

# OKLAHOMA STATE UNIVERSITY

COLLEGE OF ENGINEERING, ARCHITECTURE AND TECHNOLOGY



## 2023-2027

### STRATEGIC PLAN



# STRATEGIC PLAN

2023-2027

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COLLEGE OF ENGINEERING,  
ARCHITECTURE & TECHNOLOGY

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## Preamble

The College of Engineering, Architecture and Technology at Oklahoma State was founded more than 130 years ago. The land grant mission to provide a practical education in the mechanical arts without neglecting the humanities necessary to develop the whole person is at the core of our mission.

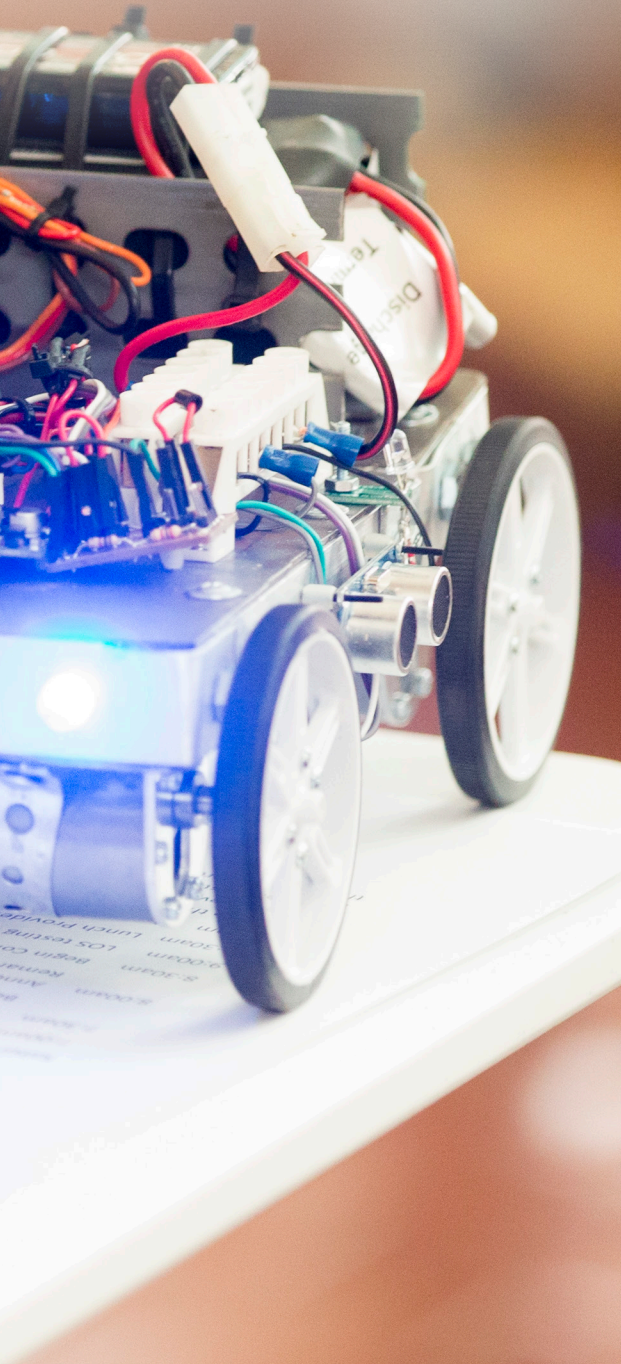
Many of Oklahoma's and the nation's leading companies are led by alumni of OSU's engineering, architecture and technology programs. The southern plains are built on the innovation, design skills and training of our graduates.

OSU graduates in engineering, architecture and technology are creating a new future in aerospace, energy, sustainability, manufacturing, research, data utilization, tools for better health, and design.

Innovation and interdisciplinary efforts in these areas, along with entrepreneurship, will define the practical education of the next generation. OSU will engage a diverse student body in a lifetime of leadership that will shape the intellectual capital of Oklahoma and the US economy. The strategic changes in the college in the next five years will define OSU for decades to come.

“As we look ahead into the next century, leaders will be those that empower others.”

- Bill Gates



## VISION

“To be a leading public university in engineering, architecture, and technology that engages the talents of diverse students, faculty, and staff with industry and government to deliver excellence in advanced learning, leadership, research, and discovery that benefits society.”

## MISSION

“Our mission is to provide diverse engineering, architecture and technology students with the highest quality technical education, research opportunities that support innovation, knowledge creation, and broad experiences that enhance their understanding of ethics, humanity, and the impacts of actions on communities.”

