

STRATEGIC PLAN



COLLEGE OF ENGINEERING
The UNIVERSITY *of* OKLAHOMA

2014-2018



COLLEGE OF ENGINEERING STRATEGIC PLAN FOR 2014-2018

THE MISSION OF THE UNIVERSITY OF OKLAHOMA IS TO

Provide the best possible educational experience for our students through excellence in teaching, research and creative activity, and service to the state and society.

THE MISSION OF THE COLLEGE OF ENGINEERING IS TO

Foster creativity, innovation and professionalism through dynamic research, development and learning experiences.

WE WILL:

- Provide our students with competitive advantages in pursuing future careers,
- Empower students, faculty and staff through professional development,
- Deliver high-impact research and technology development.

STRATEGIC PLAN FOR 2014-2018



FIGURE 1

STRUCTURE OF THE STRATEGIC PLAN

GOALS

GROW HIGH-IMPACT RESEARCH AND DEVELOPMENT

We will build on existing and planned strategic investments to bolster our leadership in high-impact R&D areas of importance to our state and nation, including: Biomedical, Energy, Materials, Radar, Transportation and Water.

LEAD NATIONALLY IN EXPERIENTIAL LEARNING

We will build on our strong emphasis on experiential learning, including a new engineering leadership program and develop and deliver an innovative degree program in data sciences and analytics.

INITIATIVES

EXPAND DIVERSITY, INCLUSION AND CAPACITY TO ENHANCE SUCCESS OF STUDENTS, FACULTY AND STAFF

In addition to expanding the size of our student body, faculty and staff, we will accomplish our goals most effectively within an inclusive environment where ideas from a diverse community are valued.

DEVELOP AND EXECUTE A COMPREHENSIVE COMMUNICATION PLAN

Executing our communication plan will help us strengthen our CoE brand and its consistency among a broad spectrum of internal and external stakeholders.

ENHANCE ACADEMIC FACILITIES AND LEARNING TECHNOLOGIES

Achieving our strategic goals will require enhancements to facilities and technologies necessary to foster dynamic learning, innovation and professionalism.

ESTABLISH SCHOOL OF BIOMEDICAL ENGINEERING

This strategic initiative outlines our plans for building an outstanding School of Biomedical Engineering, with the aspiration of becoming nationally recognized.

