College of Engineering

2019 Fact Book

UNIVERSITY OF ARKANSAS

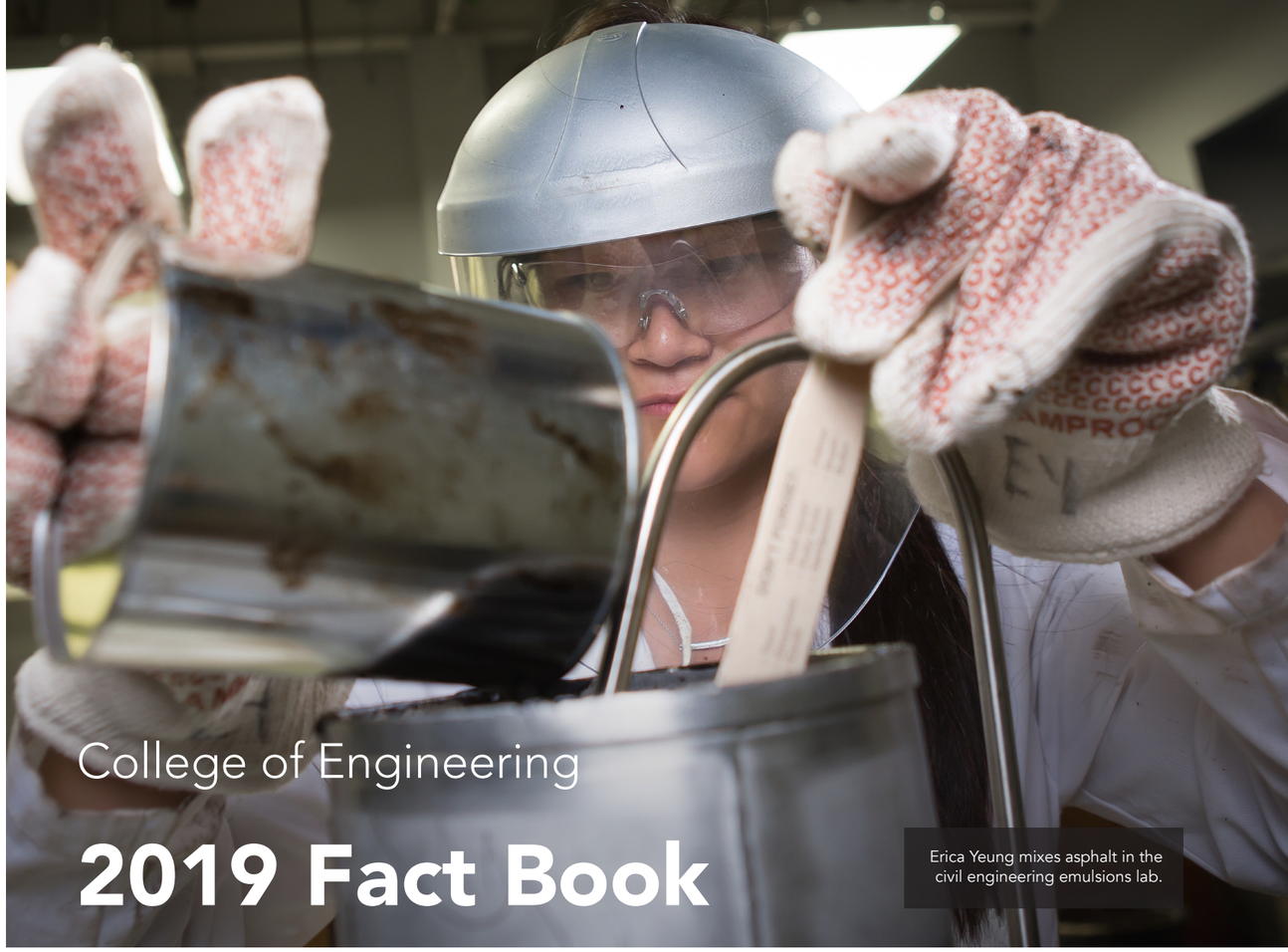
AS DEAN OF ENGINEERING, it is my pleasure to present the 2019 College of Engineering Fact Book. The pages ahead are filled with data presenting our progress on our strategic plan. It's been a record-setting year for our researchers, with new highs in expenditures, invention disclosures and patent activity. Our incoming class also has the highest average ACT score we've seen – 28.8. These are just a couple of highlights that suggest the future is bright for the College of Engineering and the state of Arkansas.

It's also important to remember each number on a graph represents a person's story, whether it's a student who is the first in their family to attend college, a faculty member receiving national recognition for a lifetime of work, or an alumnus who has chosen to give a transformative gift.

Keep that in mind as you look through the 2019 Fact Book, and I hope you'll be as inspired as I am by the thousands of people whose lives have been touched by the College of Engineering so far. I can't wait to see what comes next.

Warmly,

John English
Dean, College of Engineering
Irma F. and Raymond F. Giffels Endowed Chair in Engineering



College of Engineering

2019 Fact Book

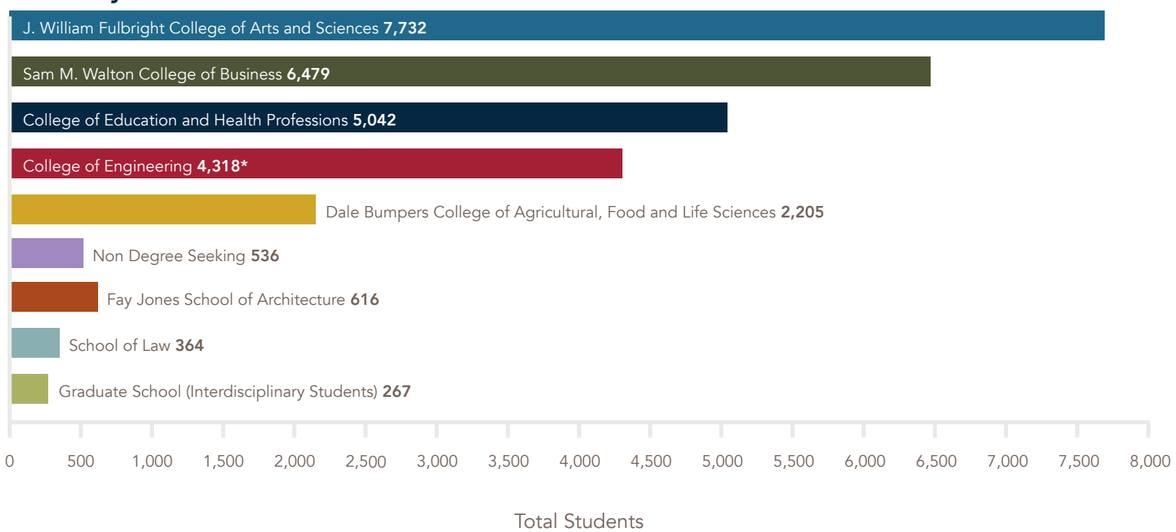
Erica Yeung mixes asphalt in the civil engineering emulsions lab.

Pictured on cover

Benjamin Runkle, assistant professor of biological and agricultural engineering, crosses a drainage ditch at Zero Grade Farms in Humnoke, Arkansas. Runkle and his research team of graduate and undergraduate students are working with farm owner Chris Isbell and his family to conduct research aimed at making rice production more sustainable in Arkansas and around the world.

University of Arkansas
Highlights

University of Arkansas Fall 2019 Enrollment

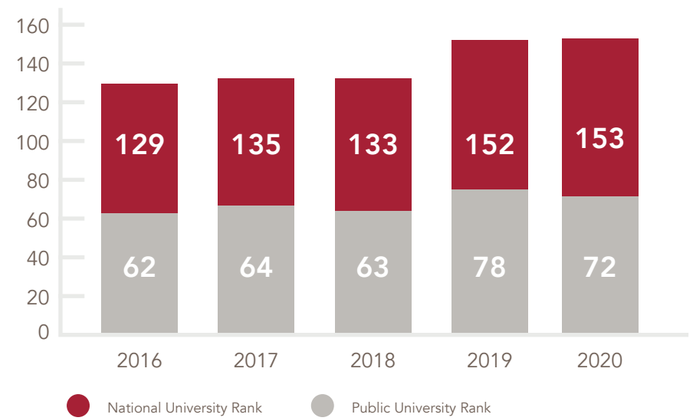


** Excludes interdisciplinary graduate students*

Fall 2019 Enrollment

23,025	4,170	364	27,559
Undergraduate	Graduate	Law	Total Enrollment

University of Arkansas Rankings*



**Source: U.S. News and World Report*

College of Engineering
Highlights

3,344
Undergraduate Students*

1,023
Graduate Students**

4,367
College of Engineering Total Enrollment

Ph.D. student enrollment has **increased by 50 students** since 2017.

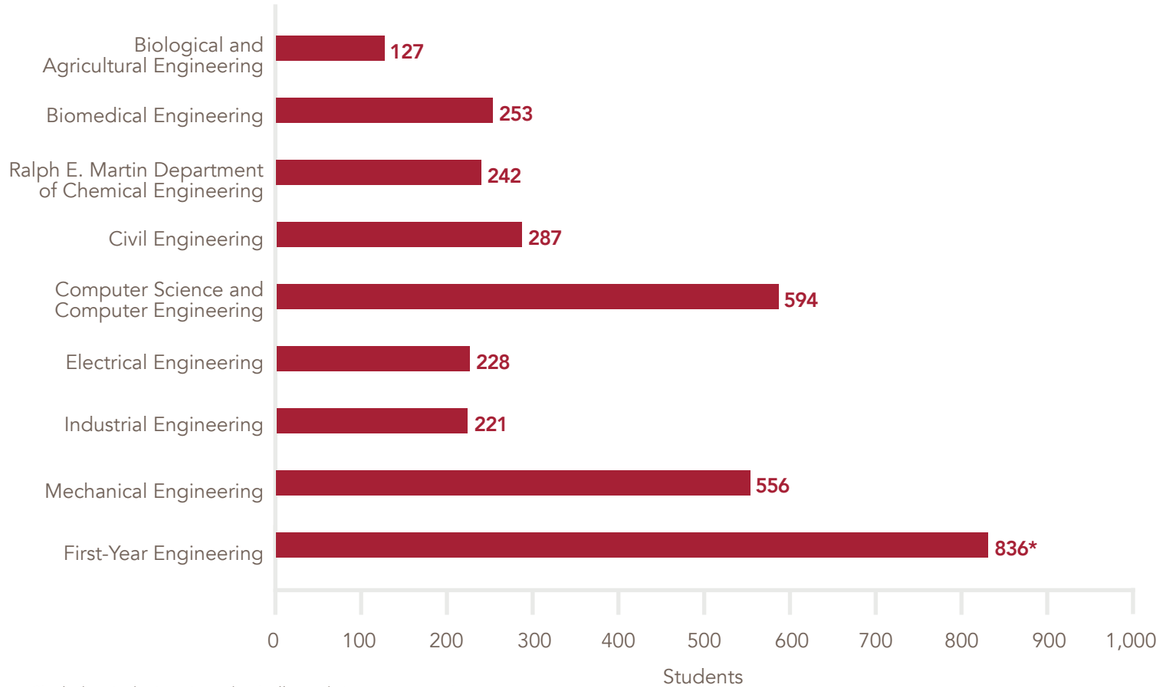
Our 2019 graduate enrollment is **24% female.**

Underrepresented students — female, minority, and first-generation college students — make up **51%** of the first-year class.

711 new First-Year students, with 492 from Arkansas

**Degree-seeking only*
***Includes engineering students enrolled in interdisciplinary programs and distance education*

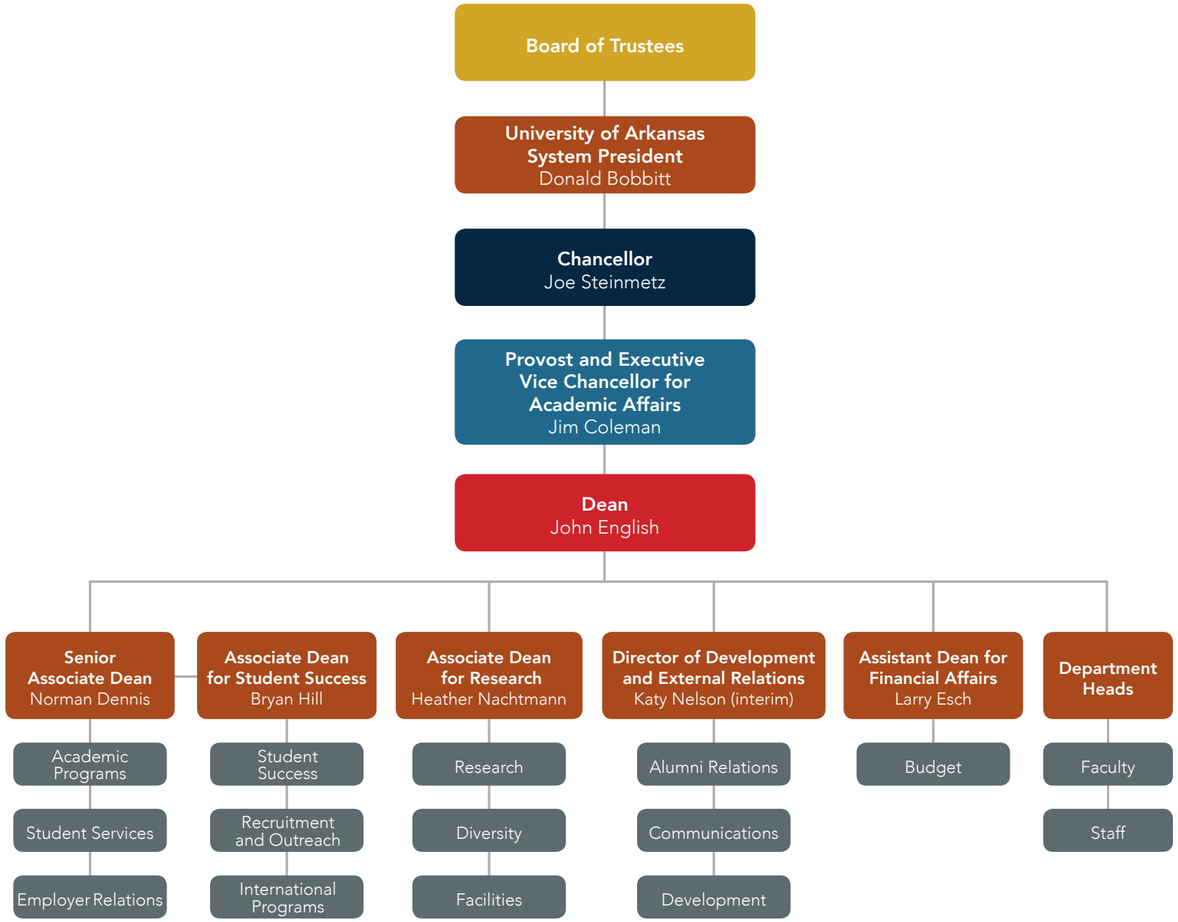
Fall 2019 Undergraduate Enrollment by Department