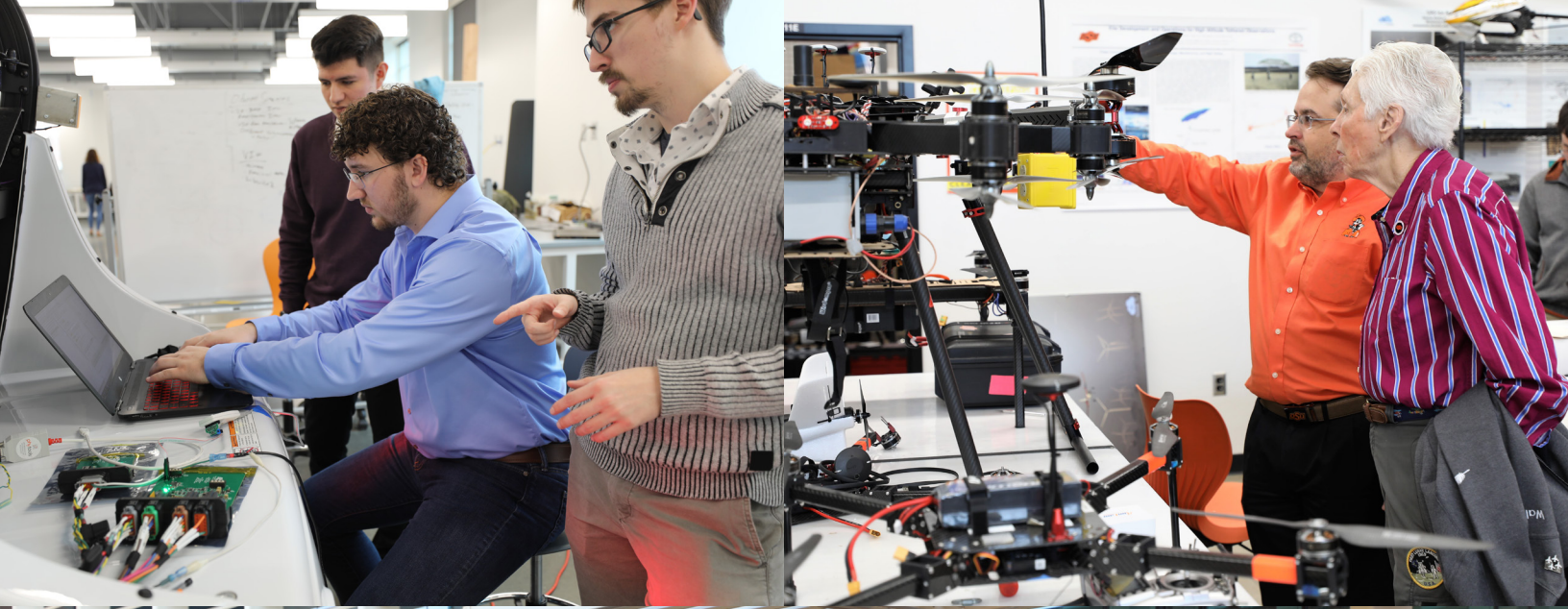
# LEADERSHIP DIRECTION

**The College of Engineering, Architecture and Technology** is a community of scholars, innovators and leaders who are changing the world. The preparation of professionals that anticipate the needs of a changing world is at the nexus of society, economy, ethics, sustainability, and humanity. The College is committed to hiring, training, and educating leaders and professionals who innovate, design, and build a resilient and sustainable future for the university, the state of Oklahoma and the nation.

The vision and mission of the College of Engineering, Architecture and Technology emphasizes the land grant mission of OSU, and the obligation to create future designers and leaders in professions of life that are grounded in science, engineering, humanity, ethics, innovation and sustainability.

**The five-year strategic plan** is developed to guide resource decisions, investments, and the future directions of the College of Engineering, Architecture and Technology. The strategic plan assists the leadership of the College of Engineering, Architecture and Technology (CEAT) in improving our performance by defining both the direction and metrics by which progress is measured. It is the principles by which the College defines its direction and aspirations to continuously improve and stay among the very best programs in the nation among the very best programs in the nation.





## GOALS AND OBJECTIVES

The goals of the College of Engineering, Architecture and Technology at Oklahoma State University help the faculty, staff, and administration achieve the College's mission.

Each is a specific, measurable, achievable, realistic and time-oriented (SMART) goal presented with measurable objectives or benchmarks and strategies that will assist the faculty and staff to reach the goals, and the administration to support the goals. Diversity, equity and inclusion are integrated into every aspect of the College.