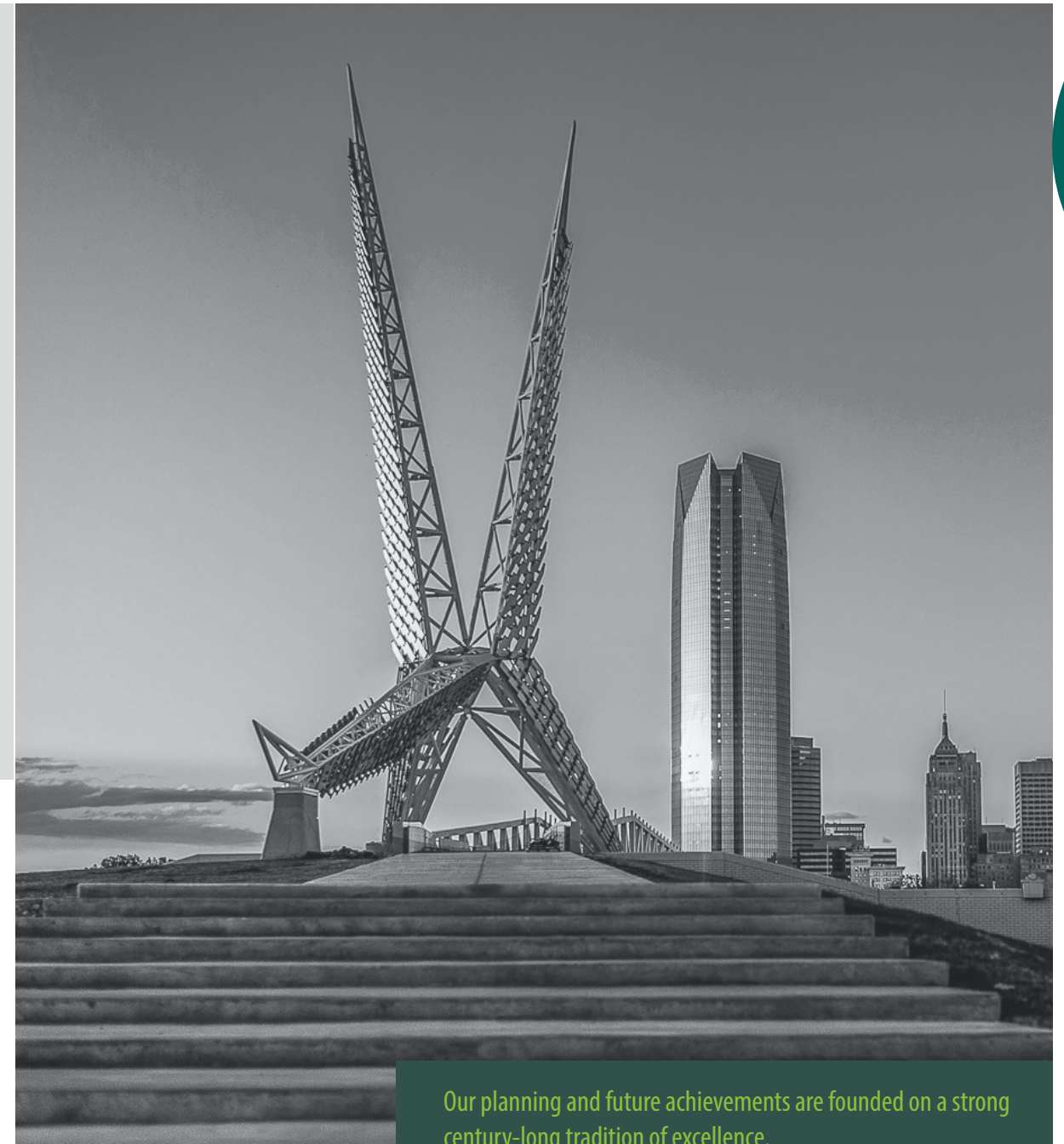
APPROACH

Our mission will be achieved by investing in initiatives consistent with our strategic goals of growing high-impact research and development and leading nationally in experiential learning. In both of these goals, the service mission of the university is implicit. Examples of our service to the state and society will include technology development and transfer yielding economic benefits and service learning projects that create societal benefits. With a bold mission, strategic goals and finite resources, we must define a limited set of initiatives and execute specific projects. These initiatives and projects are chosen in concert with the mission of a comprehensive public research university – and our core values, rich traditions, distinctive capabilities and timely opportunities. Engineering is vital to the future prosperity and security of our state and society. We will grow our numbers of graduates and capacity to serve them. A diverse and inclusive community offers the greatest opportunities to grow the engineering workforce and to change the world through discoveries and innovations that come from diverse viewpoints. We must be more effective in internal communications to successfully carry out this strategic plan. More effective external communications are also essential to enhancing our reputation, securing support and attracting the most talented people. Our growth in capacity will require that we increase the quality and quantity of facilities and adopt advanced technologies. Biomedical engineering is the fastest growing field in engineering and attracts students who are highly talented and passionate. Leading programs average research expenditures per faculty exceed \$1 million. The University of Oklahoma leads the state in all facets of health care and the time is right for the establishment of a School of Biomedical Engineering, with degree programs from undergraduate to doctoral.

TRADITION OF EXCELLENCE

Our planning and future achievements are founded on a strong century-long tradition of excellence. Our strategic plan will preserve the tradition and vitality of these core strengths; and our strategic initiatives are designed to stimulate the growth needed to achieve our strategic goals.¹ The nine academic schools and programs highlighted at the base of Figure 1 serve as showcases for the many accomplishments and traditions of excellence found in the College.

¹ The concepts of “Preserving the Core / Stimulating Progress” are from the book *Good to Great*, by Jim Collins, HarperCollins Publishers, Inc., 2001.



Our planning and future achievements are founded on a strong century-long tradition of excellence.

GROW HIGH-IMPACT RESEARCH AND DEVELOPMENT

The College of Engineering has significantly benefited from strategic investments made by OU's upper administration into cluster hires and University Strategic Organizations (USOs) to support research and development. OU's current emphasis is in the general area of "Weather/Water/Climate." Thus, five of the six high impact research areas that CoE has identified below (viz: Energy, Radar, Materials, Transportation and Water) either overlap or directly align with this larger university focus. The sixth, Biomedical, represents a unique growth opportunity for CoE and OU. While pursuing these, we will continue our commitment to growth and success in established areas, as well as launch bold initiatives in emerging areas. Accordingly, we must grow the size of our faculty and graduate programs, as well as the supporting research infrastructure.

