AS DEAN OF ENGINEERING, I am pleased to present the 2017 College of Engineering Fact Book. The data found in the following pages presents our progress towards fulfilling the objectives of our strategic plan. The information is organized according to the objectives, and in each section of the book, you will read stories of success specific to the objective being addressed. This book shows our proud commitment to fulfilling our role as part of a land grant university. In its pages you can see where we have been, what progress we have made, and how we are working to prepare our students, faculty, staff and alumni for tomorrow.

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

Fall 2017 Total Enrollment

<table>
<thead>
<tr>
<th>Category</th>
<th>Enrollment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate</td>
<td>23,044</td>
</tr>
<tr>
<td>Graduate</td>
<td>4,161</td>
</tr>
<tr>
<td>Law</td>
<td>353</td>
</tr>
<tr>
<td>Total Enrollment</td>
<td>27,558</td>
</tr>
</tbody>
</table>

University of Arkansas
Fall 2017 Enrollment (Degree Seeking Only)

- College of Education and Health Professions: 7,880
- Sam M. Walton College of Business: 5,121
- College of Engineering: 4,316
- J. William Fulbright College of Arts and Sciences: 6,354
- Fay Jones School of Architecture: 352
- Dale Bumpers College of Agricultural Food and Life Sciences: 266
- Total Students: 22,812
University of Arkansas Rankings*

* Source: U.S. News and World Report

- National University Rank
- Public University Rank

Dale Bumpers College of Agricultural Food and Life Sciences
Fay Jones School of Architecture
J. William Fulbright College of Arts and Sciences
College of Education and Health Professions
College of Engineering
Sam M. Walton College of Business
Law
Graduate School (Interdisciplinary Students)

2017 Enrollment Highlights

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate*</td>
<td>3,393</td>
</tr>
<tr>
<td>Graduate**</td>
<td>958</td>
</tr>
<tr>
<td>College of Engineering</td>
<td></td>
</tr>
<tr>
<td>Total Enrollment</td>
<td>4,351</td>
</tr>
</tbody>
</table>

Total undergraduate enrollment is **up 2.5 percent** over 2016.

Since 2007, undergraduate enrollment has more than doubled.

We have **802 new freshmen** for 2017.

Our 2017 freshman class is **24 percent female**.

Underrepresented students—female, minority and first generation college students—make up **50.1 percent** of the freshman class.

* Degree seeking only

** Includes engineering students enrolled in interdisciplinary programs and distance education
# Fall 2017 Undergraduate Enrollment by Department*

<table>
<thead>
<tr>
<th>Department</th>
<th>Total Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological and Agricultural Engineering</td>
<td>102</td>
</tr>
<tr>
<td>Biomedical Engineering</td>
<td>226</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>321</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>305</td>
</tr>
<tr>
<td>Computer Science and Computer Engineering</td>
<td>491</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>230</td>
</tr>
<tr>
<td>Industrial Engineering</td>
<td>240</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>573</td>
</tr>
<tr>
<td>Undeclared</td>
<td>905</td>
</tr>
</tbody>
</table>

* Students in the Freshman Engineering Program are not included.
College of Engineering
Organization & Finances

Board of Trustees

University of Arkansas System President – Donald Bobbitt

Chancellor – Joseph Steinmetz

Provost – Jim Coleman

Dean – John English

Senior Associate Dean
Norman Dennis

Academics
Recruitment and Outreach
Student Services

Associate Dean for Research
Heather Nachtmann

Diversity
Facilities
Research

Director of Development and External Relations
Emily Wood

Alumni Relations
Communications
Development

Assistant Dean for Financial Affairs
Larry Esch

Budget

Department Heads

Faculty

2017 Revenue (excluding gifts)

State Appropriations & Tuition $24,090,402
Distance Learning Revenues, Ft Smith, Service Centers, Conferences $5,362,663
Research Incentive Funds $953,566
Biological Engineering Teaching and Agricultural Experiment Station* $1,898,336
Sponsored Research ** $19,057,463
Sponsored Activities and Scholarships $900,368
Student Equipment Fee Revenues (TELE-net) $2,689,449

Total Revenue: $52,952,247

2017 Expenditures (excluding gifts)

Salary and Benefits $21,296,537
Operating Expenditures $922,571
Dept Restricted Fees/Misc $754,493
Student Equipment Fees $2,137,758
Scholarships $343,444
Research*** $29,770,215

Total Expenditures: $55,225,019

For complete financial information, see Appendix page 36

* Cooperative Extension Service not included
** As reported to ASEE and USNWR
*** Reported and compiled by the U of A Research Accounting Office and submitted to the NSF
College of Engineering