**Includes students not academically ready to pursue a major*

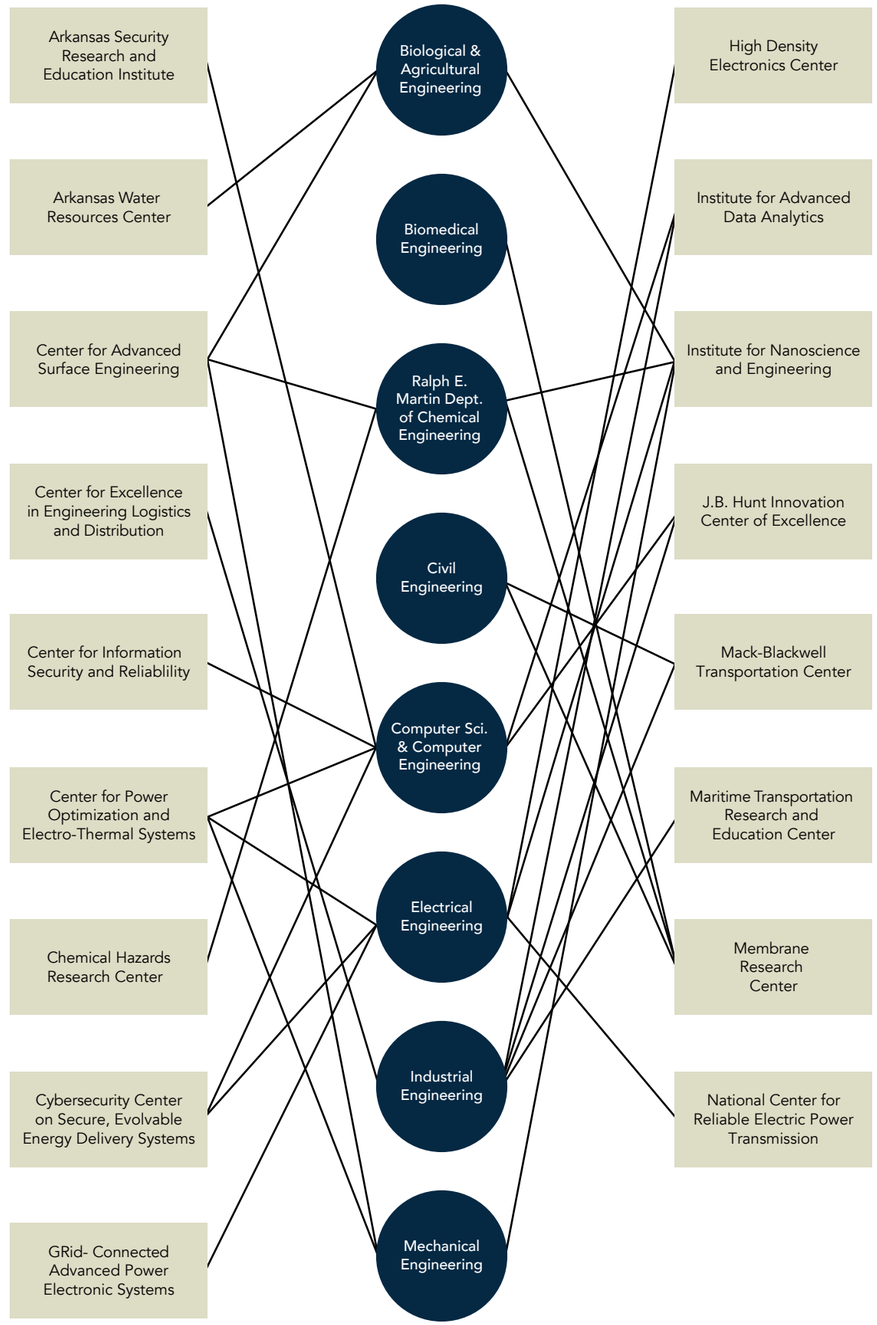
College of Engineering

Organization



College of Engineering

Departments and Centers



College of Engineering

Finances

Revenues (excluding gifts)

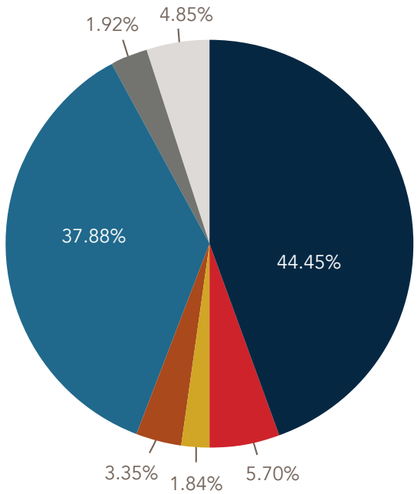
	2019
State Appropriations & Tuition	$26,938,648 44.45%
Distance Learning Revenues, Fort Smith, Service Centers, Conferences	$3,457,200 5.70%
Research Incentive Funds	$1,116,012 1.84%
Biological Engineering Teaching and Agricultural Experiment Station**	$2,031,850 3.35%
Sponsored Research (actual expenditures)*	$22,961,598 37.88%
Sponsored Activities and Scholarships (actual expenditures)	$1,166,060 1.92%
Student Equipment Fee Revenues (TELE-net)	$2,937,985 4.85%
Total	**$60,609,353**

**As reported to ASEE and USNWR*
***Cooperative Extension Service not included*

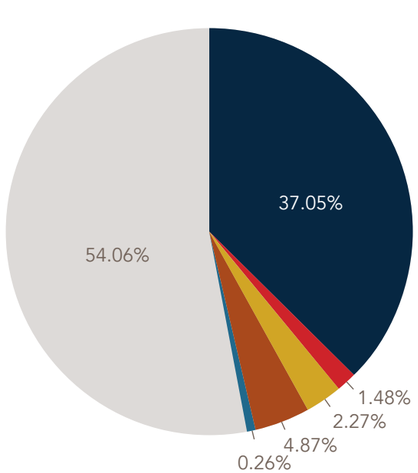
Expenditures (excluding gifts)

	2019
Salary and Benefits	$22,933,705 37.05%
Operating Expenditures	$918,842 1.48%
Dept. Restricted Fees/Misc.	$1,404,434 2.27%
Student Equipment Fees	$3,013,000 4.87%
Scholarships*	$162,903 0.26%
Research**	$33,463,296 54.06%
Total	**$61,896,181**

**Scholarships from state fund only*
***NSF expenditures report generated by Research Accounting*

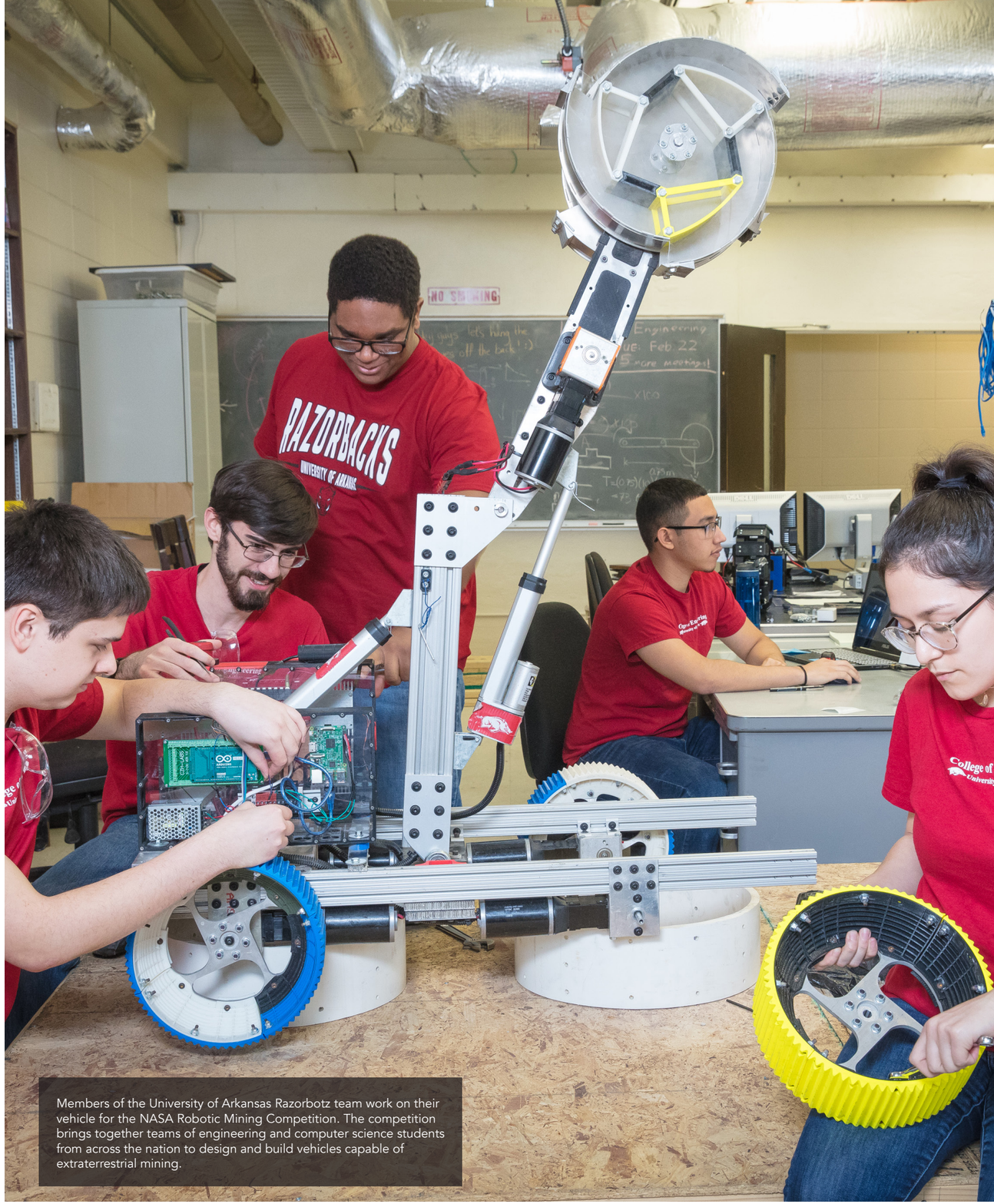


- State Appropriations & Tuitions
- Distance Learning Revenues, Fort Smith, Service Centers, Conferences
- Research Incentive Funds
- Biological Engineering Teaching and Agricultural Experiment Station*
- Sponsored Research (actual expenditures)**
- Sponsored Activities and Scholarships (actual expenditures)
- Student Equipment Fee Revenues (TELE-net)



- Salary and Benefits
- Operating Expenditures
- Dept. Restricted Fees/Misc.
- Student Equipment Fees
- Scholarships
- Research***

**Cooperative Extension Service not included*
***As reported to ASEE and USNWR*
****Reported and compiled by the UofA Research Accounting Office and submitted to the NSF*



Members of the University of Arkansas Razorbotz team work on their vehicle for the NASA Robotic Mining Competition. The competition brings together teams of engineering and computer science students from across the nation to design and build vehicles capable of extraterrestrial mining.

College of Engineering

Strategic Plan

Vision

Pursue excellence in research, scholarship and education, ensuring personal and professional growth for future generations of engineering leaders who will stimulate prosperity for Arkansas, the nation and the world.

Strategic Goals

- Recruit and graduate diverse, high-quality students
- Increase number and diversity of faculty and staff
- Support, recognize and reward faculty and staff excellence
- Increase research proposals and funding
- Build research and development culture
- Cultivate relationships with alumni and corporate partners
- Plan for infrastructure growth

Fifth and sixth grade girls take a tour of the Arkansas & Missouri Railroad station in Springdale, Arkansas, as part of their GirlTREC summer camp experience. In addition to taking a train ride, the girls met with Caren Kraska, president and chairman of the Arkansas & Missouri Railroad.

Balanced Growth Metrics

- 3,500 undergraduate students
- 1,000 master's students
- 350 doctoral students
- 135 tenured and tenure-track faculty members
- 65 teaching and research faculty members
- 180 staff members
- $300,000 in research expenditures per faculty member

Objectives	Increase Student Quality and Diversity	Provide Student-Centered Education	Recruit and Retain High-Quality Faculty and Staff	Increase Research Productivity	Increase Economic Development	Increase Alumni and Corporate Partnerships	Provide High-Quality Infrastructure
Metrics	ACT and GRE quantitative scores Career placement rate Graduate student acceptance rate Honors student completion rate Student diversity	Experiential learning participation First-year retention rate Six-year undergraduate graduation rate Student-faculty ratios Student semester credit hours per FTE Undergraduate degrees awarded	Faculty retention National awards Professional society leaders and fellows National Academy of Engineering membership Staff-faculty ratios Faculty diversity	Doctoral and master's degrees granted New research grants received Peer-reviewed publications Research proposals submitted Research expenditures (total and per faculty)	Invention disclosures Industry research expenditures Patents awarded Startup companies	Philanthropic giving Endowed faculty positions Endowed scholarships and fellowships Percentage of alumni who give	Academic space Research space Renovated space Renovation investment