BIOMEDICAL

OU has made a major commitment to establish a nationally-recognized biomedical engineering program. The overall goal of the Biomedical Engineering USO Initiative is to develop at least one federally-funded research center in five years. The major research thrusts are medical imaging, nanomedicine and neuroengineering (neural interfaces). To enhance growth in medical imaging research for cancer detection, a new initiative began in 2012 to hire four new faculty members. Our plan is to: (1) build upon existing strengths and infrastructure in X-ray imaging in cancer detection, functional-MRI of brain disorders, brain-machine interfaces and biomedical applications of carbon nanotubes; (2) develop and strengthen partnerships with the OUHSC, OU-Tulsa School of Community Medicine and other medical research institutes in our state (Oklahoma Medical Research Foundation and Laureate Institute for Brain Research) through targeted funding and seed grant programs; and (3) enhance research capabilities in these areas with further strategic cluster hires.



While pursuing high-impact strategic research areas, we will continue our commitment to growth and success in established areas.

ENERGY

Long a recognized leader in research related to oil and gas recovery and processing, the College of Engineering will continue to lead in fossil energy R&D, while making cutting-edge contributions in a variety of other energy-related areas. Research on catalytic conversion of lignocellulosic biomass to gasoline and diesel fuel has gained national recognition over the last five years. Recent chemical flooding research shows promise to economically recover billions of barrels of trapped oil. Opportunities exist for development of sensors and nonintrusive diagnostic tools, multiphase flow modeling and insulation systems related to conventional and unconventional oil and gas recovery. The partnership with MPGE in the Mewbourne College of Earth and Energy in the development of unconventional oil and gas recovery technologies will continue to be a strategic focus for CoE. The college will

also continue to emphasize design and implementation of grid-related technologies to accommodate distributed power sources, such as Oklahoma wind farms. In the energy arena, CoE researchers have exciting opportunities to collaborate with private industry and national laboratories, including our many partners in the oil field services sector and GE's global oil and gas research center in Oklahoma.

MATERIALS

We will develop materials-by-design, coupled with innovative mechanics-based modeling and experimental characterization, supported by the Materials Genome Initiative. Focus areas include advanced multifunctional composites, semiconductor nanostructures, nanoparticles at interfaces and biomaterials. Develop multifunctional, high-performance, lightweight composites with unique thermo-mechanical properties using both theoretical modeling and innovative experimental techniques. Such advanced multifunctional composites are particularly needed for applications such as deep-water drilling, pipeline insulation and high-speed aircraft. Semiconductor device applications will include mid-infrared lasers and detectors, transistors and microwave systems for chemical sensing, thermal imaging, radar and power electronics, optoelectronics and photovoltaics. Biomaterials applications include design and synthesis catalytic nanoparticles to enable biomass conversion with dramatically improved carbon capture, to improve mobility of trapped oil in reservoirs and to facilitate capture of contaminants from aqueous systems ranging from fracking water to large scale potable water technologies. Whether it be the surface of an artificial biomaterial or the native extracellular matrix, the chemical composition and topography of the surfaces that a cell encounters

in its local microenvironment will control its behavior. Thus, understanding and designing materials that control the cell-surface interface have important implications in the design of implanted medical devices, scaffolds for tissue regeneration and nanoparticle drug delivery systems.

RADAR

Owing to the Strategic Research Initiative in Weather Radar initiated by President Boren in 2003, OU is now recognized as the nation's leader in weather radar research and education. To leverage this expertise, a new initiative was undertaken in 2010 to expand radar research programs in defense, security and intelligence (DSI). Four new faculty members were hired in 2012 to support this initiative and joined with existing radar faculty in the reorganized Advanced Radar Research Center (ARRC), a University Strategic Organization (USO). The CoE will continue to play an important role in growing the impact of radar by building on a strong record of sponsored research from funding agencies such as NOAA and DARPA. Completion of the new Radar Innovations Laboratory (RIL) in April 2014 dramatically increases our capabilities. It brings students and researchers together into a single collaborative space with access to state-of-the-art anechoic chambers, design and testing capabilities, and prototyping facilities.

TRANSPORTATION

Transportation research is a recognized domain of strength and accomplishment of CoE faculty, particularly in the areas of highway infrastructure, safety and freight logistics. The recently announced U.S. DOT award for OU to lead the Southern Plains Transportation Center (SPTC) creates an unprecedented opportunity to elevate our transportation research, workforce development and leadership program

KEY PERFORMANCE INDICATORS

- Research expenditures
- Proposals submitted
- Research awards
- PhD enrollment and GRA stipends
- PhD graduation and time to graduation
- Number of post-docs, research faculty and visiting scientists
- Number of high-impact journal and refereed proceedings publications
- Invention disclosures, patents, licenses, commercialization