There are five major goals in this strategic plan:

- I. ACADEMIC GOAL
- II. RESEARCH GOAL
- III. EXTENSION GOAL
- IV. RECRUITMENT GOAL
- IV. GROWTH & REPUTATION GOAL



**ACADEMIC GOAL:** Recruit, retain, educate and graduate diverse, academically qualified students to address the engineering and architecture design challenges of the 21st century.

This goal addresses the 5-10 year needs of the State of Oklahoma, the region, and the U.S. employers that depend on technical professionals to grow, innovate and lead their companies. With changing demographics in the region, it will require OSU to focus on recruiting and admitting qualified students as well as providing a means for more of them to succeed in their degree program and careers.

### STRATEGIES FOR THE ACADEMIC GOAL

#### **Recruit, Retain, Educate and Graduate Growing Numbers of Diverse, Academically Qualified Students**

1. Selectively recruit more qualified (ACT 24+, HS GPA 3.25+, 4 years of HS Math and Science) undergraduate and graduate students from economically, culturally, and racially/ethnically diverse backgrounds to improve the quality and spectrum of thought in the classroom, laboratory and research.
2. Develop and support innovative and effective advising, monitoring, and intervention protocols to increase retention and graduation rates to serve the growing demand for graduates in Oklahoma.
3. Develop and support innovative programs that engage our students to develop interdisciplinary and contextual designs to complex global challenges in an ethical and sustainable manner.
4. Provide a coordinated and enriching first and second year experience that provides the foundational knowledge to enabling student success.
5. Provide CEAT students with a diverse array of enrichment opportunities, including undergraduate research, global experiences, internships, entrepreneurship, leadership, and competitive innovation.

#### **Address the 21st Century Design Challenges**

1. Create a culture that values interdisciplinary teamwork, a strong work ethic, grit, and strives for academic and professional excellence leading to the development of requisite skills to lead in a competitive and complex world.
2. Provide CEAT students with innovative courses and pedagogy to achieve excellence in mastering fundamental and advanced concepts, creative design and problem solving, and entrepreneurship.
3. Introduce the design experience early in the curriculum and provide design and teamwork experiences through a holistic integration of the curriculum.
4. Develop and grow selected professional graduate programs to meet emerging workforce demands.



# STRATEGIC PLAN 2023-2027

## METRICS FOR ACADEMIC GOAL

### Recruit

1. Average Composite ACT of 28 for CEAT freshmen. (2022: 27.6)
2. CEAT freshman enrolled, 30 percent are female. (2022: 20.6%)
3. Racial and ethnic diversity CEAT undergraduate students, 35 percent. (2022: 31.6%)
4. Increase CEAT freshman/transfer from out-of-state/international to 40 percent. (2022: 36%)

### Retain

5. 90 percent of CEAT new freshmen are retained to their sophomore year at OSU. (2022: 85%)
6. 50 percent of CEAT new freshmen engineers graduate within four years. (2022: 39.3%)
7. 70 percent of CEAT new freshmen graduate within six years of entering CEAT. (2022: 66%)
8. Average time to graduation equal to 4.5 years. (2022: 5 years)
9. Develop 700 CEAT students pursuing Honors degrees and provide financial support to 300 merit based CEAT Scholars each year to participate in scholar development and leadership programs (2022: 673 Honors students, 287 CEAT Scholars)

### Enrich

10. 150 students per year participate in global engineering/architecture experiences. (2022: 74)
11. 2,000 free enrichment opportunities for CEAT students per year (2022: ~1250)
12. 150 students/year have a significant undergraduate research experience. (2022: 96)
13. 60 percent of CEAT undergraduate students graduate with professional internship (2022: 40%)

### Improve

14. 40 percent of CEAT graduates participate in an interdisciplinary senior design project. (2022: ~10%)
15. Fully develop OSU-Tulsa collaborative degrees in IEM and MAE that focus on aerospace manufacturing engineering. (2022: NA)



**RESEARCH GOAL:** Execute impactful research through a growing enterprise that engages faculty and students in extramurally funded federal, state, and industry-based grants, contracts, and innovation activities.

This goal addresses the 5-10 year needs of CEAT to mentor our students in innovation and provide intellectual capital to the economy of Oklahoma and beyond. As a major public research institution, OSU has the mandate to help develop sustainable enterprises and engineering discoveries that improve the economy through innovation. There is a specific need to advance aerospace innovation, develop sustainable energy and environmental practices, and reduce the impact of a 21st century economy on natural resources as well as the local and global environment.