Departments and Centers

Biomedical Engineering

Biological and Agricultural Engineering

Ralph E. Martin Department of Chemical Engineering

Arkansas Water Resources Center

Chemical Hazards Research Center

Membrane Research Center

Civil Engineering

Mack-Blackwell Transportation Center

Maritime Transportation Research and Education Center

Southern Plains Transportation Center

Computer Science and Computer Engineering

Institute for Nanoscience and Engineering

Institute for Advanced Data Analytics

Center for Information Security and Reliability

Arkansas Security Research and Education Institute

Industrial Engineering

Center for Excellence in Logistics and Distribution

Center for Innovation in Healthcare Logistics

J.B. Hunt Innovation Center of Excellence

Electrical Engineering

Center for Power Optimization of Electro-Thermal Systems

Cybersecurity Center for Secure Evolvable Energy Delivery Systems

Grid-Connected Advanced Power Electronic Systems

High Density Electronics Center

National Center for Reliable Electric Power Transmission

Mechanical Engineering

Center for Advanced Surface Engineering
# 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

## Objectives

### Increase student quality and diversity

- ACT and GRE quantitative scores
- Career placement rate
- Graduate student acceptance rate
- Honors student completion rate
- Student diversity

### Provide student centered education

- Experiential learning participation
- Freshman retention rate
- Six year undergraduate graduation rate
- Student-faculty ratios
- Student semester credit hours per FTE
- Undergraduate degrees awarded

### Recruit and retain high quality faculty and staff

- Faculty retention
- National awards
- Professional society leaders and fellows
- National Academy of Engineering membership
- Staff to faculty ratios
- Faculty diversity

### Increase research productivity

- Doctoral and master’s degrees granted
- New research grants received
- Peer reviewed publications
- Research proposals submitted
- Research expenditures (total and per faculty)

---

8 Our stories. Our progress. Our future.
### Balanced Growth Metrics

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

### Increase economic development

- Invention disclosures
- Industry research expenditures
- Patents awarded
- Startup companies

### Increase alumni and corporate partnerships

- Philanthropic giving
- Endowed faculty positions
- Endowed scholarships and fellowships
- Percentage of alumni who give

### Provide high quality infrastructure

- Academic space
- Research space
- Renovated space
- Renovation investment

---

**Preparing You for Your Tomorrow**
Danielle Neighbour, BSCE 2016
2016 College of Engineering
Outstanding Senior

Danielle Neighbour wants to spend her career alleviating the global water crisis, and her experience at the College of Engineering has given her a great start. Her first trip abroad was an internship with Reach Beyond International in Ecuador. It was on this trip that she learned what it means to help communities struggling with water issues. Neighbour built on her experience with water quality issues on a service leadership study abroad trip to Vietnam. Neighbour has also studied abroad at the University of Barcelona in Spain, where she took classes in Spanish, participated in a language exchange partnership program, and made new friends from all over the world. At an internship at Burns and McDonnell in Kansas City, she also gained experience in consulting engineering.

Neighbour’s global adventure hasn’t ended since she graduated in December 2016. As a senior, she received both the Truman Scholarship and the Schwarzman Scholarship. Since graduating, she spent the spring semester getting more hands-on experience as a strategic initiatives intern with the water technology company Xylem Inc. in New York City.

* Interdisciplinary students are included in the department of their faculty advisor.
Balanced Growth Goals

- 3,500 undergraduate students
- 1,000 master’s students
- 350 doctoral students
- 135 tenured and tenure-track faculty members
- 65 clinical and research faculty members
- 180 staff members
- $300,000 in research activity per faculty member
Humeyra Ulusoy-Erol
Doctoral Student, Chemical Engineering

Humeyra Ulusoy-Erol is conducting research on water quality and biofuels, and she is passionate about women’s rights around the world. In her home country, Turkey, Ulusoy-Erol was the president of an organization devoted to empowering women as citizens. When she came to the U.S. to study, she continued to advocate for women’s rights. Her involvement with this issue has led Ulusoy-Erol all the way to the United Nations, where she and some friends organized a panel called “Empowering Refugee Women as Entrepreneurs in American Economy” for the 61st session of the UN Commission on the Status of Women.

Ulusoy-Erol has also been selected to receive an AAUW International Doctoral Fellowship from the American Association of University Women. Founded in 1881, AAUW is one of the world’s largest sources of funding for graduate women.
Our future

Balanced Growth

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 ranking.
Our students need to know how to combine engineering skills with creativity and innovation to come up with the next big ideas. That’s why the College of Engineering is finding ways to nurture and encourage our students’ drive to explore and invent. In the new Freshman Honors Innovation Experience, students make a plan to develop and commercialize a new product. We plan to build on the success of this program and integrate innovation throughout the engineering curriculum.”
Preparing for Tomorrow:

- We will 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 working to create more endowed scholarships to support engineering undergraduates who have financial need.
- We hope to establish more doctoral fellowship endowments to recruit graduate students and provide our faculty with excellent assistants in their research.
- We plan to increase scholarships for juniors and seniors who display exceptional leadership and academic qualities.
Keuna Porter
Chemical Engineering Student

“As a child, math and sciences were things that I easily understood. As I got older, I wanted to take my understanding of those subjects and make a difference in the world. That’s how I chose to attend the University of Arkansas and became part of the Engineering Career Awareness Program in the College of Engineering.