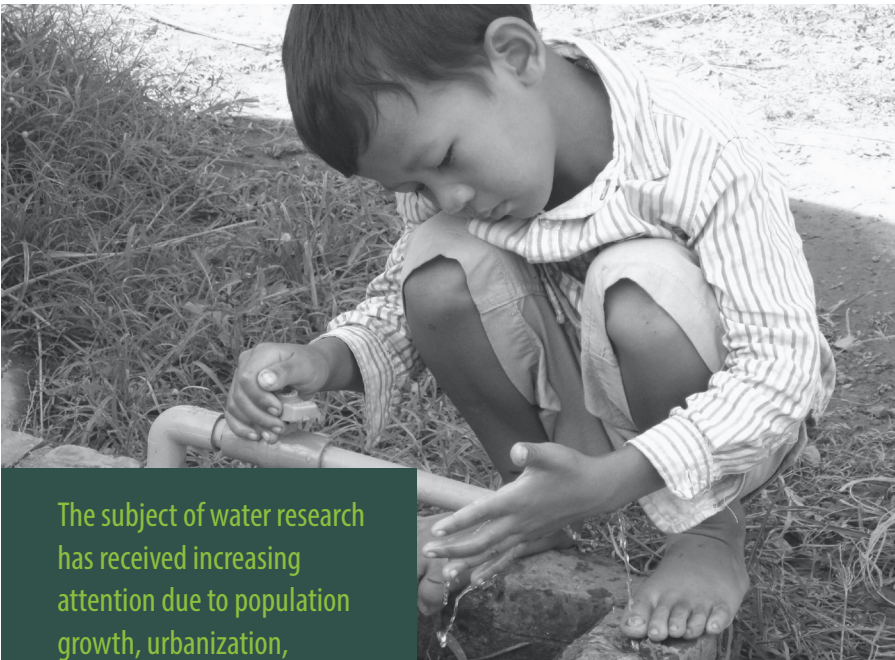
to the national level. With climate adaptive transportation and freight infrastructure as SPTC’s strategic focus area, OU’s unique facilities and track record in weather research and strong funding support from state DOTs in the region, we are uniquely positioned to address the enormous challenges to transportation infrastructure maintenance and public safety due to weather extremes. Focus areas include impact of weather extremes on bridges and pavements, novel infrastructure

monitoring techniques and innovations in materials, construction and safety. Our strength in data sciences and analytics is synergistic to advancing a sustainable and resilient transportation and freight infrastructure. We seek USO designation for this important new federally funded center.

WATER

The College of Engineering has a long history of significant contributions in water research; the subject has received increasing attention due to population growth, urbanization, industry and climate change putting more stress on water availability and quality. Additionally, water utilization and quality are of increasing importance due to the growth of the unconventional energy sector. Under such conditions, new approaches to managing water are needed in order to sustain the natural and built environment. We will leverage existing strengths and alliances with state and

federal partners to grow our research portfolio. Targeted areas include: water reclamation and reuse, remote sensing hydrology, ecological engineering, subsurface transport, fate and remediation, flood hazard modeling, warning and mitigation, advanced water and wastewater treatment and recovery, resilient infrastructure, place-based studies of multi-use reservoirs, geogenic contaminants, water utilization and quality in the unconventional energy sector, geomorphology, integrated (cultural, economic, technical) solutions for sustainable water supply and ecosystems services and functions. The application of radars developed at OU provides the base upon which we will build advanced remote sensing technologies for modeling and prediction of global water resources and quality.



The subject of water research has received increasing attention due to population growth, urbanization, industry and climate change.

LEAD NATIONALLY IN EXPERIENTIAL LEARNING

Experiential learning is an educational approach where, through the exploration of real-life activities and challenges, students are involved in hands on, collaborative and reflective experiences. Through learning from the *process*, students “take ownership” to develop new skills and knowledge. The OU College of Engineering already has a strong emphasis and belief in the value of experiential learning; we will build on this competency by creating even more opportunities for student-centered active learning environments. Consistent with growing opportunities for experiential learning, we will create a new engineering leadership program to provide students with leadership and management skills. This approach enables students to appreciate and harness the power of problem solving in a team environment. The leadership program will also serve as a point of contact for interdisciplinary entrepreneurial efforts. Additionally, we will create an innovative multi-disciplinary degree program in the area of data sciences and analytics that is founded on the principles of experiential learning and teamwork. This program involves significant experiential learning through team project work based on real-world problems and data. We also seek to develop other innovative curricula, including undergraduate and graduate degrees, certificates and specialization tracks in targeted areas.