## STRATEGIES FOR THE RESEARCH GOAL

### **Execute Impactful Research**

1. Expand our expertise and research impact in all forms of energy engineering, including efficient use of hydrocarbons, nuclear, net zero technologies, hydrogen, wind, geothermal, solar, biomass, energy storage, energy conservation, and reduced environmental impact of energy.
2. Expand the Aerospace and Unmanned Systems Development Programs, including air-mobility partnerships, counter UAS, space systems, biomimicry, propulsion, lightweight materials manufacturing and inspection, aerospace emissions, and sensor/data utilization.
3. Development of advanced computational and communication systems.

### **Growing the Research Empire**

1. Invest in targeted research efforts with faculty expertise or in university focused strategic efforts (e.g. Aerospace, Energy, Health and Agriculture).
2. Leverage and invest in existing strengths (Aerospace, Energy, Infrastructure, and Computing).
3. Seed and enable research development in new strategic areas (e.g. Manufacturing & Automation).
4. Recruit high quality graduate students.
5. Compete for large efforts (multi-MM\$, multi-departmental/disciplinary RFPs – EPSCoR, EDA, etc.).

### **Engage Faculty and Students**

1. Continue financial incentives for faculty to engage in revenue generating activities and research that funds students.
2. Communicate and recognize faculty and students for outstanding research efforts and success.
3. Mentor faculty leadership for large collaborative center efforts.
4. Provide excellent services in proposal writing and administrative support to permit faculty to obtain and sustain federal, state and industrial research funding.

# STRATEGIC PLAN 2023-2027

## METRICS FOR RESEARCH GOAL

### **Create Impact through Innovation and Interdisciplinary Centers - Metrics for 2027**

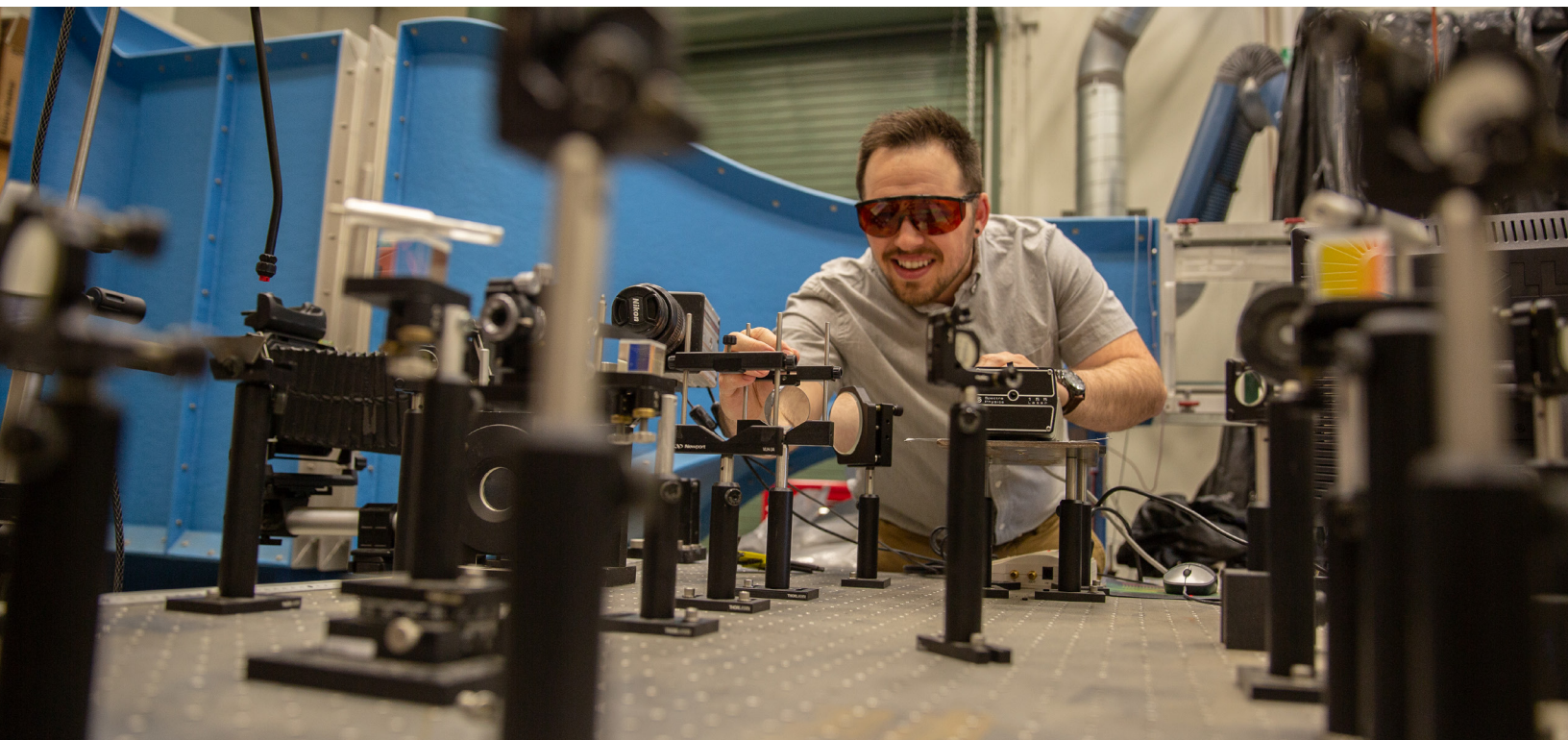
1. Operate 5 self-sustaining \$1M+/year research centers. (2022: 2 - NPDC and USRI)
2. Invest \$1.5 Million in supporting research centers to accelerate faculty synergistic success.