Preparing You for Your Tomorrow

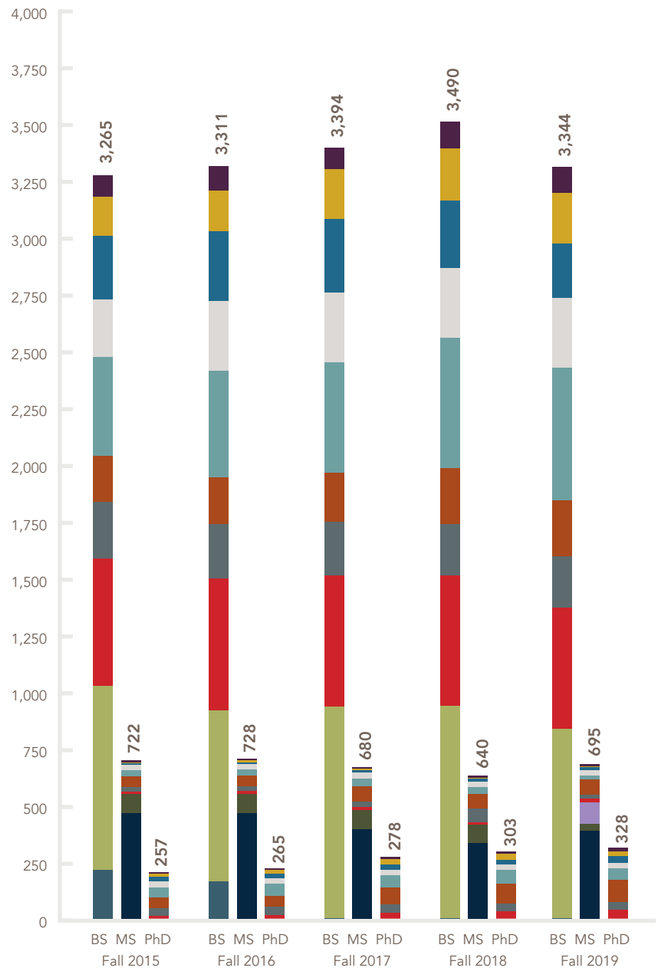
College of Engineering

Balanced Growth

OLGA BRAZHKINA
B.S.Bm.E. 2019
College of Engineering
Outstanding Senior

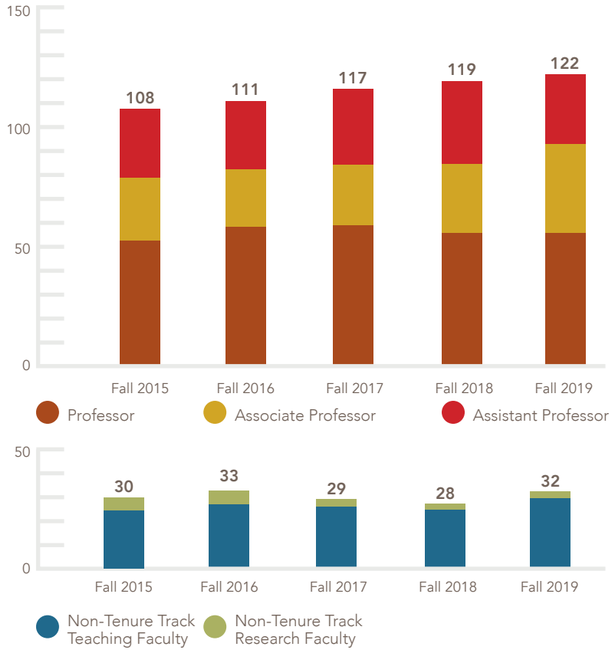
"During my time at the University of Arkansas, I grew both professionally and personally. Throughout my education, I took courses that challenged me to think critically in engineering and prepared me for my future career. I was able to conduct research for all four years of my undergraduate education and held leadership positions in several student organizations to promote student engagement. These opportunities allowed me to grow outside the classroom and identify what I valued most as an engineer: community and mentorship. Most importantly for my career, I was able to present my research at a national conference and complete an honors thesis. Both have furthered my abilities as a researcher immensely, and I am grateful to the U of A for providing me these numerous opportunities. As I move on to complete a Ph.D. in biomedical engineering at Georgia Tech, I am confident that the skills I gained in the College of Engineering here will serve me well into my future."

Enrollment by Department*

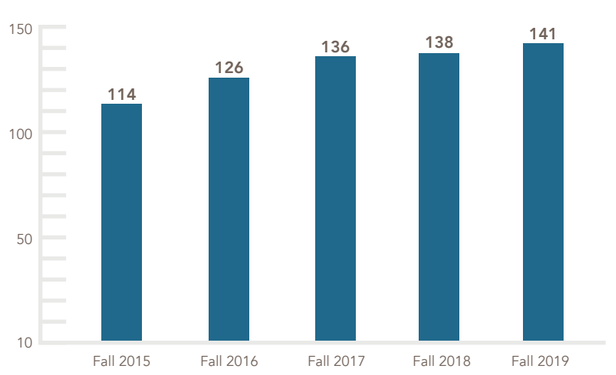


Interdisciplinary students are included in the department of their faculty advisor.

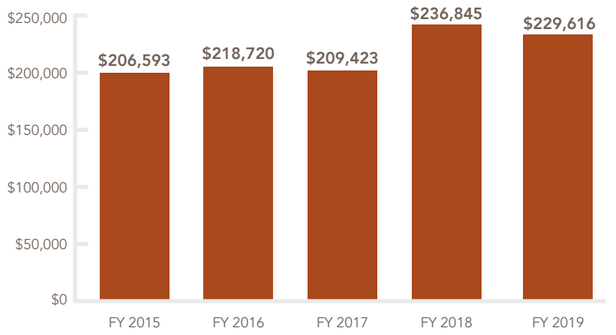
Faculty by Rank



Total Staff



Research Expenditures per Faculty



Balanced Growth Goals

3,500
undergraduate students

1,000
master's students

350
doctoral students

135
tenured and tenure-track faculty members

65
teaching and research faculty members

180
staff members

$300,000
in research expenditures per faculty member

College of Engineering

Balanced Growth

NORMAN DENNIS
Senior Associate Dean,
University Professor of
Civil Engineering

"The fields of engineering and computer science are changing rapidly. Our students need to be uniquely equipped to excel in an increasingly interdisciplinary workplace, and the College of Engineering is preparing them to do just that.

Our faculty and staff work diligently to provide meaningful experiences inside and outside the classroom to prepare our students for success in their next steps, whether they're entering the workforce or pursuing an advanced degree.

Our students benefit from the vibrant business ecosystem in our community, where they can engage with businesses of all sizes, from start-ups to some of the largest corporations in the world. That hands-on experience allows students to apply what they've learned in the classroom to solve real-world problems, working alongside their fellow students from outside the College of Engineering. Those experiences differentiate them from their peers and help set them on the path to success in a fast-moving world."

Undergraduate Ranking

Undergraduate Peer Assessment Score

2016	2017	2018	2019	2020
2.4	2.4	2.5	2.6	2.6

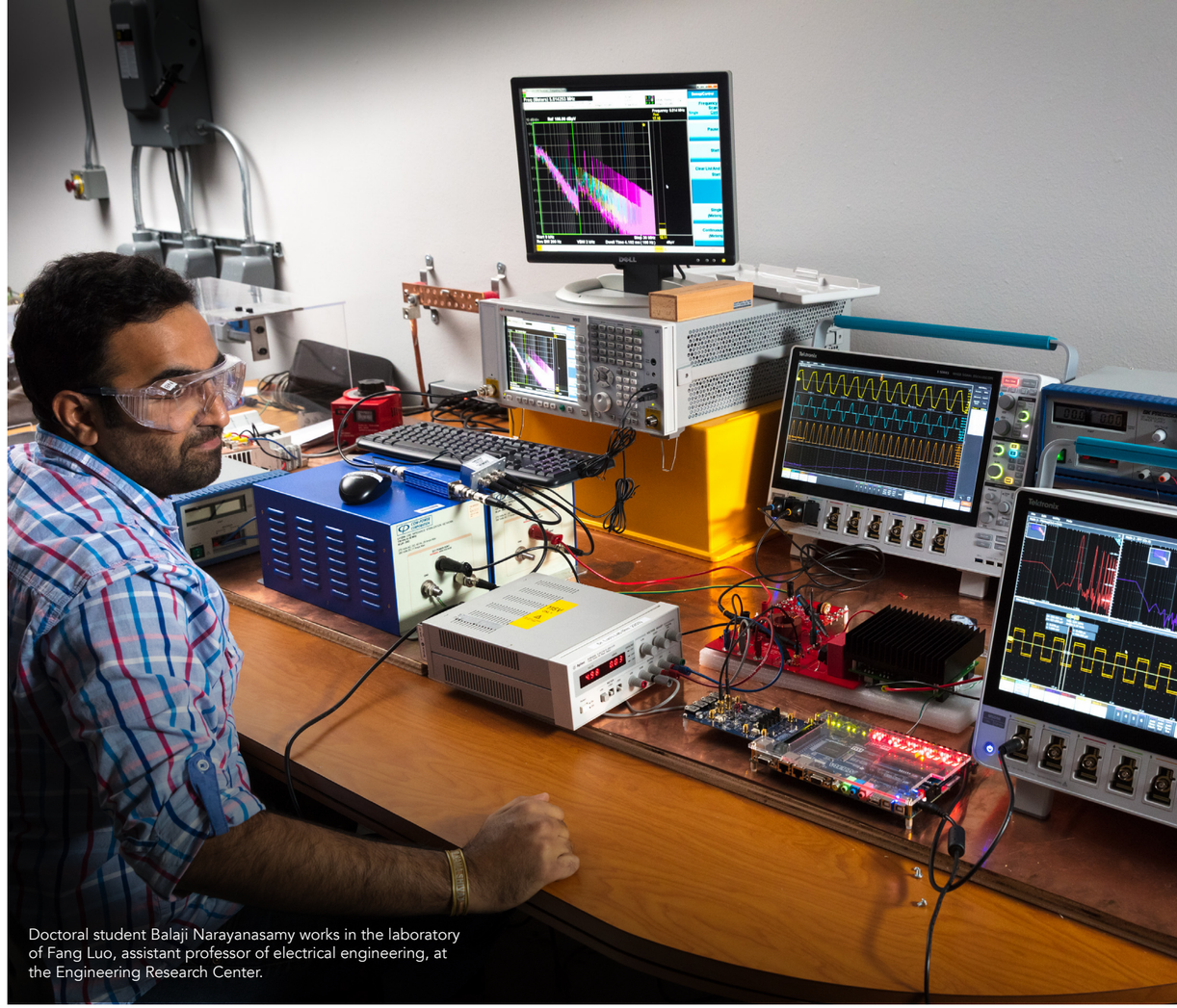
Graduate Ranking

Academic Reputation Score (out of 5.0)

2016	2017	2018	2019	2020
2.3	2.3	2.3	2.3	2.3

Non-academic Reputation Score (out of 5.0)

2016	2017	2018	2019	2020
2.6	2.7	2.8	2.7	2.8



Doctoral student Balaji Narayanasamy works in the laboratory of Fang Luo, assistant professor of electrical engineering, at the Engineering Research Center.

U.S. News & World Report How Rankings Are Measured

U.S. News and World Report, a popular source of university rankings, ranks both undergraduate and graduate programs.

For Ph.D. programs, it considers metrics related to the quality of students the college attracts and metrics related to graduates' achievements.

U.S. News also surveys deans, program directors, senior faculty and professionals who hire engineering graduates to establish peer and corporate recruiter assessment data. For its college undergraduate rankings, U.S. News uses only peer assessment data. The 2020 rankings are based on a two-year average of data from 2017 and 2018.

Graduate Rankings Metrics:

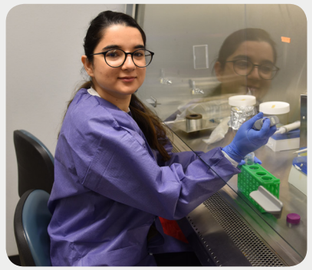
Quality assessment:
Peer assessment **25%**
Corporate recruiter assessment **15%**

Student selectivity:
Mean GRE quantitative score **6.75%**
Graduate acceptance rate **3.25%**

Faculty resources:
Student-to-faculty ratio - Ph.D. **7.50%**
Student-to-faculty ratio - M.S. **3.75%**
Percent of faculty in the National Academy of Engineering **7.50%**
Doctoral degrees awarded **6.25%**

Research activity:
Total research expenditures **15%**
Average research expenditures per faculty member **10%**

Look for this icon throughout the book. It indicates metrics that directly affect our U.S. News and World Report ranking.



ISHITA TANDON

Doctoral Candidate
Biomedical Engineering

Ishita Tandon is researching calcific aortic valve disease — the formation of calcific lesions in the aortic heart valve. It's a disease that impacts 2.5 percent of Americans, and Tandon is working to identify an early detection method for the disease, because current technology usually only allows doctors to identify the disease after irreversible damage has been done.

Tandon earned an American Heart Association Predoctoral Fellowship to support her work through 2020.

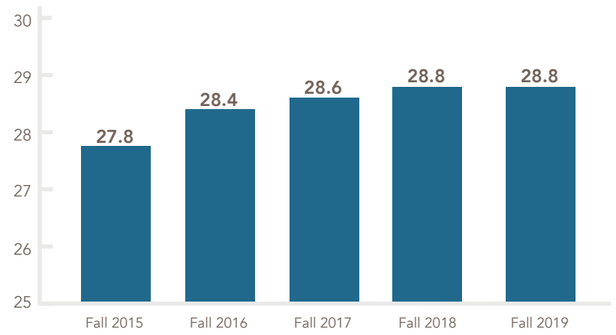
Under the guidance of Kartik Balachandran, associate professor of biomedical engineering, Tandon's research centers on developing a realistic 3D model of the aortic valve, then using multiphoton imaging to look for early changes that could indicate the onset of calcification. From there, researchers could develop ways to treat the disease before it intensifies.

The imaging aspect of Tandon's research includes a collaboration with researchers in Kyle Quinn's lab. Quinn is an assistant professor of biomedical engineering whose lab specializes in tissue diagnostics, using advanced imaging techniques to provide non-invasive, real-time assessments of tissue structure and function.

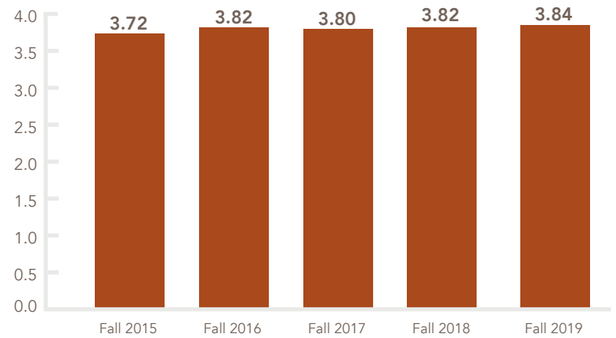
Raj Rao, professor and department head of biomedical engineering, said the award reflected well on Tandon, Balachandran and the department.

"Ishita's receipt of the AHA Predoctoral Fellowship is an indication of the significance of the ongoing cardiovascular research programs in the department," he said. "It also demonstrates the caliber of our doctoral students and the important guidance provided by Dr. Balachandran."

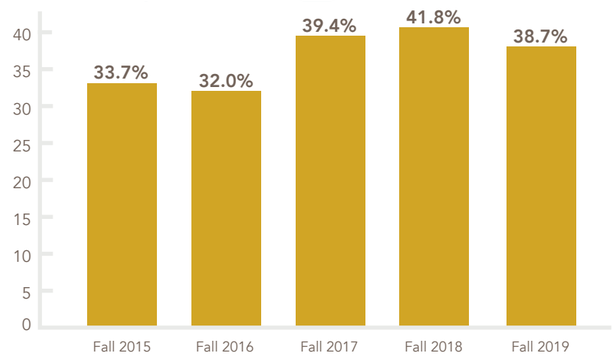
First-Year ACT Average



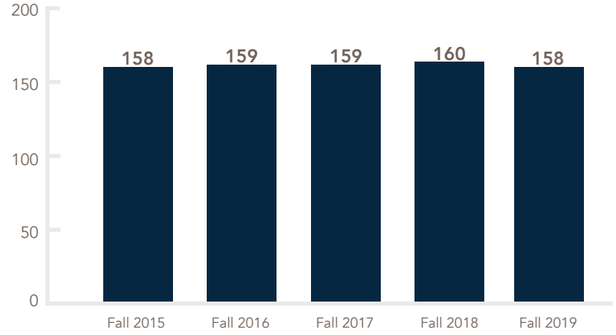
First-Year Mean High School GPA



Graduate Acceptance Rate



Mean GRE Quantitative Score*



*Does not include distance students

Preparing for Tomorrow

We continue our outreach to Arkansas K-12 schools with increasingly excellent STEM programming to interest young people in engineering careers and to enhance the number of students pursuing STEM disciplines.