EXPERIENTIAL LEARNING

We will strengthen and expand experiential learning opportunities available to students through both curricular (e.g., hands-on experiential learning in credit-bearing lab sections, water minor, capstone projects, research) and extra-curricular (e.g., competition teams, service-learning – volunteer work on water and sanitation in developing regions, summer internships, study abroad, entrepreneurship opportunities and research). Key to our current success in experiential learning is the world-class ExxonMobil Lawrence G. Rawl Engineering Practice Facility, which we will continue to expand in terms of support, capabilities and capacity. Undergraduate research, which



Through learning from the *process*, students “take ownership” to develop new skills and knowledge.

is an emphasis for the University, promotes experiential learning and is a strength within the CoE that we will continue to expand, including through growth and improvement of laboratory facilities. We will also seek out and develop new methods for integrating experiential learning in innovative and non-traditional ways, e.g., re-thinking and re-structuring how we teach subjects traditionally thought of by students and faculty as being highly theoretical and traditionally taught using didactic or even rote methods. In our effort to provide experiential learning for all engineering students,

in-classroom pedagogies of engagement and active learning will require “in context” learning scenarios to provide students with authentic engineering experiences and opportunities to reflect and conceptualize what they learn. We will lead in evidence-based practices of experiential learning, including dissemination through the literature of engineering education.

ENGINEERING LEADERSHIP PROGRAM

Our Leadership and Organizational Management course is one of the most popular of CoE offerings, resulting in many testimonials of life-changing experiences. Through the creation of a CoE Leadership Program, we will build on and formalize this and other leadership and management of technology courses and opportunities available to our undergraduate and graduate students’ professional development, providing them with competitive advantages in pursuing future careers in industry, government and academia. The program will also manage the college’s relationship with key partners (e.g., Price College of Business Entrepreneurship program, Software Business Accelerator and the Center for Creation of Economic Wealth) to support students in an entrepreneurship-related minor, study missions to key U.S. cities and immersion experiences.

ON-LINE MASTER’S DEGREE AND CERTIFICATE IN DATA SCIENCES AND ANALYTICS

Data sciences is a systematic interdisciplinary study to facilitate the transformation of data into information. It is concerned with the development and application of analytical models and methods combined with the necessary computational techniques to gain insights from complex and ubiquitous data for evidence-based decision-making. The credentialing programs (Master of Science and Graduate Certificate) in Data Sciences

and Analytics (DSA) will bring together the disciplines of Computer Science and Industrial and Systems Engineering to produce the next generation of data analysts. This program will give the students the ability to understand, evaluate, build and deploy data science and analytics solutions by giving them a strong foundation in computing, analytics and systems thinking. Having a strong foundation in engineering, statistics and information technology enables students in this program to develop new algorithms and tools used in a broad range of data analytics applications, including engineering, business and science domains. Students will engage in internships and team projects that are driven by real-world problems and data. This differentiates OU’s DSA program from other similarly named programs, which focus primarily on the application of existing tools to business problems. We will leverage and build on our current successes in utilizing OU’s Janux platform for on-line delivery of content as appropriate.

KEY PERFORMANCE INDICATORS

- **Number, intensity, and effectiveness of experiential learning experiences**
 - Curricular experience
 - Extra-curricular experience
 - Evidence-based research
 - Funded projects/proposals
 - Partners and employers
- **Real world projects/product/service development**
 - On and off-campus events
 - Student and employer satisfaction
 - Enrollment and graduation statistics
 - Invention disclosures, patents, licenses

EXPAND DIVERSITY, INCLUSION AND CAPACITY TO ENHANCE SUCCESS OF STUDENTS, FACULTY AND STAFF

Creativity and innovation thrive in environments where diversity is valued and inclusion is cultivated through awareness and appreciation of ideas and talent contributed by each member of the college community. Increasing the scope of our highly successful Multicultural Engineering Program (MEP) is foundational to achieving our goals in the areas of diversity and inclusion. Additionally, we will invest in the following programs to effectively recruit and enhance the success of our students, faculty and staff.

GROW THE COE STUDENT BODY THROUGH EFFECTIVE OUTREACH AND RECRUITMENT

Increase the capacity and scope of our outreach program – We will create pathways for K12 students to pursue engineering through the development and dissemination of hands-on experiential learning exercises and curriculum.

Provide Competitive Scholarships for Recruitment and Retention –

Enhance scholarship awards for qualified students to build and retain a strong and diverse student body, and thus increase our numbers of graduates.

ENHANCE STUDENT SUCCESS

Position Summer Bridge Program to Increase Academic Preparedness of Incoming Students – Expand this program, which sets the standard for equipping incoming students with the academic tools and skills necessary to achieve first-year success.