### **Create Impact through Innovation and Interdisciplinary Centers - Metrics for 2022**

1. Conduct \$40 million in research expenditures by tenure track and research faculty. (2022: \$27M)
2. Add \$3 million in research infrastructure per year through start up or new investments. (2022: \$3M)
3. 40 faculty leading >\$250k research/year. (2022: 22)
4. 4 faculty leading >\$1,000,000/year. (2022: 2)
5. Define 3 course research active models as faculty that support the equivalent of 2 full GRA positions/year from extramural research/extension funds.
6. Add 20 tenure-track faculty to growing research areas particularly in energy and aerospace.

### **Engage Faculty and Students**

1. Provide endowed chairs with \$20k/yr in graduate fellowships. (2022: \$0)
2. Provide 50 named \$4k/year graduate fellowships for student support. (2022: 24)
3. Provide 400 students/year with significant graduate research assistantships. (2022: 254)
4. Graduate 50 PhD/year. (2022: 25, 3-year average: 30)



**EXTENSION GOAL:** Expand innovation and theory into forward looking practices, create solutions, empower partnerships and relationships, and deliver applied knowledge and skills to create sustainable global impacts and inspire world-class stakeholders.

This goal addresses the 5-10 year needs of CEAT to serve the professional community with advancing technical and practical skills that allow Oklahoma to remain competitive. As a land-grant institution, OSU has the mandate to serve the state to improve the economy through innovation, reduce the impact of natural disasters, elevate the safety of its citizens, and bring technical advances to its industries and public agencies.

### STRATEGIES FOR THE EXTENSION GOAL

#### **Expand Innovation and Theory into Forward Looking Practices, Research, Development and Delivery**

1. Engage CEAT faculty and students in engineering extension programs.
2. Establish a unique marketing and communications model, including brand that increases CEAT's reputation for high-value extension applied research, education and training.

#### **Create Solutions; Empower Partnerships and Relationships**

1. Enhance and increase educational and training opportunities with advanced digital technology and adult education best practices for the delivery of engineering extension courses and programs.
2. Partner with other state, national and international organizations to deliver needed extension services.

**Expand professional development offerings to ensure a cutting edge workforce by engaging the public and private sector in the changing needs of Oklahoma.**



# STRATEGIC PLAN 2023-2027

## METRICS FOR EXTENSION GOAL

### **Expand Innovation and Theory into Forward Looking Practices - Metrics for 2027**

1. Conduct \$25 million/year in extension and auxiliary services to promulgate knowledge transfer. (2022:\$22M)
2. Add \$2 million in training infrastructure.
3. Expand accreditation to 50 institutions of higher education (2022: 40); 80 state, provincial and international training agencies. (2022: 69)
4. Engage 200 undergraduate and graduate students annually in research, development, and delivery of engineering extension initiatives. (2022:100)
5. Engage 60 faculty annually in engineering extension initiatives. (2022:40)
6. Increase awareness of academic faculty, college and university leaders, industry stakeholders, and OSU alumni regarding engineering extension units, initiatives and accomplishments.

### **Create Solutions; Empower Partnerships and Relationships - Metrics for 2022**

1. Expand partnership at OSU-Tulsa to double the extension services. (2022: \$1M)
2. Increase public and private partnerships by 25 percent to deliver needed education, training, and extension services. (2022: 300/200)
3. Expand levels of accreditation and continuing education courses available to state and county officials by 50 percent. (2022: 35)
4. Increase digital technology-delivered extension courses and programs by 75 percent. (2022: 200)

### **Deliver Applied Knowledge and Skills - Metrics for 2027**

1. Increase annual professional development offerings provided to public and private workforce by 5 percent. (2022: 15,000)
2. Increase students annually completing professional development courses by 5 percent. (2022: 75,000)
3. Launch professional development program in robotics and advanced manufacturing.