ECAP, for me, is my family away from home. I am from a small town, so such a large university atmosphere could have easily become overwhelming. ECAP has helped me find my place here. Through the program I have met my closest friends, and been exposed to early opportunities to be involved in several organizations on campus through exposure, awareness, and networking.”
Preparing for Tomorrow:

- Every semester, our STEM Career Fair attracts over 100 employers and over 1,000 students. We also offer networking events and workshops around the event, so that students receive many opportunities to work on their resumes, practice their interview skills and connect with potential employers.

- With endowed funds for colloquia, we invite speakers to campus and create programs for visiting scholars and executives in residence at the university. This exposes our students and faculty to the emerging trends in engineering excellence.
Our stories

Orlando Aguirre-Martinez
Computer Science and Computer Engineering Student

“I primarily chose the University of Arkansas because of the Engineering Career Awareness Program. As part of ECAP, I attended a summer bridge program the summer before my freshman year where I got to meet the rest of my cohort. This allowed me to know 20 incoming engineers that I knew were taking some of the same classes. It was helpful to see some familiar faces on the first day.

Over time, I have found ECAP provides a network of people who become like family. I keep up with ECAP alumni, and there are many out there doing some amazing things with their careers!”

Increase student quality and diversity

Gender Diversity

<table>
<thead>
<tr>
<th>Year</th>
<th>Undergraduate Students</th>
<th>Graduate Students*</th>
<th>Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2013</td>
<td>18.5%</td>
<td>22.5%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Fall 2014</td>
<td>18.0%</td>
<td>21.7%</td>
<td>20.5%</td>
</tr>
<tr>
<td>Fall 2015</td>
<td>17.5%</td>
<td>21.2%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Fall 2016</td>
<td>18.0%</td>
<td>21.0%</td>
<td>20.5%</td>
</tr>
<tr>
<td>Fall 2017</td>
<td>18.5%</td>
<td>21.5%</td>
<td>20.0%</td>
</tr>
</tbody>
</table>

* Does not include distance education.

Ethnic Diversity

<table>
<thead>
<tr>
<th>Year</th>
<th>Undergraduate Students</th>
<th>Graduate Students*</th>
<th>Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 2013</td>
<td>10.0%</td>
<td>12.0%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Fall 2014</td>
<td>9.5%</td>
<td>11.5%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Fall 2015</td>
<td>9.0%</td>
<td>11.0%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Fall 2016</td>
<td>9.5%</td>
<td>11.5%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Fall 2017</td>
<td>10.0%</td>
<td>12.0%</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

* Does not include distance or international students.
We are easing students’ transition from community colleges through the STEM Preparation Program. This program provides online science, engineering and math classes for students enrolled at an Arkansas community college. These classes count toward an associate’s degree at the student’s community college and a bachelor’s degree in engineering, science or math at the University of Arkansas.

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

Preparing for Tomorrow:

- Our Engineering Career Awareness Program (ECAP) has led to significant 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.
“I chose to study engineering because it was the most efficient way for me to pursue my budding interests in research and biomedical sciences while also allowing me a clear transition to graduate school. The Freshman Engineering Program not only helped me make the most of my freshman year—it also helped me make the most of being a freshman in the College of Engineering. My mentor was an incredible person who became one of my first friends within the College of Engineering and helped me with everything from getting involved on campus to finding an apartment for my sophomore year! Additionally, my honors research course gave me the incredible opportunity to meet a professor from every department in the College and hear about the current research goals within each one. It was an unforgettable and unique experience.”
Preparing for Tomorrow:

- In order to cement our success in retaining and graduating engineers, we are seeking to endow the Freshman 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.
Our stories

Richard Cassady
Professor of Industrial Engineering and Director of the Freshman Engineering Program; Dean’s Award of Excellence for Outstanding Public Service

Richard Cassady has an excellent record of service to the university, to his professional organization and to the local community. He has served on numerous campus committees and task forces, and his most notable achievement in this area is his role as director of the Freshman Engineering Program, which has made a significant impact on student retention in the college.

Christa Hestekin
Associate Professor of Chemical Engineering; Ansel and Virginia Condray Endowed Professorship in Chemical Engineering; Dean’s Award of Excellence for Rising Teaching

Christa Hestekin has made the education of both graduate and undergraduate students a priority in her career. She consistently receives a score of 4+ on her evaluations, and she has proven herself to be innovative and adaptable in her teaching. She is also engaged in teaching outside of the classroom, and she has been successful in securing external funding for student-centered activities like the P3 design competition sponsored by the EPA.

