
- ▶ Researchers have been studying irrigation on the variable soils at the Fisher Delta Research, Extension and Education Center, with a focus during the past five years on variable-rate irrigation in cotton fields. Variable-rate technology, when related to irrigation, allows for the targeted application of water based on data that is collected by sensors, maps and GPS.

CAFNR administrators are working with legislators and the agriculture industry to leverage funding for assessment of technology, real-world technology demonstrations, technology trainings, mobile technology demonstrations, and addressing the issue of rural broadband.

“  
**MU is uniquely positioned  
to lead the charge on  
smart-farm technology.**  
”

# ON THE DRIVE

Biennial Report for the CAFNR Strategic Plan:  
Drive to Distinction  
2021



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MU: An equal opportunity/ADA institution.