We are creating more endowed scholarships to support engineering undergraduates who have financial need.

We are increasing scholarships for students who display exceptional leadership and academic qualities.

We are establishing more graduate endowments to recruit exceptional graduate students and provide our faculty with excellent assistants to their research.

BRYAN HILL

Associate Dean for Student Success

"Student success is at the heart of what we do every day in the College of Engineering. Preparing students to take on the challenges of a rapidly evolving engineering workplace requires faculty, staff and students to commit to excellence.

Through a focus on diversity and inclusion, we're recruiting and graduating high-achieving students from traditionally underrepresented backgrounds, and those students bring critical new perspectives that make the College, University and the state of Arkansas better.

We've seen considerable gains in our doctoral student enrollment, which continues to be a key strategic focus for the College and will ultimately benefit our academic and industry partners as those students develop a deep level of knowledge in their fields.

Our first-year class in fall 2019 set a record for the highest mean high school GPA we've seen, yet another indicator the University of Arkansas College of Engineering is the school of choice for top students in Arkansas and elsewhere. That's an encouraging sign that the future of the College is bright and getting brighter."

DANIELLE ALVERSON

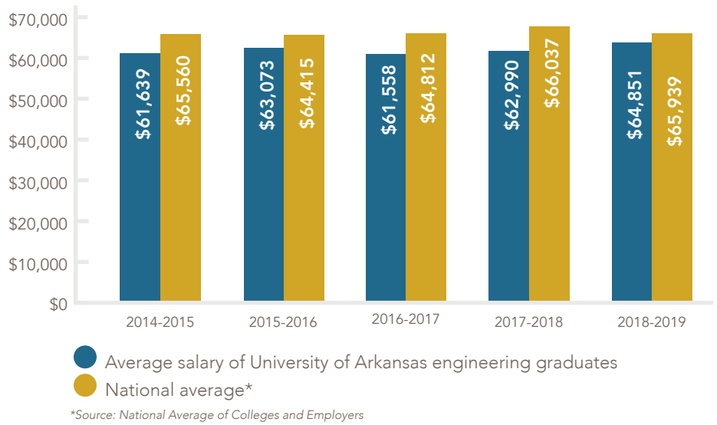
Mechanical Engineering Student

"I have always known that I wanted to pursue an engineering degree, and the Engineering Career Awareness Program helped me decide the University of Arkansas was where I was going to attain that degree. I was able to come into college with the confidence and the tools needed for me to not only achieve success academically but to obtain success professionally as well.

ECAP has provided me with opportunities and networking relationships that would not have formed if it were not for this program. I have attended dinners, trips, company talks and a plethora of other events that have influenced me in positive ways.

I have an incredible support base that I would consider my family. Through the good times and the bad, I know that I have a system for me that understands me."

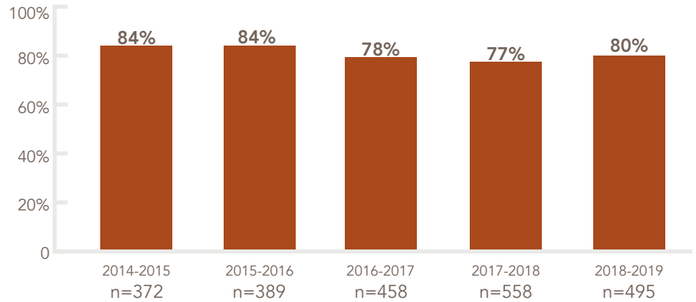
Engineering Graduate Average Starting Salaries



Source: National Average of Colleges and Employers

Engineering Graduate Placement Rate*

(percentage of graduates employed or attending graduate school)



Self reported percentage of students graduating who were employed as engineers or attending graduate school within three months of graduating.

Fall 2019 Incoming Student Awards

3	33	107	27
Bodenhamer Fellows	Honors College Fellows	Chancellor Scholars	Merit Scholars

Class of 2019 graduates sing the alma mater during commencement in May 2019.

Number of Honors Graduates

2015	2016	2017	2018	2019
62	92	67	85	96

Recipients of Nationally Competitive Awards and Scholarships	2015	2016	2017	2018	2019
National Science Foundation Graduate Research Fellowship	1	2	2	3	1
NSF GRF Honorable Mention	3	1	3	4	1
Goldwater Scholarship		1	1	1	2
Truman Scholarship		1			1
Udall Honorable Mention	1			1	1
Critical Language Scholarship				1	1
Fulbright English Teaching Assistantship				1	
Benjamin A. Gilman Scholarship					2
Total	5	5	6	11	9

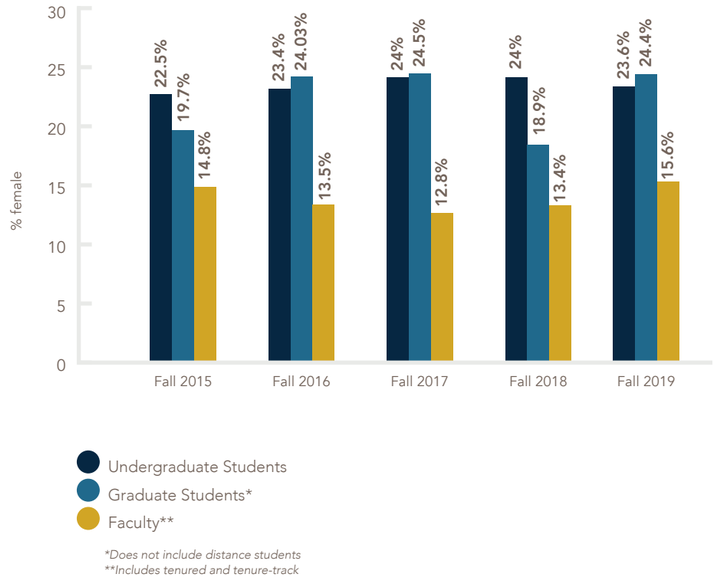
KEVIN TORRES

Chemical Engineering Student

"The Engineering Career Awareness Program is exactly the kind of program colleges need for first-generation students like myself. It's a family. It's a support system that has guided me through college while providing resources and opportunities to let me be as successful as I could be.

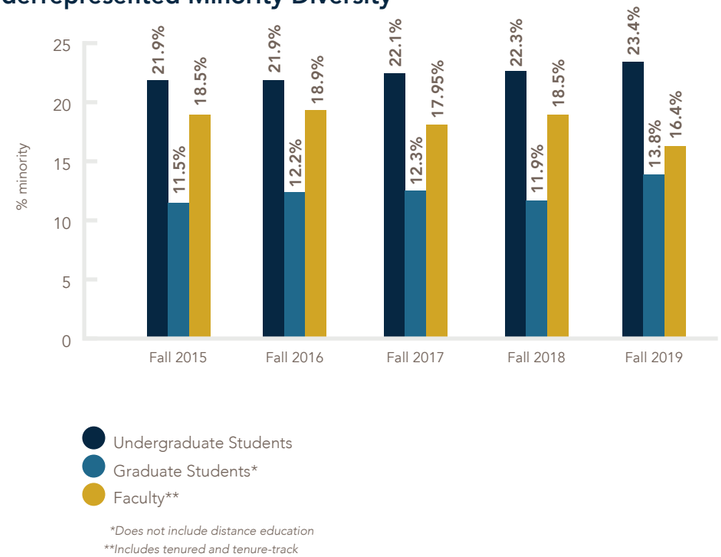
My first interaction with ECAP was in the summer bridge program before my first year, where I met other students in my cohort. I bonded with them there, sat with them in class, and they're still some of my closest friends to this day. I'm thankful for the opportunities, wisdom, connections, and support ECAP has given me. I'm also thankful for the financial burden that was lifted from my family, and for the strong emphasis on my success in college."

Gender Diversity



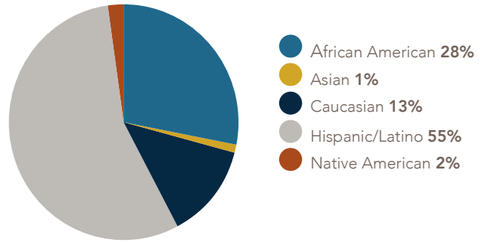
*Does not include distance students
**Includes tenured and tenure-track

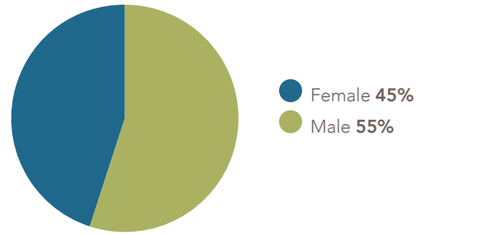
Underrepresented Minority Diversity



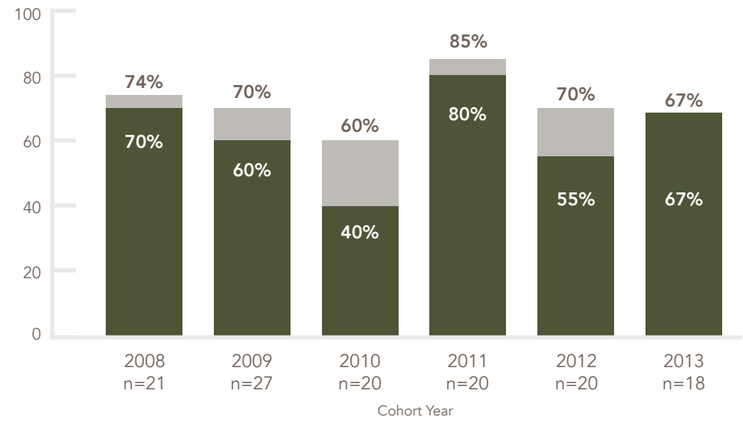
*Does not include distance education
**Includes tenured and tenure-track

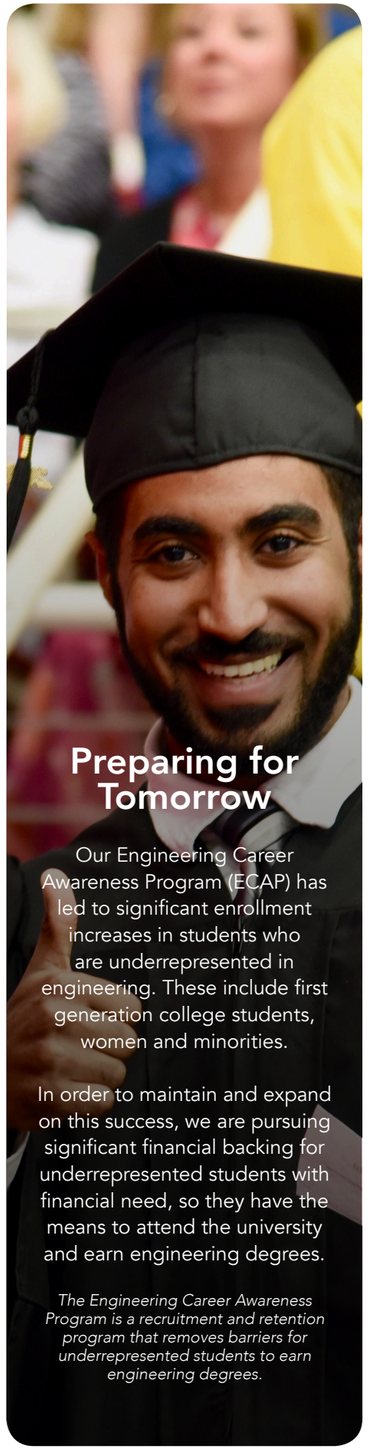
Engineering Career Awareness Program Student Demographics





Engineering Career Awareness Program Six-Year Graduation Rates





Preparing for Tomorrow

Our Engineering Career Awareness Program (ECAP) has led to significant enrollment increases in students who are underrepresented in engineering. These include first generation college students, women and minorities.

In order to maintain and expand on this success, we are pursuing significant financial backing for underrepresented students with financial need, so they have the means to attend the university and earn engineering degrees.

The Engineering Career Awareness Program is a recruitment and retention program that removes barriers for underrepresented students to earn engineering degrees.

DOMINIQUE SAVAGE

First-Year Engineer of the Year

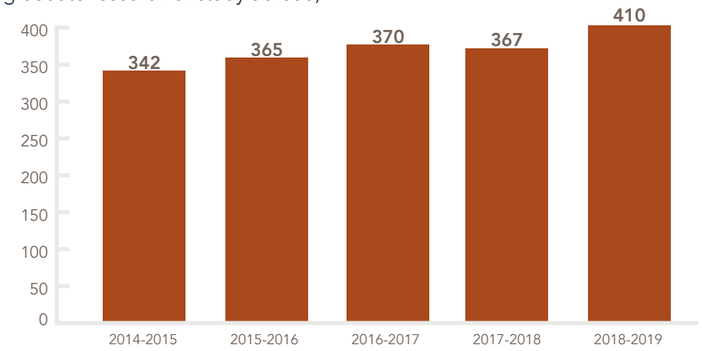
"I gained interest in engineering through taking STEM and pre-engineering classes in high school that introduced me to a whole new realm. I thrived in these classes and enjoyed competing in Science Olympiad events that implemented engineering concepts.

The University of Arkansas allowed me to pursue my passion in this subject and others. My major is in Chemical Engineering and minors are in Chinese and Foundations of Sustainability. I also wanted to study at the University of Arkansas because I felt welcomed and supported by the whole academic community.

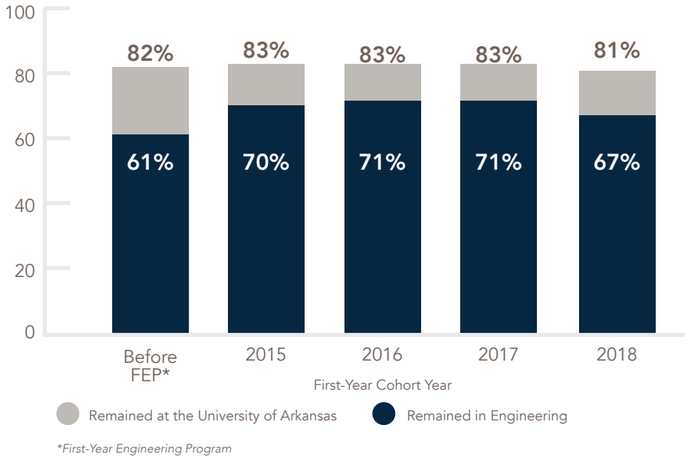
With the skill set I cultivate during my time at the university, I may have the opportunity to collaborate between the United States and China through engineering projects. I want to graduate and work for a company that shares my goals and interests as well as use my degrees to better connect the world."