Recruit/retain high quality faculty and staff

Faculty Retention

<table>
<thead>
<tr>
<th>Year</th>
<th>Retention Rate</th>
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</thead>
<tbody>
<tr>
<td>Fall 2013</td>
<td>98%</td>
</tr>
<tr>
<td>Fall 2014</td>
<td>98%</td>
</tr>
<tr>
<td>Fall 2015</td>
<td>99%</td>
</tr>
<tr>
<td>Fall 2016</td>
<td>97%</td>
</tr>
<tr>
<td>Fall 2017</td>
<td>100%</td>
</tr>
</tbody>
</table>

National Faculty Awards Received

<table>
<thead>
<tr>
<th>Year</th>
<th>Awards Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>22</td>
</tr>
<tr>
<td>2013</td>
<td>26</td>
</tr>
<tr>
<td>2014</td>
<td>21</td>
</tr>
<tr>
<td>2015</td>
<td>24</td>
</tr>
<tr>
<td>2016</td>
<td>19</td>
</tr>
</tbody>
</table>

Professional Service Leadership

<table>
<thead>
<tr>
<th>Year</th>
<th>Leadership Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>123</td>
</tr>
<tr>
<td>2015</td>
<td>223</td>
</tr>
<tr>
<td>2016</td>
<td>294</td>
</tr>
</tbody>
</table>

Society Fellows*

<table>
<thead>
<tr>
<th>Year</th>
<th>Fellows</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>62</td>
</tr>
<tr>
<td>2015</td>
<td>59</td>
</tr>
<tr>
<td>2016</td>
<td>60</td>
</tr>
<tr>
<td>2017</td>
<td>63</td>
</tr>
</tbody>
</table>

* For a complete list of fellows, see Appendix page 39
**Our progress**

**Membership in the National Academy of Engineering**

- 2013: 2
- 2014: 2
- 2015: 2
- 2016: 2
- 2017: 2

**Staff-Faculty Ratio**

- Fall 2012: 0.89
- Fall 2013: 0.86
- Fall 2014: 0.87
- Fall 2015: 0.93
- Fall 2016: 0.89

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

- ASEE Aspirant Professor
- ASEE Aspirant Associate Professor
- ASEE Aspirant Assistant Professor
- U of A Professor
- U of A Associate Professor
- U of A Assistant Professor

* ASEE salary survey data for fall 2017 is not available until January. Instructor salaries are not benchmarked in the ASEE salary survey.

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**Our future**

**John White**

**Distinguished Professor of Industrial Engineering; John Imhoff Award for Teaching**

Over his 54-year career, John White has taught more than 5,000 engineering students. In addition to teaching, he also contributes to student learning through his textbooks and published papers. Three of his six co-authored books received book-of-the-year awards from the Institute of Industrial and Systems Engineers. Students he has taught or mentored have received awards at design contests, co-authored papers as undergraduates, been selected as U of A Seniors of Significance and received best paper awards at national conferences.

---

**Ranil Wickramasinghe**

**Professor of Chemical Engineering; Ross E. Martin Endowed Chair in Emerging Technologies; John Imhoff Award for Research**

Ranil Wickramasinghe is an internationally recognized leader in membrane science and technology. His signature accomplishment at the U of A was the establishment of our campus as a site of the Membrane Science, Engineering, and Technology Center, or MAST Center. MAST now comprises three campus sites and is one of the longest running Industrial/University Cooperative Research Centers at the National Science Foundation.
Heather Nachtmann
Associate Dean for Research
Professor of Industrial Engineering

“Engineers are results-oriented and problem solvers, and our researchers are no exception. Our researchers are creating more efficient solar panels and finding ways to integrate them into the power grid, examining materials on the nanoscale in order to create new technologies and products, and investigating new approaches in infrastructure to make our buildings, roads and water sources safer. Much of this work leads directly to benefits for the state. Our faculty and students are working on Arkansas roads, collaborating with Arkansas farmers and testing Arkansas water supplies. They are also starting new companies that contribute to the economy and intellectual capital of our region. Our faculty and students want to make the world a better place, and they have the talent and innovative spirit to do so.”
Our progress

New Research Grants Received

Our future

Lauren Greenlee
Assistant Professor of Chemical Engineering; Louis Owen Professorship in Chemical Engineering; Dean’s Award for Rising Star

In the past year, Lauren Greenlee published three peer reviewed papers in prestigious journals, with another one under review. She received a major external award for new investigators, the 3M Non-tenured Faculty Award, and she has given five invited talks. She is a PI or co-PI on seven external grants from federal and private agencies and has significant state and university funding.

Yanbin Li
Distinguished Professor of Biological and Agricultural Engineering; Tyson Endowed Chair in Biosensing Engineering; Dean’s Award for Collaborative Research Faculty

Yanbin Li has a sustained record of active collaborations both within and outside the college, and has received numerous awards and recognitions, from both the university and national organizations. He is currently involved in a collaborative project which focuses on improving food safety in the Chinese poultry industry. This project has brought together researchers from biological and agricultural engineering, industrial engineering, supply chain management and poultry science, along with the Walmart Foundation, three Chinese universities, a Chinese research institute and three Chinese poultry companies.