The WiE program will provide an environment where female students can freely engage in activities in support of their success in engineering degree programs.

Establish Women in Engineering Program – By having emphasis in the areas of outreach, retention and professional development, the WiE program will provide an environment where female students can freely engage in activities in support of their success in engineering degree programs.

KEY PERFORMANCE INDICATORS

- **Enrollment**
 - Outreach and recruitment
 - First year retention (UG)
 - Second year retention (UG)
 - Graduation
 - Diversity
 - Financial support
- **Faculty**
 - Diversity
 - Retention

EXPAND CAPACITY

Recruit Highly Qualified Graduate Assistants – Provide competitive graduate stipends to teaching assistants supporting curricular experiential learning (e.g., hands-on teaching lab assistants). Cooperate with Graduate College to pilot ¼ –time graduate assistantship appointments with non-resident tuition waivers, to be competitive with regional universities.

Recruit Additional Faculty of Engineering Practice – A key reason that students leave engineering is they do not see how early engineering coursework relates to professional practice. An engineering faculty with significant industrial experience provides the necessary link between fundamental engineering concepts and practical applications.

Recruit New Faculty and Staff – Achieving our strategic goals – grow high-impact R&D and lead nationally in experiential learning – will require us to grow our faculty in key areas. Additionally, the establishment of the new School of BME, including the development and delivery of a new undergraduate degree program, will require new faculty and staff. We will seek out highly qualified candidates and enhance diversity among faculty and staff.

PROVIDE GUIDANCE AND SUPPORT FOR CAREER DEVELOPMENT OF FACULTY AND STAFF

We will nurture, reward and invest in career and professional development activities. A new mentoring program will be established for junior faculty. The program will include training on guidelines for promotion and tenure (PPO3), a senior or emeritus faculty member being a valuable resource, confidant and advocate of the junior faculty member, and providing seed funds to accelerate success of the faculty member. Workshops, seminars, discussion groups and other initiatives will be provided to create awareness and understanding of inclusive culture, innovative classroom technologies and to enhance success of research proposals submitted by faculty. We will leverage existing resources across campus (such as the Center for Teaching Excellence, the Center for Research Program Development and Enrichment, the Sooner Engineering Education Center and Human Resources).



An engineering faculty member with significant industrial experience provides the necessary link between fundamental engineering concepts and practical applications.

DEVELOP AND EXECUTE A COMPREHENSIVE COMMUNICATION PLAN

The communication plan will strengthen CoE brand awareness and public relations among our wide range of constituents identified in the stakeholder analysis, including internal (students, faculty, staff, administrators, etc.) and external (alumni, peers, government agencies, companies, etc.).

STRENGTHENING BRAND AWARENESS

Development of a brand identity will provide a foundation for all our communication efforts. To achieve consistent and effective communications with key stakeholders, the CoE will create and periodically update “elevator speeches” that highlight significant accomplishments. We strive to rise in the national rankings; accordingly, we will annually report data to the ASEE on-line database and *U.S. News* rankings. The range of periodic publications (print and digital) to build the brand will include the existing publications and extend to include all academic schools, programs and outreach/recruiting/retention programs.

INTERNAL COMMUNICATIONS

Internal communications among the schools, programs and college is the first priority and shall be consistent with the college policies and procedures (particularly PP03). Monthly college reports will consolidate and celebrate achievements of the faculty, students, schools, programs and interdisciplinary collaborations.

125TH ANNIVERSARY EVENTS AND MEDIA

The CoE centennial year of 2009-2010 successfully raised our local and regional profile. The upcoming celebration of OU’s 125th Anniversary (2015) is, likewise, a unique opportunity to raise our national profile through publications and special events, such as symposia. The two-day centennial symposium in Spring 2010 attracted prominent keynote speakers and panelists to help place in broader societal context our history of educational and technical achievement, professional leadership and economic impact. Following this successful model, the proposed 2015 symposium will feature an initiative of the CoE 2014-2018 strategy, to be vigorously promoted making use of both mass media and social media.

LEVERAGING SOCIAL MEDIA

Many of our key stakeholders are digital natives. Accordingly, they are both receptive to and accomplished in social media. The CoE will increasingly rely on the low-cost / low-risk tools of social media to more effectively reach targeted market segments, while gaining valuable experience and insights for reaching the mass markets with high-quality messages. We will employ the social media talents of student teams consisting of CoE students, as domain experts, and of journalism and mass communications students, as social media experts. These student teams will be supplied with the appropriate resources to be successful, including technology and training.