Experiential Learning

(Students who participated in cooperative education, undergraduate research or study abroad)

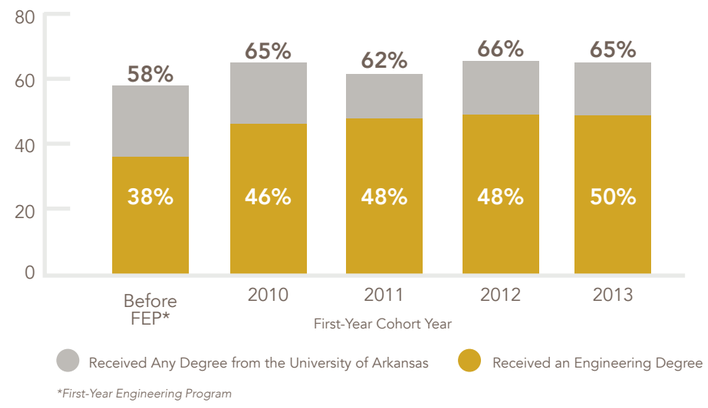


First-Year Retention Rate



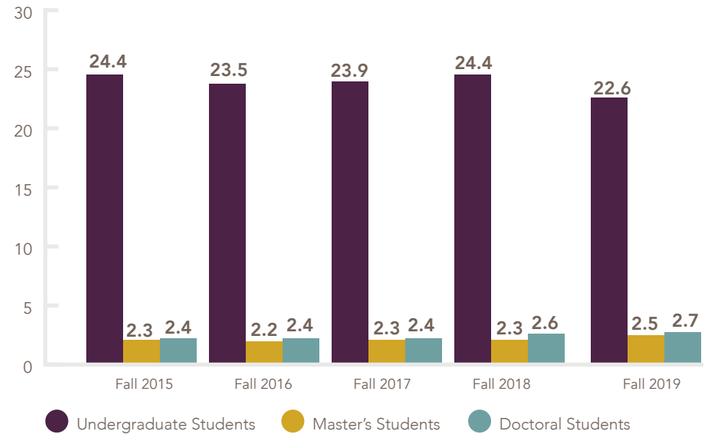
*First-Year Engineering Program

Six-Year Graduation Rate

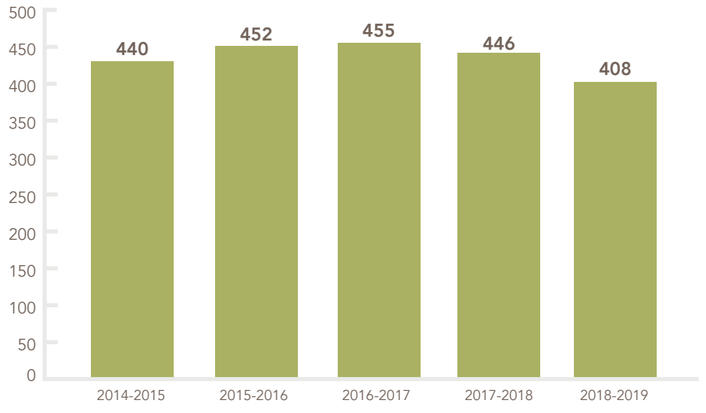


*First-Year Engineering Program

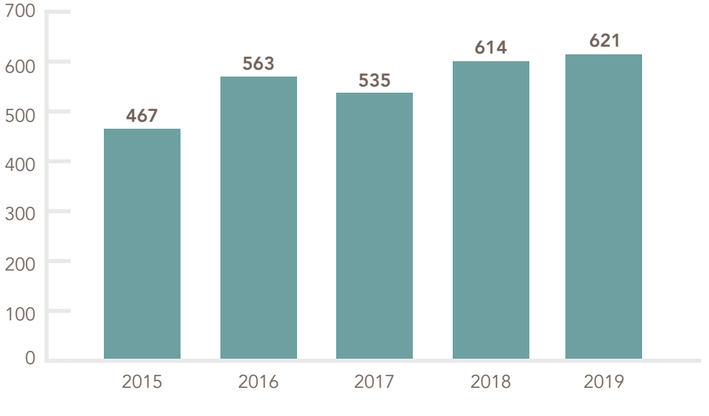
Student-Faculty Ratios



Student Semester Credit Hours per Faculty Full Time Equivalence



Bachelor's Degrees Awarded



Preparing for Tomorrow

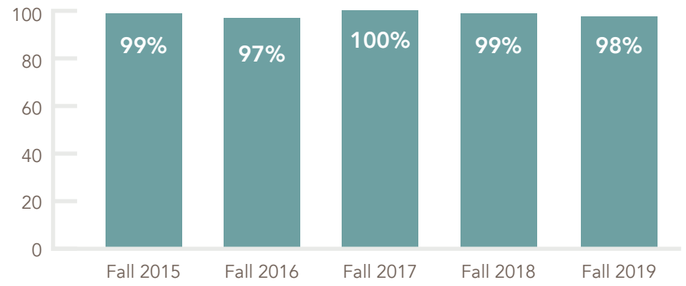
In order to cement our success in retaining and graduating engineers, we are seeking to endow the First-Year Engineering Program so that it is assured support in perpetuity.

We plan to continue to connect successful alumni with our students through classroom presentations, mock interviews, industry visits and other activities.

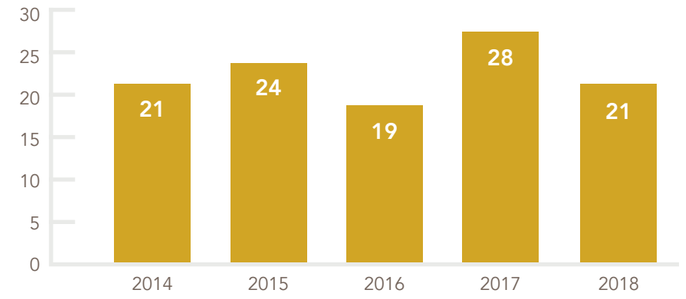
ALAN MANTOOTH
Distinguished Professor of Electrical Engineering, Twenty-First Century Research Leadership Chair in Engineering
Dean's Award for Excellence for Outstanding Public Service

Alan Mantooth's contributions to the field of electrical engineering are truly global in nature. Over the course of two years, Alan traveled more than 400,000 miles and visited six continents, delivering presentations at meetings and conferences around the world. All along the way, he advanced the profession and spread the word about the excellent research taking place in the College of Engineering. He has served in a variety of executive positions within the IEEE Power Electronics Society, a 10,000-member organization. He also organized technical meetings from Fayetteville to Shenzhen, China, to Busan, South Korea. In the local community, Alan's work has played a critical role in bringing two research centers to Fayetteville, advancing the field of knowledge and providing a critical resource for industry partners around the world.

Faculty Retention

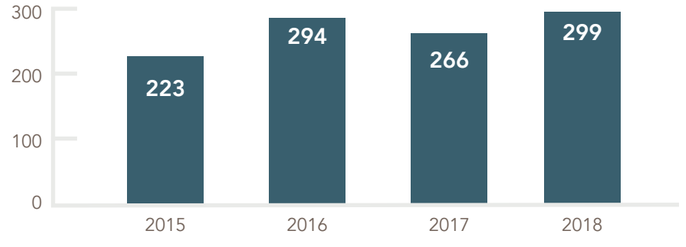


National Faculty Awards Received

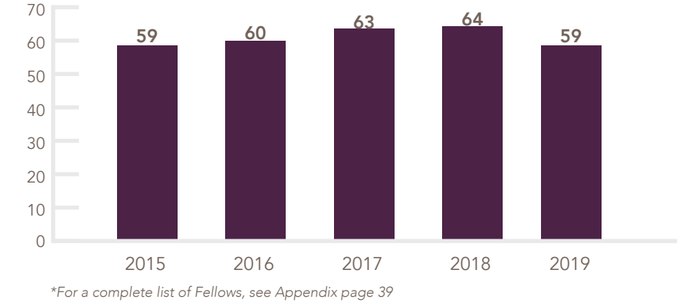


Professional Service Leadership

(number of external leadership positions held by faculty)



Society Fellows*

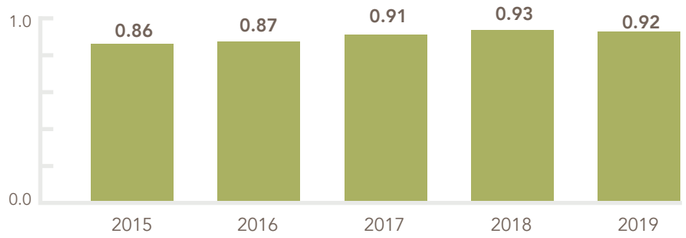


For a complete list of Fellows, see Appendix page 39

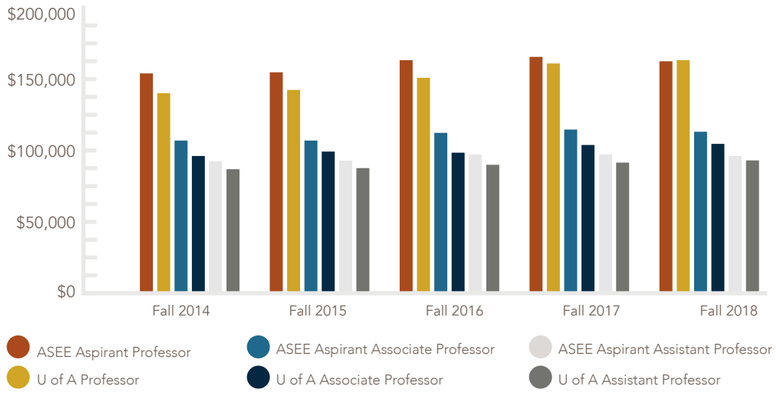
Membership in the National Academy of Engineering

2015	2016	2017	2018	2019
2 members	2 members	2 members	3 members	2 members

Staff-Faculty Ratio

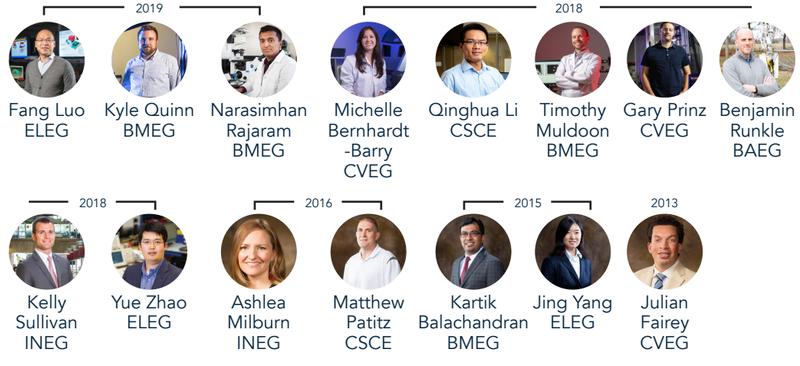


U of A and American Society for Engineering Education (ASEE) Average Faculty Salary Comparisons*



*ASEE salary survey data for fall 2019 is not available until January.
Instructor salaries are not benchmarked in the ASEE salary survey.*

NSF CAREER Award Winners Since 2013



ASHLEA MILBURN
Associate Professor of Industrial Engineering
Dean's Award for Excellence for Rising Teaching

Ashlea Milburn's dedication to excellence in teaching is obvious to anyone who has ever been in her classroom. She teaches one of the most difficult courses in the industrial engineering curriculum, and still has some of the highest evaluation scores in the department. She does this through dynamic teaching methods that go beyond simply presenting the required information. She engages her students in meaningful conversations, supported by real-world examples and meticulously prepared visual aids.

GREG THOMA
Professor and Bates Teaching Endowed Professorship holder, Ralph E. Martin Department of Chemical Engineering
John L. Imhoff Award for Research

Greg Thoma is an internationally-recognized expert in the field of agricultural life cycle assessment. He serves on two United Nations Technical Advisory Groups, the Board of Directors of the International Lifecycle Academy, and the Steering Committee for a Swiss National Science Foundation research program as well as a Subject Editor for The International Journal of Lifecycle Assessment. Greg has given an impressive 21 invited talks in the last five years with six delivered to international audiences, including a speech to the World Bank about fruit and vegetable sustainability that was simulcast to 15 countries.

HEATHER NACHTMANN

Associate Dean for Research,
Earl J. and Lillian P. Dyess
Endowed Chair in Engineering,
Professor of Industrial
Engineering

"It was a record-setting year for research in the College of Engineering!

Our researchers received $29.5 million in new research grants in fiscal year 2019, up nearly $7 million from 2018, and surpassing the previous high of $28.7 million. This is a clear sign of the caliber of work taking place in our research labs as our researchers continue to secure competitive funding from federal, state, and industry partners at a record pace.

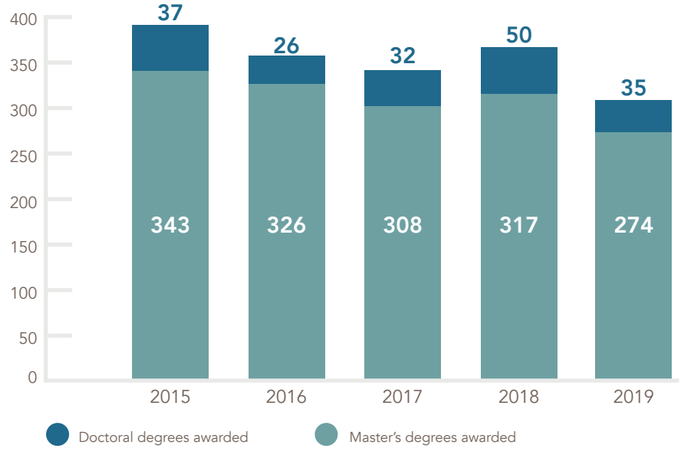
Our faculty, staff and student research teams published more peer-reviewed publications than ever before with 525 articles and papers published in 2018, a 56% increase over a five year period.

Our research success is also translating into practice with an all-time high of 31 inventions disclosed last year, up from the previous high of 21 invention disclosures in fiscal year 2018.