Peer-Reviewed Publications

Research Expenditures by Department (FY 2017)
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.

**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.

**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.

**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.

**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.

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

**Aerospace**
The U of A is moving to respond to this area, which is the single largest export market from the state of Arkansas.

**Big Data/ Data Analytics**
Technology has increased the amount of data we produce, leading to an increased need to analyze this data.

**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.
Research centers predominately working in this area include the Center for Power Optimization of Electro-Thermal Systems, Grid-Connected Advanced Power Electronic Systems (GRAPES), High Density Electronics Center (HiDEC) and the National Center for Reliable Electronic Power Transmission (NCREPT).

- Approximately $4 million per year in research expenditures
- Several startup companies have emerged from this area

The Cybersecurity Center for Secure Evolvable Energy Delivery Systems 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

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.

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.

The Mack-Blackwell Transportation Center and Center for Excellence in Logistics and Distribution have been at the forefront 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.

**Advanced Manufacturing**

- Keeping manufacturing jobs in America and maintaining our competitiveness in this area is key for economic growth.

**Optoelectronics**

- This field is emerging from the broader field of electronics. It involves new semiconductor materials, biophotonics and photovoltaics.

**Sustainability**

- Faculty across the college are engaged in some form of research involving sustainable practices, design or technologies.

**Systems Integration**

- This area encompasses research in automation, robotics and systems and process control, and inspires keen interest in our students.

**Water**

- Research in this area includes water quality, wastewater treatment and watershed management.
Whether you know it or not, you probably own items covered in polytetrafluoroethylene, or PTFE. This material is non-reactive, repels water, resists corrosion and reduces friction, which makes it useful for coating cookware, but it also has industrial applications as a solid lubricant, reducing friction and wear in machinery. However, as anyone who has owned a non-stick pan knows, PTFE coatings wear off easily. The non-stick property that makes this material such a good solid lubricant also means it can be easily scraped from a metal surface by an errant fork or spatula. Min Zou, professor of mechanical engineering, and Samuel Beckford, CEO of SurfTec, have been researching ways to improve the performance of PTFE as a solid lubricant. Zou and Beckford, who was her graduate student at the time, discovered that incorporating silica nanoparticles into the PTFE increased its resistance to wear without sacrificing the lubricating qualities of the substance. The two researchers also developed an adhesive that bonds PTFE more securely to a metal surface. Beckford received his PhD in 2014, and he and Zou turned their research into a startup company. SurfTec, LLC focuses on providing a replacement for lead-based journal bearings, which are used in electric motors and generators.
## College of Engineering Startup Companies

Since 1990, 25 companies have been created based on engineering research at the U of A.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>■</td>
</tr>
<tr>
<td>1999</td>
<td>■</td>
</tr>
<tr>
<td>2003</td>
<td>■</td>
</tr>
<tr>
<td>2004</td>
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<td>2005</td>
<td>■ ■ ■ ■</td>
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<tr>
<td>2007</td>
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<td>2008</td>
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<td>2009</td>
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<td>2010</td>
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<tr>
<td>2011</td>
<td>■</td>
</tr>
<tr>
<td>2014</td>
<td>■ ■</td>
</tr>
<tr>
<td>2016</td>
<td>■</td>
</tr>
<tr>
<td>2017</td>
<td>■</td>
</tr>
</tbody>
</table>

## 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.
Melinda Faubel
B.S.I.E. 1980
Director of External Affairs, AT&T Arkansas; Chair of the Engineering Dean’s Advisory Council

“The College of Engineering has made a very significant impact on my life, but the impact the college is making on our state is immense. I am truly proud that I graduated from the University of Arkansas College of Engineering. The college is achieving impressive results and is filled with remarkable students. The faculty and staff are exceptional in providing superior education and research in their support of our students. My fellow advisory board members are outstanding leaders who are working throughout the U.S. and across the globe. I'm especially proud of the focus the college puts on recruiting and retaining underrepresented groups including women, minorities, and first generation college students. Now, more than ever, the young people of our state, region, and nation are finding that engineering is a viable direction for their lives. It is exciting to see the new perspectives brought in to our companies and communities because of the opportunities created in our own College of Engineering.”
Endowed Scholarships and Fellowships

2016: 133
2017: 139

Alumni By State

2017 Hall of Fame Award
• Bob H. Crafton, BSCE 1957
• Larry G. Stephens, BSIE 1958

2017 Distinguished Alumni Award
• Pat Bourne, BSEE 1968
• Bob Harrison, BSME 1974
• Pam McGinnis, BSIE 1990
• Lynn Moore, BSCSE 1994, MSCSE 1996
• Mike Shook, BSAGE 1982
• Michael Wood, BSCHE 1984
• Carl Yates, BSCE 1958