KEY PERFORMANCE INDICATORS

- Numbers and timeliness of PR pieces (stories, ads, etc.) in various print, broadcast and internet channels
- Stakeholders reached by category as defined in the stakeholder analysis
- Analytics (e.g., open rates, responses, comment posts, follows, likes, etc.)

ENHANCE ACADEMIC FACILITIES AND LEARNING TECHNOLOGIES

Success of our strategic plan will require growth and change in areas of infrastructure, including physical facilities and mobile/active-learning technologies. High-quality facilities are vital to innovation in experiential learning and to student satisfaction and success. Exposure to state-of-the-art laboratory environments will provide our students with a competitive advantage in securing top positions with future employers. Accordingly, we will initiate development of a facilities/technologies master plan in early 2014. A user group – including faculty, staff and students – will be formed to participate in the master planning for all renovation and new construction. Our legacy buildings – Engineering Laboratory (1918), Felgar Hall (1925), Carson Engineering Center (1964) and Sarkey’s Energy Center (1991) – are in dire need of renovation, particularly to improve the quality of research and teaching laboratories. Legacy classroom improvement projects will address updating in décor, furnishing and learning technology. We will engage in plans on the Research Campus, including the radar innovations, water research, biomedical engineering and other laboratory projects aligned with our priorities in high-impact research and development.

FACILITIES

Up to 100,000 square feet of new facilities will be constructed, including a variety of spaces – e.g., reconfigurable and dual-use laboratories, collaborative learning spaces (team rooms, forum rooms, classrooms, open reconfigurable lobby space for outreach activities and special events) and large (200 seat) auditorium. Research in our interdisciplinary priority areas will have first priority for new research laboratories. For example, research in energy and materials will grow significantly, requiring cluster hires and state-of-the-art laboratory facilities accessible to the faculty and students. New construction will also house institutional functions of the new School of Biomedical Engineering, including space for administrative

and faculty offices, teaching labs and selected research labs. Existing BME research laboratories will continue to be located on the Research Campus, in the Stephenson Research and Technology Center and additional BME research laboratories may be located there and in new facilities among the growing presence of life sciences research.

KEY PERFORMANCE INDICATORS

- Area and accessibility in each category and for all locations (gross and net sq. ft.)
- Condition (years since construction/renovation)
- Online course offerings, enrollments and credentialing

LEARNING TECHNOLOGIES

Selected courses will be re-designed for delivery using flipped, blended or fully online instructional modalities. Flipped and blended courses require active learning environments that encourage student collaboration and peer teaching. OU has developed technology-enhanced classrooms that demonstrate the efficacy of active learning, via integrated technology, furnishings and layout. Assessment of experiences with these spaces, surveys of evidence-based practices and forecasts of emerging modalities will inform design of classrooms in the new and renovated facilities. Initial pilot course re-designs will make use of the OU Janux platform for delivery of three College of Engineering courses – at least one each in CS, ISE and ENGR. We will also pilot the use of iBooks for a digital electronics teaching laboratory manual. We will draw upon key resources at OU to inform all projects in mobile and active learning, including the Center for Teaching Excellence, Provost Advisory Committee for Classrooms and Information Technology.

ESTABLISH SCHOOL OF BIOMEDICAL ENGINEERING

SCHOOL OF BME AND NEW B.S. BME DEGREE

Establishing the School of BME presents an outstanding opportunity for the University of Oklahoma to expand cutting-edge medical research focus, with the aspiration of becoming nationally recognized, especially in the areas of medical imaging, nanomedicine and neuroengineering. It will allow us to meet the growing needs for better healthcare and more biomedical engineers, particularly within Oklahoma, expand CoE's curricular coverage, increase the diversity of the student body and recruit outstanding faculty and students. The proposed targets for student enrollment by 2018 are 100 U/G, 15 M.S. and 30 Ph.D. The 5-year goals for the School of BME include positioning for a first junior class in 2018, subsequently graduating the first senior class in 2019 and undergoing first EAC of ABET site visit for accreditation in the 2020-2023 timeframe. Biomedical engineering research will significantly impact OU and CoE research expenditures. At \$6.3 million in annual research dollars per department, biomedical engineering is the top discipline across all U.S. engineering colleges.² The top 25 BME programs in the nation report average annual research expenditures exceeding \$1 million per faculty member. By strategically partnering with the OUHSC, Laureate Institute for Brain Research and other medical research institutes in Oklahoma, we will offer students unique, cutting-edge research and experiential learning opportunities in health care associated with cancer, diabetes, neurological and cardiovascular diseases. To accomplish these goals we will recruit 11 new faculty members during the 5-year planning

² ASEE Prism, December 2013, pp. 16-17.