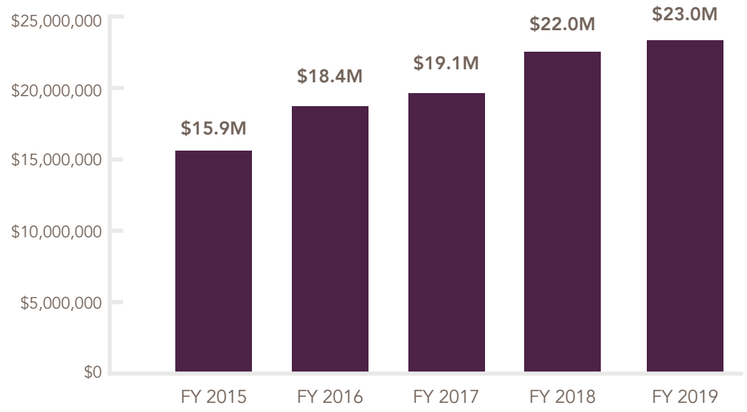
College of Engineering researchers were also awarded 10 patents in fiscal year 2019, exceeding the college's previous annual record of six patents. This growth is a testament to the increasing success of our technology transfer efforts as our college moves research outcomes toward the marketplace.

The translational research that begins in our labs has implications for people across Arkansas and around the world, and I'm proud to be a part of this team who is improving the way our society lives and works."

Advanced Degrees Awarded

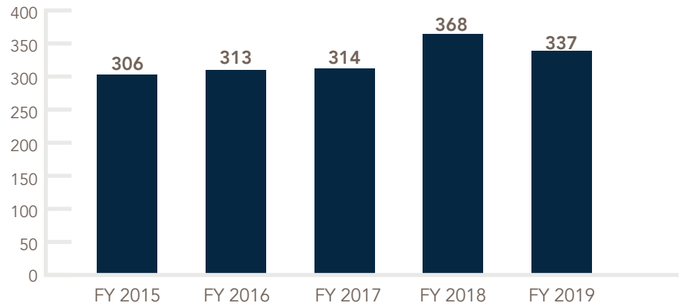


Total Research Expenditures*

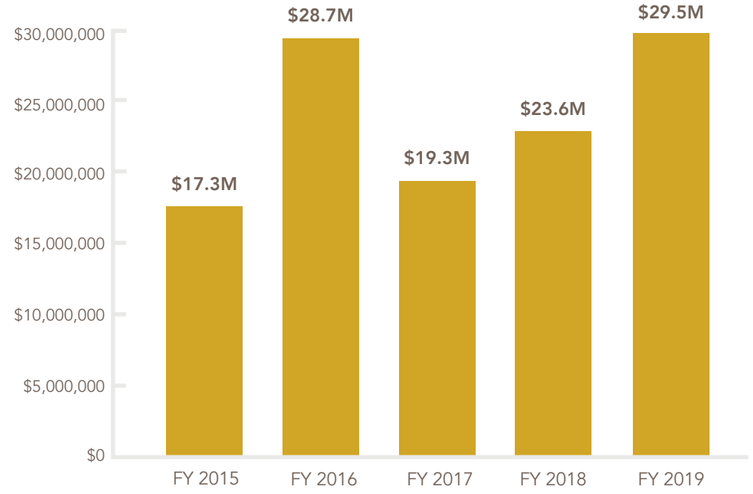


*As reported to ASEE/USNWR

Research Proposals Submitted



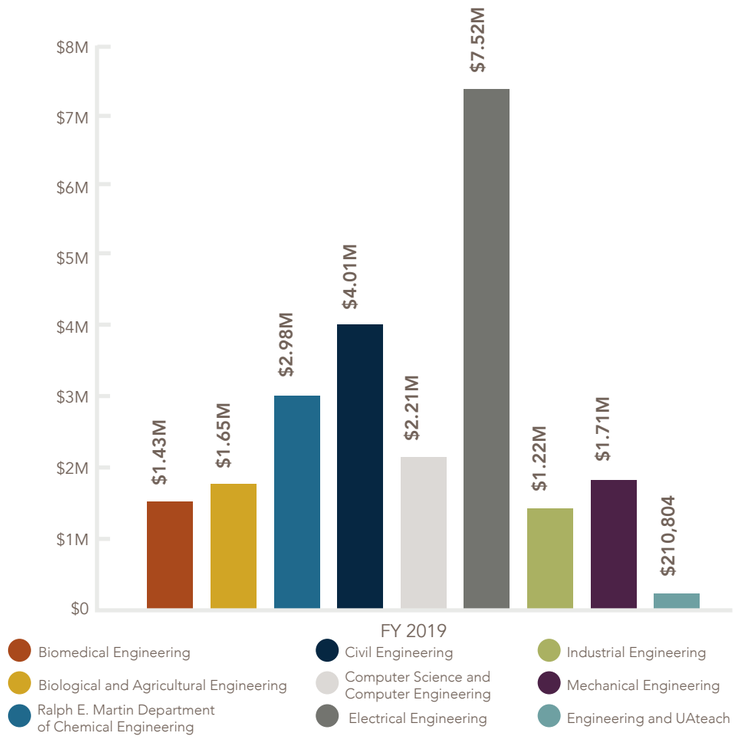
Research Grants Awarded



Peer-Reviewed Publications

2014	2015	2016	2017	2018
397	402	455	515	525

Research Expenditures by Department



KYLE QUINN

Assistant Professor of
Biomedical Engineering
Rising Star Faculty Research Award

Kyle Quinn joined the biomedical engineering faculty in 2015, after a five-year postdoctoral program at Tufts University. He is a talented investigator, and his research in the microstructure of skin changes related to aging is transforming the fields of biomedical engineering, skin biology, and wound healing. Kyle has earned impressive external research funding during his time at U of A, most notably the highly competitive NIH-R01 and NSF CAREER awards.

JAMIE HESTEKIN

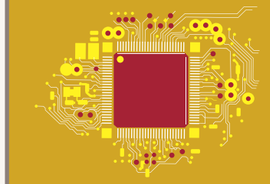
Professor and Ralph E. Martin
Professorship holder, Ralph E. Martin
Department of Chemical Engineering
Collaborative Faculty Research Award

The recommendations written on Jamie Hestekin's behalf for the Collaborative Faculty Research Award echoed two consistent messages – first, that he is a bright and accomplished researcher who is highly respected for his technical expertise. His colleagues praised Jamie's ability to tackle difficult research topics and noted that his ability to work through the complexities of interdisciplinary collaborations set him apart from his peers. And second, he is a collaborative team leader. Jamie earned nearly $3 million in collaborative grant funding over the past five years and published 10 collaborative papers that span work in five different departments.

University of Arkansas College of Engineering

RESEARCH STRENGTHS

FACULTY DEPARTMENTS CENTERS



Electronics

The College of Engineering has been producing graduates focused on electronics for over 30 years. Researchers in this area are developing new materials for circuits and photovoltaic cells, designing and modeling circuits, creating packages that protect and integrate electronic devices and creating and testing new technologies to improve our power grid.

- Research centers predominately working in this area include the Center for Power Optimization of Electro-Thermal Systems, GRid-connected Advanced Power Electronics Systems (GRAPES), High Density Electronics Center (HiDEC) and the National Center for Reliable Electric Power Transmission (NCREPT)
- Approximately $4 million per year in research expenditures
- Several startup companies have emerged from this area

Energy

The broad area of energy has a foundation in electronics, but has expanded to include power systems, energy storage, smart grid innovation, biofuels and oil and gas research. As the world struggles to find and integrate safer and more sustainable sources of energy, research in this field is more important than ever.

- The Cybersecurity Center for Secure Evolvable Energy Delivery Systems (SEEDS) along with GRAPES and NCREPT contribute to the college's annual research expenditures of $4 million
- Energy research in the college is supported by the National Science Foundation, Department of Energy and Department of Defense
- Tech transfer of this research is making significant contributions to the college's public and private energy partners

Biomedical and Healthcare Engineering

College of Engineering research encompasses both technological and biological investigations in biomedical and healthcare engineering. Many life-enhancing breakthroughs in medicine and healthcare delivery result from research combining engineering and the medical sciences, including biomechanics and mechanobiology, biomaterials, cell and tissue engineering, healthcare logistics and medical decision making.

- The college conducts approximately $2 million in annual research expenditures in this area including work done by the Membrane Research Center
- This is one of our most collaborative research areas with faculty from all eight departments working together to obtain funding from health agencies including the National Institutes of Health
- Researchers in this area collaborate with industry and healthcare providers to improve health and wellness throughout Arkansas and the U.S.

EXISTING STRENGTHS

In January 2014, a research task force appointed by Dean John English identified existing and emerging strengths in the college. Existing strengths are those areas where the college is already nationally recognized. Emerging areas are fields where the college has some key presence, expertise and momentum. These are expected to emerge into strengths with additional investment. The full report can be found at engineering.uark.edu.

Materials Science and Engineering

Our college's innovations in materials science and engineering lead to improved materials to solve technological and societal problems. Our research activities include advanced materials for packaging, control analysis, high resolution and device characterization, advanced coatings and surface engineering, photovoltaic materials, thermoelectric materials, nanotribology and bioinspired functional surfaces and materials.

- Materials research is conducted at the Center for Advanced Surface Engineering and Institute for Nanoscience and Engineering which are supported by micro-fabrication at HiDEC and in labs throughout the college
- Annual research expenditures in this area approach $2 million
- Several startup companies were created such as the award-winning NanoMech and SurfTec demonstrating successful tech transfer in this area

Transportation and Logistics

The College of Engineering has been a national leader in transportation and logistics for more than 20 years. Researchers are looking at distribution, transportation, information technology and software solutions, and maritime and multimodal transportation.

- The Mack-Blackwell Transportation Center and Center for Excellence in Logistics and Distribution (CELDi) have been at the fore-front of research in this area for two decades
- Annual research expenditures in this area consistently exceed $3 million
- The college works closely with the Arkansas and U.S. Departments of Transportation and many other transportation stakeholders across the nation

EMERGING AREAS

Data Science

Our data science researchers are exploring real-time data collection and assessment, parallel data processing, machine learning, intelligent search, sensor network architecture and design flow, electronics packaging, and information transmission and processing.

Cybersecurity

Researchers are looking at increasing digital security and information assurance, especially in the areas of transportation and the power grid.

Infrastructure

As a land-grant institution, the U of A has a responsibility to maintain the nation's water and electric resources, communications and transportation.

Advanced Manufacturing

Our innovation into modern manufacturing involves technology-driven manufacturing processes, assembly and control technologies, new automation, techniques, design and modeling of systems, process planning.

Membranes & Separations

Our researchers are exploring membrane materials, characterization, formation, and performance to improve energy production, water treatment, pharmaceutical purification, and chemical processing.

Water

Research in this area includes water quality, wastewater treatment and watershed management.

UNIVERSITY OF ARKANSAS

CATALYZEH2O

Lauren Greenlee, associate professor of chemical engineering and Ralph E. Martin Leadership Chair in Engineering, is the chief technical officer of CatalyzeH2O. Chemical engineering alumnus Mojtaba Abolhassani is the lead scientist on the project, which incorporates technology from his Ph.D. dissertation.

The company's CEO is Shelby Foster, a University of Arkansas M.B.A. student with a background in petroleum and chemical engineering. Foster is also the principal investigator on the grant and led the proposal effort.

The team's plan is to design a reusable nanofiltration membrane platform to clean wastewater more efficiently. Water purification and reuse are expensive, energy-intensive endeavors for local governments and industrial users.

"Fouling is one of the largest market pains associated with the membrane industry, because fouling leads to an increase in operational costs by 50-100% in many cases," Foster said. "CatalyzeH2O is working to develop an antimicrobial membrane to decrease fouling and lessen the need for extensive preventative fouling maintenance."

CatalyzeH2O's solution focuses on using a nanofiltration membrane with a unique surface chemistry that makes the membrane last longer than the current industry standard.

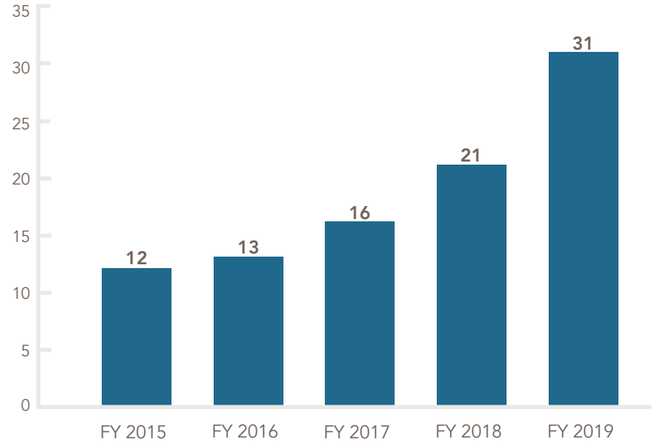
"One of the key advantages is the surface of the membrane is antimicrobial, so there's less biological and organic fouling," Greenlee said. "That's because of the inherent properties of the membrane. You don't have to do special chemistry, it's just part of the materials we're using. That translates ultimately into cost savings."

College of Engineering Startup Companies

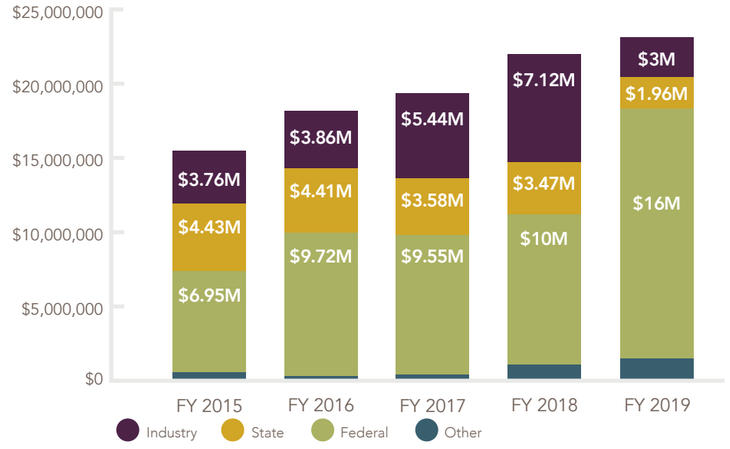
Since 1990, 28 companies have been created based on engineering research at the University of Arkansas.