2017 Early Career Award
• Andy Davis, BSCE 1999, MSCE 2001
• Adam Ekenseair, BSCHE 2005
• Matt Francis, BSEE 2003, BS 2004, MSEE 2007, PhD 2009
• Amanda Furr, BSIE 2003
• Toni McCrory, BSBE 2007
• Jonathan Schisler, BSCMP 2004, MSCMP 2005
• Matt Zwicker, BSME 2003
## Renovated Space

<table>
<thead>
<tr>
<th></th>
<th>Academic</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>5,236 ft²</td>
<td>8,200 ft²</td>
</tr>
<tr>
<td>2016</td>
<td>6,420 ft²</td>
<td>14,449 ft²</td>
</tr>
<tr>
<td>2017</td>
<td>10,325 ft²</td>
<td>6,209 ft²</td>
</tr>
</tbody>
</table>

## Renovation Investment

<table>
<thead>
<tr>
<th></th>
<th>Academic</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>$546,000</td>
<td>$304,000</td>
</tr>
<tr>
<td>2016</td>
<td>$229,500</td>
<td>$430,500</td>
</tr>
<tr>
<td>2017</td>
<td>$553,900</td>
<td>$608,100</td>
</tr>
</tbody>
</table>

## Total Space

<table>
<thead>
<tr>
<th></th>
<th>Academic</th>
<th>Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>77,416 ft²</td>
<td>92,272 ft²</td>
</tr>
<tr>
<td>2016</td>
<td>84,229 ft²</td>
<td>102,067 ft²</td>
</tr>
<tr>
<td>2017</td>
<td>84,229 ft²</td>
<td>102,067 ft²</td>
</tr>
</tbody>
</table>
Preparing for Tomorrow:

- The college plans major renovations to John A. White, Jr. Engineering Hall. This historic building has housed engineering classes and labs since 1927. We plan to upgrade the space and create a classic interior that pays homage to the building’s rich history.

- Construction of the Civil Engineering Research and Education Center will provide research space for structures analyses and allow the Department of Civil Engineering to remain regionally competitive.
## Revenues (excluding gifts)

<table>
<thead>
<tr>
<th></th>
<th>FY 2013</th>
<th>FY 2014</th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>State Appropriations &amp; Tuition</td>
<td>$20,117,970</td>
<td>$20,787,672</td>
<td>$21,712,044</td>
<td>$22,948,204</td>
<td>$24,090,402</td>
</tr>
<tr>
<td>Distance Learning Revenues, Ft Smith, Service Centers, Conferences</td>
<td>$3,335,980</td>
<td>$3,103,014</td>
<td>$3,140,177</td>
<td>$3,325,452</td>
<td>$3,362,663</td>
</tr>
<tr>
<td>Research Incentive Funds</td>
<td>$1,635,454</td>
<td>$1,643,657</td>
<td>$942,325</td>
<td>$1,077,827</td>
<td>$953,566</td>
</tr>
<tr>
<td>Biological Engineering Teaching and Agricultural Experiment Station*</td>
<td>$1,947,726</td>
<td>$1,787,000</td>
<td>$1,851,719</td>
<td>$1,893,397</td>
<td>$1,898,336</td>
</tr>
<tr>
<td>Sponsored Research**</td>
<td>$14,930,781</td>
<td>$11,805,030</td>
<td>$15,907,692</td>
<td>$18,372,457</td>
<td>$19,057,463</td>
</tr>
<tr>
<td>Distance Learning Revenues, Ft Smith, Service Centers, Conferences</td>
<td>$3,335,980</td>
<td>$3,103,014</td>
<td>$3,140,177</td>
<td>$3,325,452</td>
<td>$3,362,663</td>
</tr>
<tr>
<td>Student Equipment Fees Revenues (TELE-net)</td>
<td>$2,092,715</td>
<td>$2,286,709</td>
<td>$2,302,119</td>
<td>$2,436,534</td>
<td>$2,689,449</td>
</tr>
<tr>
<td>Total</td>
<td>$45,396,844</td>
<td>$42,931,241</td>
<td>$47,393,199</td>
<td>$51,711,996</td>
<td>$52,952,247</td>
</tr>
</tbody>
</table>