**GROWTH AND REPUTATION GOAL:** Increase the reputation of the college to draw more qualified STEM students and faculty to the CEAT degree programs and research. Increase the enrollment of talented undergraduate and graduate students, and increase the support of these students through scholarships, advising, support services, and extramurally funded graduate research assistantships.

This goal addresses the 5-10 year needs of Oklahoma's workforce. The legislature has funded a growth in engineering across the state to meet the ever changing technical requirements of jobs in aerospace, energy, manufacturing and infrastructure. The need for reliable information systems, efficient energy utilization, logistics, automation, AI, and technical innovation drives the need for a more advanced workforce.

#### STRATEGIES FOR THE GROWTH GOAL

##### **Provide K-12 STEM Experiences that improve Science & Math Proficiencies**

1. Engage CEAT faculty and students, and alumni in STEM programs that inspire K-12 students to pursue careers within CEAT.
2. Offer scholarships and support to students that enter CEAT STEM college ready.

##### **Elevate the Recruiting & Resources for Undergraduate & Graduate Students**

1. Partner with external agents to reach out to qualified UG and graduate student applicants.
2. Increase the financial support for graduate research assistantships and UG scholarships.
3. Open up opportunities for UG research, study abroad, and experiential learning to incoming students.
4. Provide proactive advising and reactive resources for students in academic distress.

##### **Increase CEAT's National Profile & Reputation Among Peers & Industry**

1. Raise faculty expectation and compensation to peer level on a merit basis.
2. Recognize and value national awards and national leadership positions.



# STRATEGIC PLAN 2023-2027

## METRICS FOR GROWTH GOAL

### Grow the College

1. Enroll a freshman class of 750 new freshman with > ACT 24. (33%) (2022: 561 New Freshman)
2. CEAT faculty, 20 percent are female. (2022: 14.2%)
3. Enroll a freshman class of 250 transfer students. (+33%) (2022: 188 Transfer Students)
4. Enroll 160 new graduate students. (39%) (2022: 115)

### Grow the K-12 STEM Impact of CEAT

1. Enroll 2,000 K-12 STEM students in multi-day STEM camps/yr (48%) (2022: 1350)
2. Provide \$500,000 in Freshman STEM scholarships (+500%) (2022: \$100k)
3. Grow K-12 Outreach to STEM Training for Teachers to 100/yr. (+233%) (2022: 30)

### Grow Support & Resources for College

1. Increase UG scholarships to \$4,000,000/yr. (+33%) (2022: \$3,000,000)
2. Raise GRA stipends to a minimum of \$3,000/mo. (+36%) (2022: \$2,200/mo.)
3. Grow advisors time assisting students that struggle to reach 90% retention. (2022: unknown)
4. Expand Parker Hall Summer Bridge and Living and Learning Community to 250. (2022: 125)

### Elevate National Profile & Recognition of CEAT Faculty & Students

1. Increase number of faculty recognized as professional society fellows. (2022: 15)
2. Raise faculty salary rates to average of APLU: R1 (2022: 60% categories met)
3. Grow and support the number of national awards recognizing excellence among faculty, students and staff (e.g. Fulbright, Goldwater, SMART Scholarships and NSF Fellowship, Professional)
4. Grow national exposure of our programs and research as measured by national press or social media coverage.
5. Be considered among the top 50 public U.S. academic undergraduate programs in engineering, architecture and technology. (2022: 57th, 2012: 76th)
6. Be considered among the top 60 public U.S. academic graduate programs in engineering. (2022: 80th)