1990	1
1999	1
2003	1
2004	1
2005	8
2007	2
2008	1
2009	4
2010	1
2011	1
2014	2
2016	1
2017	1
2018	1
2019	2

Invention Disclosures

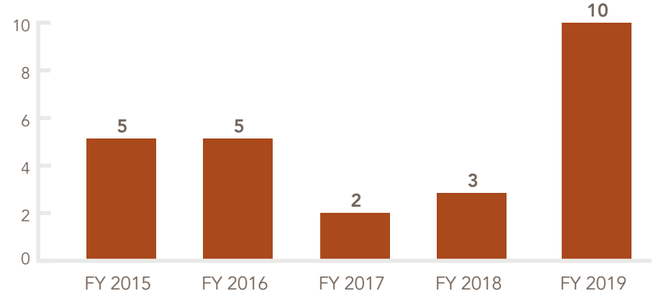


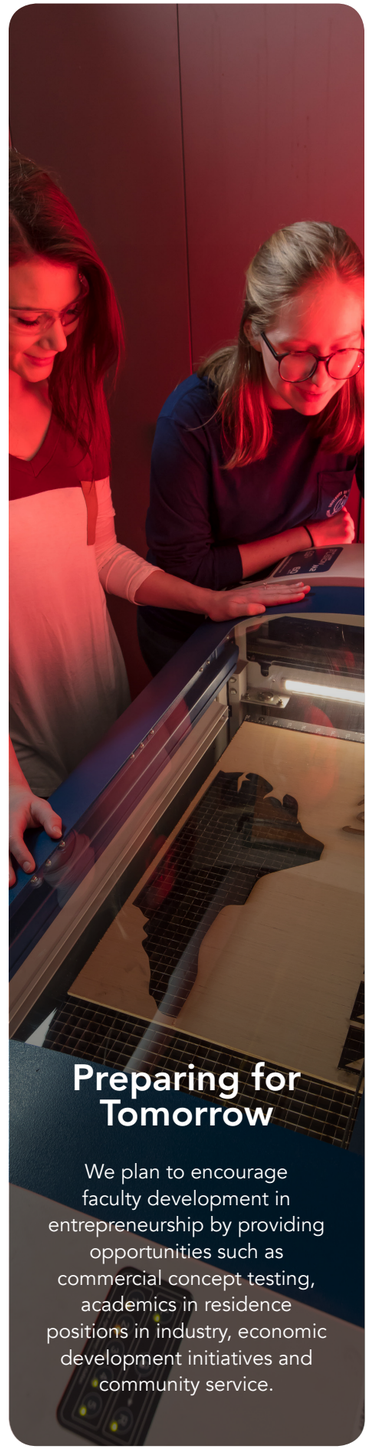
Research Expenditures by Source*



Source: ASEE Research Expenditures Report
Other Categories Include: Foreign Governments, Foundations, Other Non-Government

Patents Awarded





Preparing for Tomorrow

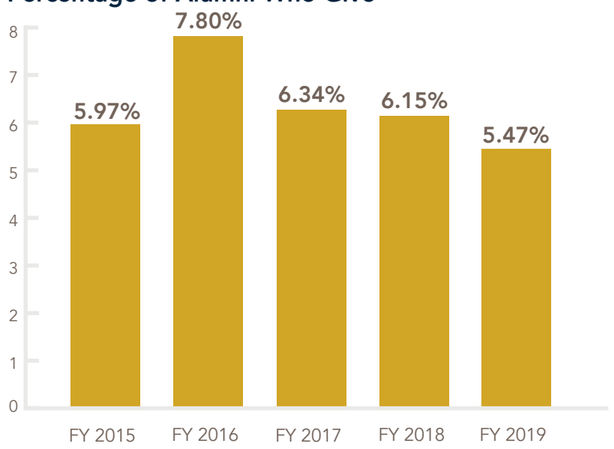
We plan to encourage faculty development in entrepreneurship by providing opportunities such as commercial concept testing, academics in residence positions in industry, economic development initiatives and community service.

Increase Alumni and Corporate Partnerships

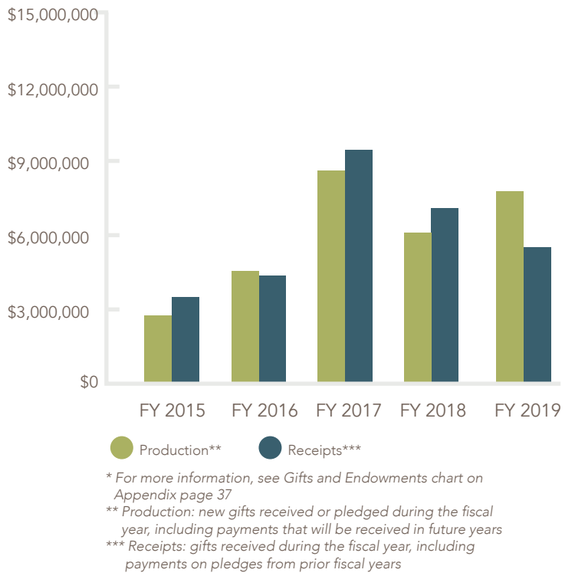
Endowed Faculty Positions

2015	2016	2017	2018	2019
33	34	35	35	36

Percentage of Alumni Who Give



Philanthropic Giving*



** For more information, see Gifts and Endowments chart on Appendix page 37*
*** Production: new gifts received or pledged during the fiscal year, including payments that will be received in future years*
**** Receipts: gifts received during the fiscal year, including payments on pledges from prior fiscal years*

KEVIN BROWN
B.S.Ch.E. 1981 | Executive Vice President, LyondellBasell (retired)
Chair of the Engineering Dean's Advisory Council

"We are truly blessed to see continued improvements in the College of Engineering. As we think about the ability of our students to get good jobs after graduation, or to further their education at prestigious schools, the perceived quality of their education is a factor in opening doors. That perceived quality often is driven by rankings, and our performance in the factors affecting rankings is quite impressive. To use a slogan borrowed from a mentor, 'we are doing a lot of the right things right.'

Our faculty's reputation and competitiveness are on an upward track. We followed last year's record seven NSF Career Award winners with another three in 2019. Our faculty members hold 60 fellowships in professional societies, representing national and international leadership in their fields. Our new faculty hires represent a high level of diversity, and come from leading institutions like Purdue, Vanderbilt, and Carnegie Mellon, among others.

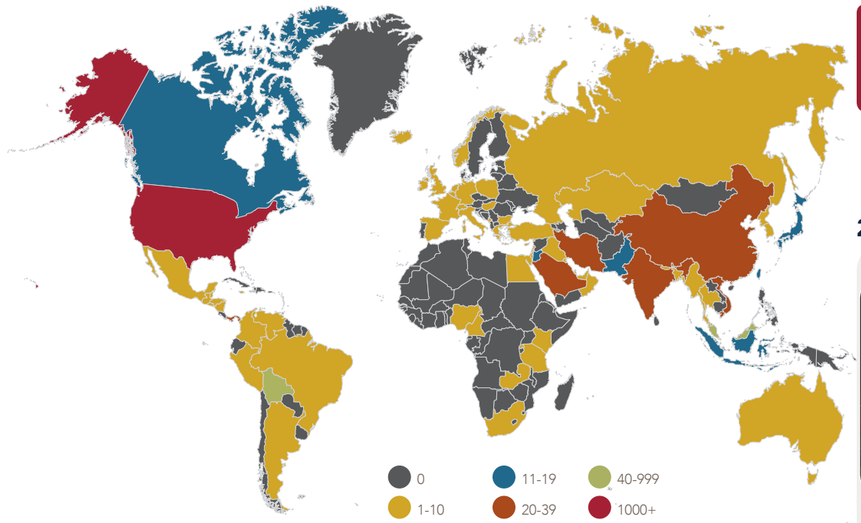
Our quality of students continues to increase. The mean undergraduate GPA was 3.84 (a new record) and the average ACT score was 28.8. Not only is our faculty diversity improving, but the diversity of our student body continues to improve as well. Females and other underrepresented minorities now represent 51 percent of our first-year student population. Our students come from all 50 states and from countries around the world. As our graduates enter the workplace, their experiences here will better prepare them for the diversity of the business world. We have broken ground on the new Student Success Center and continue to grow the Advance Arkansas scholarship funds, enabling our students to not only enter, but to succeed while in school.

Research growth in the College continues at a torrid pace. New research grants in FY2019 totaled $29.5 million, surpassing last year by almost $7 million. Invention disclosures totaled 31, surpassing last year's record of 21. Ten patents were awarded, surpassing the prior high of 6, and last year's 3 patents. These numbers reflect the innovative and collaborative nature of our research enterprise, and are a positive sign for the years ahead.

Yet, there are opportunities for growth. Philanthropic giving has seen mixed results. We had our second highest production year of the last five in FY2019, and our number of endowed faculty positions has grown to 36 thanks to the support of our alumni, friends and partners. But, our percentage of former students who give has fallen each of the last 3 years, from 7.8 percent in FY2016 to 5.5 percent in FY2019. Imagine what our production would be if we maintained our giving percentage.

The faculty and administration are clearly doing their part to continue our reputational improvements. The students we are attracting continue to perform. Research continues to flourish. Our alumni who are giving are doing so at a good pace. So, my parting words to all of our alumni readers are these: When the College of Engineering improves, so, too, does the value of your degree. Just because your days on campus have come to an end, your relationship with the University of Arkansas doesn't have to. We have excellent faculty, staff and students in the College, and your support can help them reach even higher. Go Hogs!"

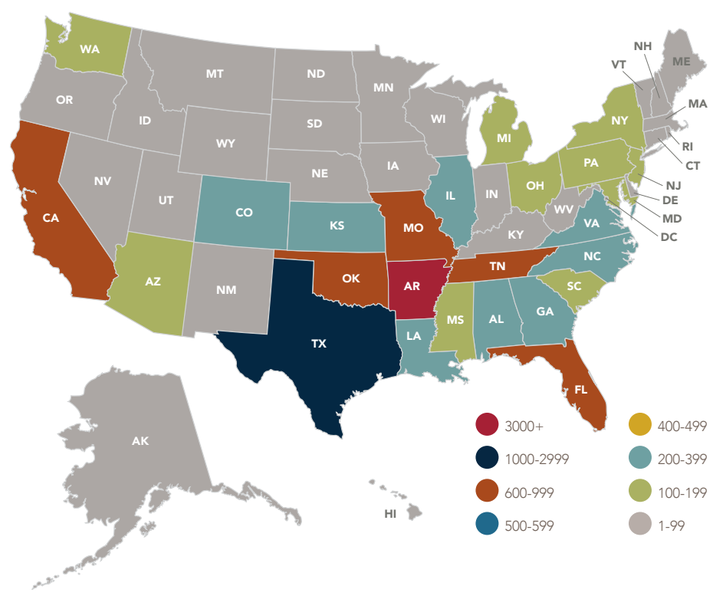
Alumni By Country



Endowed Scholarships and Fellowships

2016	2017	2018	2019
133	139	146	152

Alumni by State



Total Number of Alumni

2019
19,530

2019 Alumni Award Winners

HALL OF FAME AWARDEE
Joe Ray (J.R.) Jones, B.S.M.E. 1982

DISTINGUISHED ALUMNI
Scott E. Bennett, B.S.C.E 1989, M.S.C.E 1994
Michael W. Blinzler, M.S.O.M. 2010
Steven D. Danforth, B.S.Ag.E. 1980
Michael Elmore, B.S.C.S. 1986
Bob Etien, B.S.I.E. 1966
Deva Antoinete Hupaylo, B.S.Ch.E. 1980
Cristine Wolf, B.S.M.E. 1983
Thomas J. Wright, B.S.E.E. 1968, M.S.E.E. 1970

EARLY CAREER AWARDEES
Alfonso Camerlingo, M.S.O.M. 2014
Royce W. Floyd, B.S.C.E. 2008, Ph.D. 2012
Kyle Kruger, P.E., B.S.B.E. 2005, M.S.En.E. 2009
Willie Montgomery III, B.S.I.E. 2004, M.S.I.E. 2009
Tracie Stauffer Nutter, B.S.Ch.E. 2004
Ben Harris Rainwater, Ph.D., P.E., B.S.M.E. 2010
Dr. Brian Rowden, M.S.E.E. 2005, Ph.D. 2010

CEREC

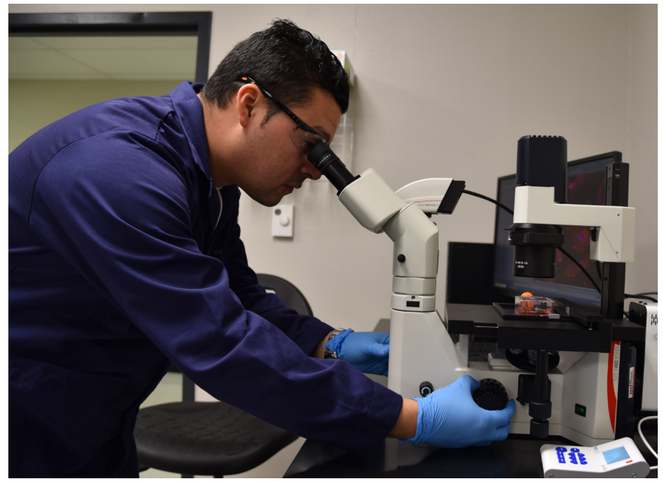
The Civil Engineering Research and Education Center (CEREC) broke ground Nov. 4 at the Arkansas Research and Technology Park in Fayetteville.

Once completed, CEREC will be a "living laboratory" for civil engineering undergraduates at the university – the first of its kind in Arkansas.

Students will use the center's design and construction process to explore topics in construction techniques and management; computer-aided design and drafting; plan development; construction materials; soil mechanics and foundation design; structural steel design and reinforced concrete design. CEREC will also provide students with vital opportunities for hands-on experience through laboratory exercises and research activities and will truly be a statewide resource.

The first phase of construction will consist of a 34,700-square-foot lab space including a high bay lab, strong floor and overhead crane. The high bay lab is the cornerstone of the CEREC, allowing large-scale testing of steel, timber, and concrete structures within a controlled environment.

The space will also allow the College of Engineering to better serve as a research partner for structural industries and agencies throughout the state of Arkansas and the region to drive innovation and solve current structural problems faced across the state, region, and nation.



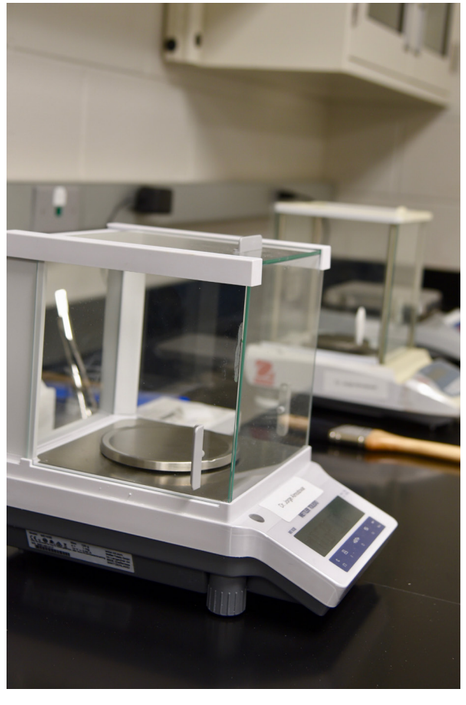
Almodovar Lab

Jorge Almodovar, assistant professor and Ray C. Adam Chair in Chemical Engineering, moved into a newly-renovated space in the Engineering Research Center in south Fayetteville in mid-2019.