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

## Expenditures (excluding gifts)

<table>
<thead>
<tr>
<th></th>
<th>FY 2013</th>
<th>FY 2014</th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary and Benefits</td>
<td>$16,572,659</td>
<td>$17,363,641</td>
<td>$18,744,220</td>
<td>$18,211,503</td>
<td>$21,296,537</td>
</tr>
<tr>
<td>Operating Expenditures</td>
<td>$2,751,265</td>
<td>$2,615,636</td>
<td>$1,301,172</td>
<td>$1,149,449</td>
<td>$922,571</td>
</tr>
<tr>
<td>Dept Restricted Fees/Misc</td>
<td>$2,466,727</td>
<td>$2,773,673</td>
<td>$1,239,293</td>
<td>$1,121,038</td>
<td>$754,493</td>
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<tr>
<td>Student Equipment Fees</td>
<td>$1,606,694</td>
<td>$2,122,512</td>
<td>$2,241,529</td>
<td>$2,082,936</td>
<td>$2,137,758</td>
</tr>
<tr>
<td>Scholarships</td>
<td>$302,547</td>
<td>$527,343</td>
<td>$758,241</td>
<td>$482,364</td>
<td>$343,444</td>
</tr>
<tr>
<td>Research*</td>
<td>$23,972,316</td>
<td>$20,729,821</td>
<td>$22,476,266</td>
<td>$27,966,133</td>
<td>$29,770,215</td>
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<tr>
<td>Total</td>
<td>$47,672,208</td>
<td>$46,132,626</td>
<td>$46,760,722</td>
<td>$51,013,423</td>
<td>$55,225,019</td>
</tr>
</tbody>
</table>

* Reported and compiled by the U of A Research Accounting Office and submitted to NSF.
## Gifts and Endowments*

<table>
<thead>
<tr>
<th>Revenue</th>
<th>FY 2013</th>
<th>FY 2014</th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributions - Expendable</td>
<td>$2,709,746</td>
<td>$1,126,807</td>
<td>$871,121</td>
<td>$1,390,103</td>
<td>$1,310,687</td>
</tr>
<tr>
<td>Contributions - Endowed &amp; Restricted Gifts</td>
<td>$1,072,257</td>
<td>$5,238,427</td>
<td>$3,620,544</td>
<td>$1,303,521</td>
<td>$948,276</td>
</tr>
<tr>
<td>Investment Income:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expendable</td>
<td>$2,322,307</td>
<td>$2,577,659</td>
<td>$2,617,325</td>
<td>$2,816,073</td>
<td>$2,969,366</td>
</tr>
<tr>
<td>Endowed (reinvestment)</td>
<td>$1,042</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Endowed Market Value Adjustment</td>
<td>$4,133,111</td>
<td>$6,979,898</td>
<td>($298,852)</td>
<td>($4,280,657)</td>
<td>$6,814,020</td>
</tr>
<tr>
<td>Net Transfers and Allocations</td>
<td>$13,743</td>
<td>($1,224,342)</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Total Revenue</td>
<td>$10,252,206</td>
<td>$14,698,448</td>
<td>$6,810,138</td>
<td>$1,229,041</td>
<td>$12,042,349</td>
</tr>
</tbody>
</table>

**Expenditures**

<table>
<thead>
<tr>
<th>FY 2013</th>
<th>FY 2014</th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scholarships and Student Support</td>
<td>$1,119,101</td>
<td>$1,154,870</td>
<td>$836,285</td>
<td>$621,766</td>
</tr>
<tr>
<td>Other College Support</td>
<td>$2,574,873</td>
<td>$2,272,358</td>
<td>$2,154,828</td>
<td>$2,002,086</td>
</tr>
<tr>
<td>Capital Outlays</td>
<td>$152,525</td>
<td>$218,170</td>
<td>$72,484</td>
<td>$187</td>
</tr>
<tr>
<td>Development costs**</td>
<td>$350,435</td>
<td>$347,631</td>
<td>$391,743</td>
<td>$131,177</td>
</tr>
<tr>
<td>Total Expenditures</td>
<td>$4,196,934</td>
<td>$3,993,030</td>
<td>$3,455,340</td>
<td>$2,755,216</td>
</tr>
</tbody>
</table>

| Revenues less Expenditures            | $6,055,272    | $10,705,419   | $3,354,798    | ($1,526,175)  | $8,683,259    |

* 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*

<table>
<thead>
<tr>
<th>FY 2013</th>
<th>FY 2014</th>
<th>FY 2015</th>
<th>FY 2016</th>
<th>FY 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash and Cash Equivalents - Expendable</td>
<td>$9,411,703</td>
<td>$8,219,552</td>
<td>$11,335,354</td>
<td>$12,807,764</td>
</tr>
<tr>
<td>Pooled Investment Funds - Endowments</td>
<td>$46,329,354</td>
<td>$55,042,921</td>
<td>$52,222,964</td>
<td>$52,164,081</td>
</tr>
<tr>
<td>Scholarship Endowments</td>
<td>$9,643,672</td>
<td>$12,348,260</td>
<td>$14,376,759</td>
<td>$13,770,926</td>
</tr>
<tr>
<td>Fellowship Endowments</td>
<td>$3,305,901</td>
<td>$3,785,316</td>
<td>$3,991,624</td>
<td>$4,292,359</td>
</tr>
<tr>
<td>Total Fund Balances</td>
<td>$68,690,630</td>
<td>$79,396,049</td>
<td>$81,926,701</td>
<td>$83,035,131</td>
</tr>
</tbody>
</table>

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

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.