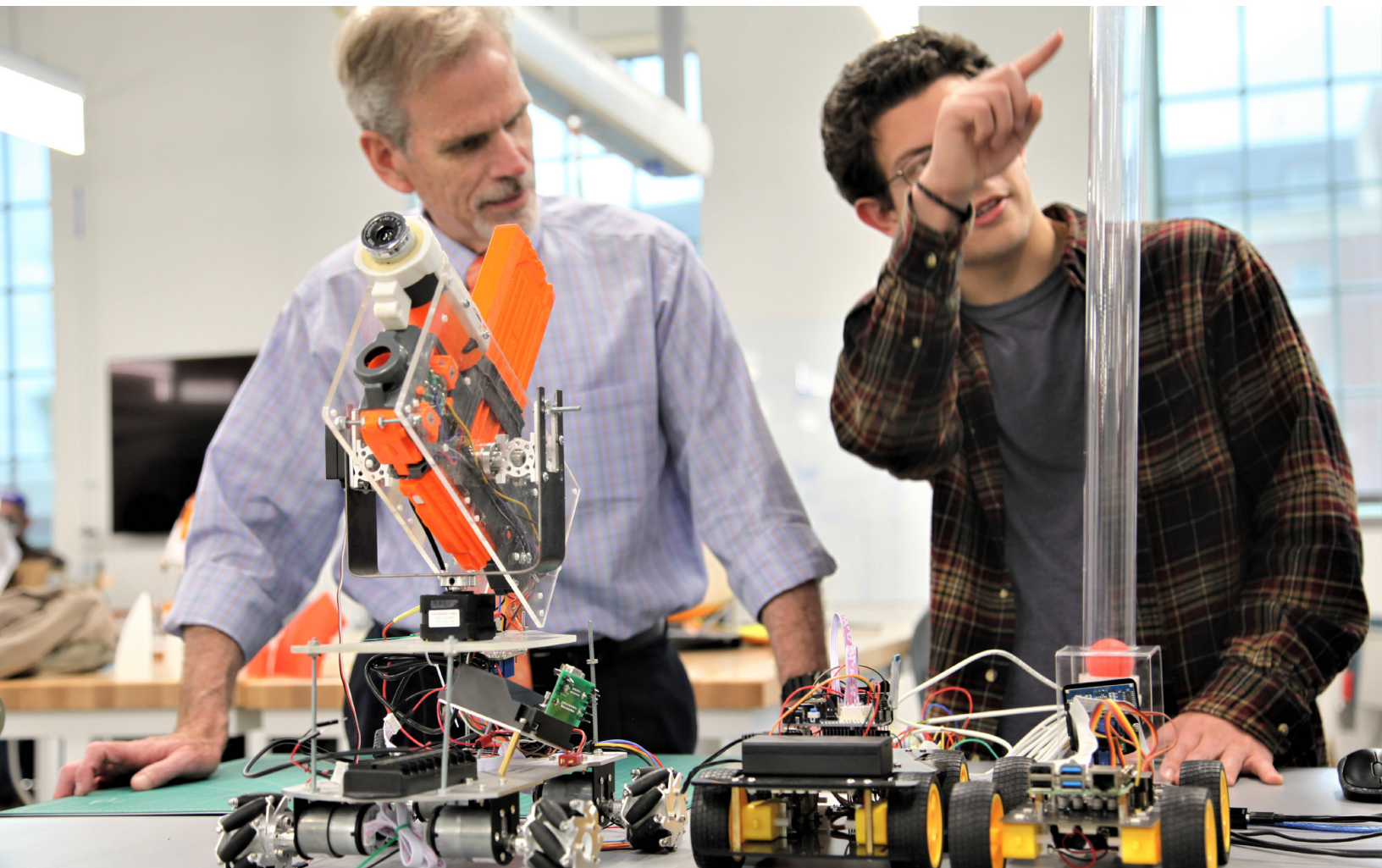


## ALIGNMENT WITH OSU STRATEGIC DIRECTION 2022

This strategic plan considers the broad constituencies that are impacted by the mission of the College of Engineering, Architecture, and Technology at Oklahoma State University. The leadership of Oklahoma State University articulated the strategic direction for the future of Oklahoma's Land Grant Institution in 2022. The CEAT Strategic Plan aligned with these broad and ambitious directions in all of its goals.

The CEAT Strategic Advisory Board reviewed the OSU strategic directives with the OSU administration and CEAT leadership to assist in aligning the CEAT Strategic Plan with OSU. The Industrial Advisory Boards of each of the schools in CEAT, are corporate and workforce constituencies that are key to our mission. Each of these boards considered the needs of the CEAT programs to develop the intellectual capital needed in Oklahoma and beyond to advance the economy of the region.

The faculty and leaders of the schools and extension units within CEAT held retreats and meetings to define their aspirations and growth potential. These aspirations in research, innovation, teaching and impact are built into the CEAT Strategic Plan. Finally, we have to consider the mandate from the legislature and Chancellor for growth in engineering disciplines and graduates to serve the growth in aerospace and energy industries in Oklahoma.





## IMPLEMENTATION OF THE CEAT STRATEGIC PLAN 2023-2027

The CEAT strategic plan is distributed widely to the faculty and staff in the college. Leaders are evaluated annually on the progress their units have made toward the the college strategic goals and metrics. The CEAT Strategic Advisory Board reviews the metrics and college resource allocations annually. They provide input into changes in direction that arise from changing market forces. The School Industrial Advisory Boards review unit metrics with the school heads annually and provide feedback to the college leadership on performance related to the strategic direction.

The CEAT strategic plan is also shared with students and posted on the CEAT web site for transparency and input from other constituencies. The CEAT strategic plan is a living document that is meant to help guide decision making and provide a guidepost for aspirational growth. It can change when resources change, technology evolves, or market drivers alter what is needed to prepare students with a "practical education of the industrial classes in the several pursuits and professions in life," as stated in the 1863 Land Grant Act.