Almodovar uses two spaces totaling approximately 800 square feet to conduct research related to biomaterials, biomedical engineering, tissue engineering and cell manufacturing. His lab engineers polymeric materials to be primarily used for healthcare applications. By using natural polymers such as collagen, researchers are developing structures that support tissue regeneration, drug delivery and therapeutic cell culture.

The lab space supports Almodovar's work and provides research opportunities for three graduate students and seven undergraduate students.

The lab houses a variety of specialized equipment for biochemical characterization, including a Luminex multiplex instrument, which allows the simultaneous detection of many proteins from one biological sample. It also has an xCELLigence unit, which is used to monitor in real-time cell behavior using impedance.



Renovation Investment

	2019
Academic	$415,000
Research	$887,500

Renovated Space

	2019
Academic	9,946 ft²
Research	6,639 ft²

Total Space

	2019
Academic	78,412ft²
Research	105,990ft²

TIME TO REFLECT

Engineering in the News

From October 1, 2018 to October 1, 2019, University of Arkansas College of Engineering students, staff, faculty and alumni were mentioned in 227 news stories from outlets in Arkansas and around the world. A few highlights:

October 19, 2018
U of A Project to Help Farmers Recycle Water, Recover Nutrients for Fertilizer
Pine Bluff Commercial

November 19, 2018
UA Startup Clinches Record Win
Arkansas Democrat Gazette

December 14, 2018
State Transportation Department Gives $1 Million to UA Civil Engineering
Arkansas Business Journal

January 15, 2019
Luke Osborn Selected for Forbes '30 Under 30' in Science
Forbes Magazine

February 27, 2019
Lapovations Receives $225,000 to Complete AbGrab Medical Device
Talk Business and Politics

March 19, 2019
New Cost-Effective Method for Hydrogen Fuel Production
Science Daily

April 5, 2019
Motoring into the Future
Scientific American

May 29, 2019
Five Coolest Things on Earth this Week
GE Blog

June 18, 2019
Blackout in South America Raises Questions about Power Grid
Washington Post

July 18, 2019
University of Arkansas Receives $4.6 Million to begin Cybersecurity Training Program
Security Magazine

August 30, 2019
DoD Awards University of Arkansas $7.5 Million to Advance Infrared Detectors
Laser Focus World

September 5, 2019
NIH Funding to Support Research into Cancer Treatment Monitoring
Phys.org

Appendix

Revenues (excluding gifts)

	FY 2015		FY 2016		FY 2017		FY 2018		FY 2019	
State Appropriations & Tuition	$21,712,044	45.81%	$22,948,204	48.42%	$24,090,402	45.49%	$25,976,864	44.44%	$26,938,648	44.45%
Distance Learning Revenues, Ft. Smith, Service Centers, Conferences	$3,140,177	6.63%	$3,325,452	7.02%	$3,362,663	6.35%	$3,381,904	5.79%	$3,457,200	5.70%
Research Incentive Funds	$942,325	1.99%	$1,077,827	2.27%	$953,566	1.80%	$1,297,597	2.22%	$1,116,012	1.84%
Biological Engineering Teaching and Agricultural Experiment Station*	$1,851,719	3.91%	$1,893,397	4.00%	$1,898,336	3.58%	$1,974,884	3.38%	$2,031,850	3.35%
Sponsored Research (actual expenditures)**	$15,907,692	33.57%	$18,372,457	38.77%	$19,057,463	35.99%	$22,026,629	37.68%	$22,961,598	37.88%
Sponsored Activities and Scholarships (actual expenditures)	$1,537,123	3.24%	$1,658,126	3.50%	$900,368	1.70%	$1,002,185	1.71%	$1,166,060	1.92%
Student Equipment Fee Revenues (TELE-net)	$2,302,119	4.86%	$2,436,534	5.14%	$2,689,449	5.08%	$2,794,429	4.78%	$2,937,985	4.85%
Total	**$47,393,199**	**100%**	**$51,711,997**	**100%**	**$52,952,247**	**100%**	**$58,454,492**	**100%**	**$60,609,353**	**100%**

** Cooperative Extension Service not included*
*** As reported to ASEE and USNWR*

Expenditures (excluding gifts)

	FY 2015		FY 2016		FY 2017		FY 2018		FY 2019	
Salary and Benefits	$18,744,220	40.09%	$18,211,503	35.70%	$21,296,537	38.41%	$23,132,313	37.80%	$22,933,705	37.05%
Operating Expenditures	$1,301,172	2.78%	$1,149,449	2.25%	$922,571	1.66%	$980,572	1.60%	$918,842	1.48%
Dept Restricted Fees/Misc	$1,239,293	2.65%	$1,121,038	2.20%	$975,285	1.76%	$1,263,733	2.06%	$1,404,434	2.27%
Student Equipment Fees	$2,241,529	4.79%	$2,082,936	4.08%	$2,137,758	3.86%	$2,908,138	4.75%	$3,013,000	4.87%
Scholarships	$758,241	1.62%	$482,364	0.95%	$343,444	0.62%	$468,273	0.77%	$162,903	0.26%
Research*	$22,476,266	48.07%	$27,966,133	54.82%	$29,770,215	53.69%	$32,452,297	53.02%	$33,463,296	54.06%
Total Expenditures	**$46,760,721**	**100%**	**$51,013,423**	**100%**	**$55,445,810**	**100%**	**$61,205,326**	**100%**	**$61,896,181**	**100%**

**NSF expenditures report generated by Research Accounting*

Appendix

Gifts and Endowments*

Revenue	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Contributions - Expendable	$871,121	$1,390,103	$1,310,687	$2,224,552	$2,489,203
Contributions - Endowed & Restricted Gifts	$3,620,544	$1,303,521	$948,276	$973,871	$1,807,863
Investment Income					
Expendable	$2,617,325	$2,816,073	$2,969,366	$3,020,637	$3,302,513
Endowed (reinvestment)	$0	$0	$0	$0	$0
Endowed Market Value Adjustment	($298,852)	($4,280,657)	$6,814,020	$3,766,783	$958,043
Net Transfers and Allocations	$0	$0	$0	$0	$0
Total Revenue	**$6,810,138**	**$1,229,040**	**$12,042,349**	**$9,985,843**	**$8,557,622**

Expenditures	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Scholarships and Student Support	$836,285	$621,766	$621,152	$829,507	$1,420,488
Other College Support	$2,154,828	$2,002,086	$2,496,899	$2,435,864	$3,036,918
Capital Outlays	$72,484	$187	$7,231	$1,401	$45,962
Development costs**	$391,743	$131,177	$233,808	$176,264	$209,251
Total Expenditures	**$3,455,340**	**$2,755,216**	**$3,359,090**	**$3,443,036**	**$4,712,619**
Revenues less Expenditures	**$3,354,798**	**($1,526,176)**	**$8,683,259**	**$6,542,807**	**$3,845,003**

** Planned and Charitable Remainder Trust Accounts are not reported.*
*** Development costs budgeted from U of A Foundation funds and includes administrative overhead charges to gift revenues.*

Gifts and Endowments Financial Position*

(Endowment Funds Held with the University of Arkansas Foundation, University of Arkansas and Agricultural Development Council)

	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Cash and Cash Equivalents - Expendable	$11,335,354	$12,807,764	$14,109,710	$14,336,491	$16,211,431
Pooled Investment Funds - Endowments	$52,222,964	$52,164,081	$55,345,454	$59,765,483	$60,931,588
Scholarship Endowments	$14,376,759	$13,770,926	$14,516,478	$15,591,733	$16,096,272
Fellowship Endowments	$3,991,624	$4,292,359	$4,934,397	$5,729,113	$6,028,533
Total Fund Balances	**$81,926,701**	**$83,035,130**	**$88,906,039**	**$95,422,820**	**$99,267,824**

** Planned/Charitable Remainder Trust Accounts are not reported. Biological Engineering accounts retroactively reported with Engineering*

Appendix

Distance Education

Master of Science in Operations Management

The Master of Science in Operations Management program was established in 1974 and since that time it has become the largest graduate degree program offered by the University. The purpose of the program is to create value through efficiency by applying the strategic, tactical and operational activities of operations management. The program offers classes at several graduate resident centers across the region. Students may complete all the requirements for the program at one of these centers, at the Fayetteville campus, or online.

Year	Number of Courses Offered	Student Credit Hours
2015	30	9,537
2016	31	9,243
2017	32	8,748
2018	33	7,600
2019	32	7,701

Master of Science in Engineering

The Master of Science in Engineering program has been offering online degrees since 2009. It is a fully-accredited program taught by graduate faculty from the College of Engineering. This program is designed for students who want to further their education in a variety of engineering topics, and its graduates are well-prepared for a career in engineering and management of engineering systems, processes and organizations.

This program is consistently ranked in the top 30 for best online graduate engineering programs and best online graduate engineering programs for veterans by *U.S. News & World Report*.

Year	Number of Courses Offered	Student Credit Hours
2015	65	1,182
2016	67	1,677
2017	76	1,527
2018	75	1,821
2019	78	2,049

Master of Science in Engineering Management

The Master of Science in Engineering Management program provides leadership and business skills to manage technology teams. The program is designed for engineers with bachelor's degrees who want to move into leadership positions in engineering organizations.

Year	Number of Courses Offered	Student Credit Hours
2018	81	477
2019	83	432

Appendix

Faculty Elected as Fellows of Professional Societies

National Academy of Engineering
Mike Johnson | Ajay Malshe

American Concrete Institute
Frances Griffith
Micah Hale

American Institute for Medical and Biological Engineering
Jin-Woo Kim
Yanbin Li
Lalit Verma

American Institute of Chemical Engineers
Tom Spicer
Ranil Wickramasinghe

American Society for Engineering Education
Norman Dennis
Kim Needy

American Society for Engineering Management
Heather Nachtmann
Kim Needy
Edward Pohl

American Society for Testing and Materials
Ashok Saxena

American Society of Agricultural and Biological Engineers
Yanbin Li
Otto Loewer
Lalit Verma

American Society of Civil Engineers
Norman Dennis
Findlay Edwards
Ernie Heymsfield
Mike Johnson
R. Panneer Selvam

American Society of Mechanical Engineers
Rick Couvillion
Ajay Malshe
Steve Tung
Min Zou

ASHRAE
Darin Nutter

ASM International
Ajay Malshe
Ashok Saxena

City and Guilds of London Institute (UK)
Simon Ang

Electrochemical Society
Simon Ang

Indian Society of Agricultural Engineers
Lalit Verma

Institute for Operations Research and Management Sciences
Greg Parnell

Institute of Biological Engineering
Yanbin Li
Lalit Verma

Institute of Electrical and Electronic Engineers
Simon Ang
Samir El-Ghazaly
Alan Mantooth

Institute of Engineering and Technology (UK)
Simon Ang
Omar Manasreh
Karl Schubert

Institute of Industrial and Systems Engineers
Richard Cassady
John English
Heather Nachtmann
Kim Needy
Edward Pohl
Manuel Rossetti

Institute of Physics
Ajay Malshe

International Academy of Agricultural and Biosystems Engineering
Lalit Verma

International Academy of Production Engineering
Ajay Malshe

International Congress on Fracture
Ashok Saxena

International Council on Systems Engineering
Greg Parnell

Lean Systems Society
Greg Parnell

Military Operations Research Society
Greg Parnell

National Academy of Construction
Mike Johnson

National Academy of Inventors
Hameed Naseem

Society of American Military Engineers
Mike Johnson

Society of Decision Professionals
Greg Parnell

Society of Reliability Engineers
Richard Cassady
Edward Pohl

Society of Tribologists and Lubrication Engineers
Min Zou

Appendix

College of Engineering Administrative Contacts

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Engineering Dean's Advisory Council

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Executive Vice President, Manufacturing & Refining (retired)
LyondellBasell Industries

Troy Alley, Jr.
President of Real Estate Division & COO
Con-Real, L.P.

Gregory Baltz, Sr.
Founder & President
Running Lake Farms

Bami Bastani
Senior Vice President,
Mobile & Wireless Infrastructures
Business Unit
GLOBALFOUNDRIES

Scott Bennett
Director
Arkansas Department of Transportation

Sherman Black
CEO
Conservis Corporation

G. Kent Burnett
Senior Vice President of IT &
E-Commerce (retired)
Dillard's, Inc.

Ansel L. Condray
Chairman & Production
Director (retired)
ExxonMobil International, Ltd.

Melinda Faubel
Director of External Affairs
AT&T Arkansas

Alan D. Fortenberry
CEO (retired)
Beaver Water District

Kendall T. Harris
Provost & Vice President of
Academic Affairs & Research
Texas Southern University

Robert S. Harrison
Vice President & Principal
ECCI

Grady E. Harvell
President & COO
W&W/AFCO Steel

David Humphrey
Vice President, Investor Relations
ArcBest

James "Jon" Keel, Jr.
Founder & CEO
Improved Results, LLC

Rodger S. Kline
CAO (retired)
Acxiom Corporation

Vincent S. Lyons
General Manager, North Texas &
Eastern Region Engineering Operations
Raytheon Company

John Marshall
President
Coastal Partners, Inc.

Charles "Micky" Mayfield, Jr.
Sales Vice President (retired)
Nokia Siemens

W. Kent McAllister
President of Projects
Wood - Americas

James "Jim" McClelland, Jr.
Chairman Emeritus
McClelland Consulting Engineers, Inc.

Pamela McGinnis
President of Global Marketing
Phillips 66

Marji McNeill
Vice President & Director,
Compliance & Ethics
Flint Hills Resources

Adam Monroe
Biotechnology Executive

Tom L. Pierson
Founder & CTO
TAS Energy, Inc.

Malik Sadiq
President, Internal Growth &
Business Optimization
Tyson Foods, Inc.

Karl D. Schubert
President & Principal Consultant
TechNova Consulting, LLC

Patrick Schueck
President
Lexicon, Inc.

Stuart Scott
Executive Vice President & CIO
J. B. Hunt Transport, Inc.

Thad Solomon
Vice President & GM
Nucor Yamato Steel Company

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Next Generation Supply Chain (retired)
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President/ CEO
Powering Forward Consulting

W. Robert Storey
Managing Director
The MVR Company

Chuck Tilmon
Vice President, Quality Control
Walmart, Inc.

Chris Weiser
Owner & CEO
J. V. Manufacturing, Incorporated

Bruce Westerman
Congressman

Daniel Williams
President & CEO
Garver, LLC

Charles Zimmerman
President & Owner
Global VE

Lang Zimmerman
Vice President
Yelcot Communications


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