<table>
<thead>
<tr>
<th>Master of Science in Operations Management</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
<td><strong>Number of Courses Offered</strong></td>
</tr>
<tr>
<td>2013</td>
<td>28</td>
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<td>2014</td>
<td>29</td>
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<td>2015</td>
<td>30</td>
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<tr>
<td>2016</td>
<td>31</td>
</tr>
<tr>
<td>2017</td>
<td>32</td>
</tr>
</tbody>
</table>

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*.

<table>
<thead>
<tr>
<th>Master of Science in Engineering</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
<td><strong>Number of Courses Offered</strong></td>
</tr>
<tr>
<td>2013</td>
<td>61</td>
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<tr>
<td>2014</td>
<td>62</td>
</tr>
<tr>
<td>2015</td>
<td>65</td>
</tr>
<tr>
<td>2016</td>
<td>67</td>
</tr>
<tr>
<td>2017</td>
<td>76</td>
</tr>
</tbody>
</table>
Faculty Elected as Fellows of Professional Societies

**National Academy of Engineering**
- Mike Johnson
- John White

**ASM International**
- Ashok Saxena
- Ajay Malshe

**ASHRAE**
- Darin Nutter

**American Concrete Institute**
- Frances Griffith
- Micah Hale

**American Institute for Medical and Biological Engineering**
- Jin-Woo Kim
- Yanbin Li
- D. Keith Roper
- Lalit Verma

**American Society for Engineering Education**
- Norman Dennis
- Kim Needy
- John White

**American Society for Engineering Management**
- Heather Nachtmann
- Kim Needy

**American Society for Testing and Materials**
- Ashok Saxena

**American Institute of Aeronautics and Astronautics**
- Jim Rankin

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

**American Institute of Chemical Engineers**
- Robert Babcock
- Tom Spicer
- Ranil Wickramasinghe

**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

**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
- John White

**Institute of Biological Engineering**
- Lalit Verma

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

**Institute of Engineering and Technology (UK)**
- Simon Ang
- Omar Manasreh

**Institute of Physics**
- Ajay Malshe

**Institute of Industrial and Systems Engineers**
- Richard Cassady
- John English
- Joseph Geunes
- Heather Nachtmann
- Kim Needy
- Edward Pohl
- Manuel Rossetti
- John White

**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 for Decision Professionals**
- Greg Parnell

**Society of Reliability Engineers**
- Richard Cassady
- Edward Pohl

**Society of Tribologists and Lubrication Engineers**
- Min Zou
College of Engineering Administrative Contacts

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Photos on the following pages courtesy University Relations: front cover, inside front cover, 2, 3, 5, 14, 22, 23, 24, 25, 28, 29, 34, back cover
College of Engineering Advisory Council

Melinda Faubel, Council Chair
Director of External Affairs, AT&T Arkansas

Troy Alley
Executive Vice President and COO
Con-Real, Inc.

Greg Baltz
Founder and President
Running Lake Farms

Bami Bastani
Senior Vice President
Radio Frequency Business Unit
GLOBALFOUNDRIES

Sherman Black
CEO
Conservis Corporation

Kevin Brown
Executive Vice President, Manufacturing and Refining (retired)
LyondellBasell Industries

G. Kent Burnett
Senior Vice President of IT and e-commerce (retired)
Dillard’s Department Stores, Inc.

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

Alan Fortenberry
CEO
Beaver Water District

Kendall Harris
Dean and Professor
Roy G. Perry College of Engineering, Prairie View A&M University

Bob Harrison
Vice President/Principal
ECCI

Grady Harvell
President
AFCO Steel

David Humphrey
Vice President, Investor Relations and Corporate Communications
ArcBest Corporation

James “Jon” Keel
Founder and CEO
Improved Results, LLC

Jack King
President and CEO (retired)
Oglethorpe Power Corporation

Rodger Kline
COO (retired)
Axiom Corporation

Vincent Lyons
President & CEO
National Instrument, LLC

John Marshall
President and CEO
Coastal Partners, Inc.

Charles “Micky” Mayfield
Sales Vice President (retired)
Coriant

Kent McAllister
President of Projects
Wood Group - Americas

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

Pamela McGinnis
President, Global Marketing
Phillips 66

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

Adam Monroe
President - Americas
Novozymes

Tom Pierson
Founder and CTO
TAS Energy

Karl Schubert
President and Principal Consultant
TechNova Consulting, LLC

Patrick Schueck
Vice President
Lexicon, Inc.

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

Ami Spivey
Senior Vice President
International Business Processes, Walmart Stores, Inc.

Julian Stewart
Sales and Marketing (retired)
IBM Corporation

W. Robert Storey
Principal Director, The MVR Company
Managing Director, VIC Technology Venture Development

Leon Topalian
Executive Vice President
Nucor Corporation

Chris Weiser
Owner and President
JV Manufacturing

Bruce Westerman
Congressman

Dan Williams
President and CEO
Garver Engineers

Charles Zimmerman
Vice President, International Design and Construction (retired)
Walmart Stores, Inc.