KEY PERFORMANCE INDICATORS

- Students: Enrollment, retention, graduation and placement
- Faculty: Proposals, awards, expenditures, archival publications, invention disclosures, patents and licenses

We will offer students unique, cutting-edge research and experiential learning opportunities in health care associated with cancer, diabetes, neurological and cardiovascular diseases.

period ending 2018, and continue building the faculty over the subsequent years to a nationally competitive level of 20. The initial hiring round will be in the nanomedicine focus area. The first round of cluster hiring will begin in Fall of 2014 and be executed by a similar mechanism to that of our ongoing medical imaging cluster hire, a model collaboration of the Norman Campus and the OUHSC Stephenson Cancer Center. At the appropriate time, current OU Biomedical Engineering Center (OUBC) faculty members may choose to be reassigned to the new School of BME. It is an expectation that searches will be initiated for rehiring at the entry level into schools from which these faculty members transfer. All CoE faculty members with appropriate areas of interest and expertise are encouraged to pursue basic research in biomedical topics and, once a record of funding and scholarship is established, to also petition for affiliation with the OUBC.

TRADITION OF EXCELLENCE

The OU College of Engineering has established a great tradition. We count among our family of graduates over 650 corporate senior executives, as well as flag officers in the armed forces, astronauts, ambassadors and members of the National Academy of Engineering. Recent graduates include recipients of the Goldwater Scholarship and the NSF Doctoral Fellowship. Our distinguished faculty includes several who have achieved the highest honors of the University, including 12 George Lynn Cross Professors, 13 David Ross Boyd Professors and 35 Presidential Professors. The college faculty hold 35 endowed Chairs and Professorships. Eleven of our faculty have received the prestigious CAREER Award of the National Science Foundation from the years 2000 to 2010, and a Civil Engineering faculty member was honored with the elite Presidential Early Career Award in Science and Engineering, presented at the White House.

The college began the 21st Century with a commitment to strategic planning. Through previous cycles of strategic planning, it is clear that planning leads to results. During the five years of our previous plan, we have successfully achieved key strategic objectives.

In 2010 we celebrated the Centennial of engineering education at this university. We marked completion of a \$160 million capital campaign, with numerous new scholarships and \$43 million for the opening of two new facilities: Devon Energy Hall (DEH) and the ExxonMobil Lawrence G. Rawl

Through previous cycles of strategic planning, it is clear that planning leads to results.

Photo by Chuck Zovko, courtesy of Lafayette College.

Engineering Practice Facility (REPF), for a combined total of 140 thousand square feet. In 2012, we positioned the college for substantial privately supported growth through creation of the J. H. Felgar Society, a discretionary funds campaign with cash gifts and pledges to date totally \$8.2 million and \$70 million in stock.

We recently secured re-accreditation of all degree programs. Compared to the base year of 2008, undergraduate enrollment grew 38% to a post-WWII high of 2,460. The quality of our students continues to increase, with entering ACT scores of 28, enrollment of 200 National Scholars and over 500 of our students in the OU Honors program. Two of our recent graduates from the School of Chemical, Biological and Materials Engineering have earned the Goldwater Scholarship. Our diversity and inclusion program has

led to new heights of 25% underrepresented minorities and 22% women, well above the national norms of 18-19% of both categories. Doctoral degree production has increase by 60%.

We are national leaders in experiential learning. The REPF is our center for experiential learning in product development and creation of the future workforce. In 2013 over 3,200 PK-12 students visited this national model facility. The Sooner Racing Team has been ranked as high as 1st in the nation and 5th in the world, out of 450 teams. In summer 2013 the Sooner Electric Vehicle Team placed 1st overall in the national competition at the Indianapolis Motor Speedway. In October 2013 we hosted the Frontiers in Education national conference for innovation in engineering education. In April 2014, we have been chosen to host the American Society of Civil Engineer's Department Heads meeting, representing the academic leaders of all 256 civil engineering programs; the theme of the meeting is experiential learning.

Research output of the college has increased three-fold from \$7M in 1998 to \$22M in 2012, and we consistently have faculty with individual annual research expenditures that exceed the \$1 million mark. The University has designated our radar engineering and biomedical engineering centers as University Strategic Organizations. College faculty are prominent in both the Advanced Radar Research Center and the OU Biomedical Engineering Center. College faculty recently led the successful proposal effort for U.S. Department of Transportation Region 6 Southern Plains Transportation Center. Invention disclosures have tripled from 9 in 2007 to 31 in 2013. Faculty have created several startup companies, including Southwest Nanotubes, which produces the benchmark material in that field, as designated by the National Institute of Standards and Technology.