The CEAT strategic plan articulates our Vision, Mission and Goals and Metrics as primary drivers for progress and growth. It also outlines major strategies for the college. Other strategies are employed by leaders of the college units to pursue excellence and the college's goals. The document does not articulate any specific tactical measures. Each unit of the college has different constituencies, resources, and personnel that contribute to the attainment of the goals. The unit level methods depend on leaders and the development of opportunities that are different across the college. The College undergoes an annual benchmarking exercise for the metrics in the strategic plan and monitors some of the metrics more frequently. This data is shared annually with the faculty, students and advisory boards.

## ASPIRATIONAL PEER PUBLIC UNIVERSITIES

**Iowa State University**

**Kansas State University**

**Louisiana State University**

**Michigan State University**

**North Carolina State University**

**Oklahoma State University**

**Rutgers University**

**Texas A&M University**

**Texas Tech University**

**University of Kentucky**

**University of Maryland**

**University of Minnesota**

**University of Nebraska-Lincoln**

**University of Oklahoma**

**University of Tennessee**

**University of Utah**

**University of Wisconsin-Madison**

**West Virginia University**



# CEAT STRATEGIC ADVISORY COUNCIL

**Gregg Bradshaw**  
Construction Manager  
Joe D. Hall General  
Contractors, LLC

**Jim Hasenbeck**  
Principal Architect  
Studio Architecture

**Cherie Humphries**  
Vice President Chief  
of Supply Chain and  
Digital Transformation  
Williams Companies

**Amanda Lowe**  
Executive  
Administrative Assistant  
CEAT

**Paul Tikalsky**  
Dean  
Oklahoma State  
University

**Shay Braun**  
President  
Select Milk Producers

**Steve Huckaby**  
Chairman and Chief  
Executive Officer  
Meritage Midstream

**Carrie Johnson**  
Chair of the Board and  
Principal  
Wallace Design  
Collective

**Jaime McAlpine**  
President  
Chermac Energy  
Corporation

**Rick Tompkins**  
Partner  
LateraLift, LLC

**Cara Cowan Watts**  
CEO  
Tulsa Drilling

**Denay Huddleston**  
Director, Batteries and  
Solar  
Phillips 66

**Mitch Johnson**  
Vice President  
AI Technologies

**Mike Rogers**  
President  
PACCAR Winch, Inc

**Patricia Vega**  
CEO and Founding  
Partner  
Quantum New Energy

**Heath DePriest**  
Vice President of  
Emerging Energy  
Phillips 66

**Jeff Hume**  
Vice Chairman of  
Strategic Growth  
Initiatives  
Continental Resources,  
Inc.

**Neal Jones**  
President  
Jones Studio Architects

**Mary Shafer-Malicki**  
Board of Directors:  
McDermott; QEP  
Resource; Ausenco  
Wood Plc

**Stacie Wrobbel**  
Senior Executive  
Associate  
Pathfinder, LLC

**Garen Ewbank**  
President  
GreyEdge Group, LLC

**Chris Humes**  
Sr. Vice President,  
Operations and  
Engineering  
Pilot Water Solutions

**Bryce Killingsworth**  
Sr. Director of  
Development  
OSU Foundation

**Ed Stokes**  
President  
Stokes International  
Consultancy, LLC

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## CEAT ADMINISTRATION

**Dr. Paul  
Tikalsky**  
Dean

**Dr. Sunderesh  
Heragu**  
Associate Dean,  
Academic Affairs

**Dr. Chuck  
Bunting**  
Associate Dean,  
Research

**Ed Kirtley**  
Assistant Dean,  
Engineering  
Extension

**Carisa  
Ramming**  
Assistant Dean,  
Engagement and  
Inclusion

**Dr. Raman  
Singh**  
Associate Dean,  
Helmerich Research  
Center Director

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## CEAT ACADEMIC HEADS

**Suzanne Bilbeisi**  
Architecture Engineering

**Dr. Norb Delatte**  
Civil and Environmental Engineering

**Dr. Camille DeYoung (Interim)**  
Industrial Engineering and Management  
Engineering and Technology Management

**Dr. Mari Chinn**  
Biosystems and Agricultural Engineering

**Dr. Young Chang**  
Division of Engineering Technology

**Dr. James Smay**  
Material Science and Engineering

**Dr. Heather Fahlenkamp**  
Chemical Engineering

**Dr. Jeffrey Young**  
Electrical and Computer Engineering

**Dr. Sandip Harimkar**  
Mechanical and Aerospace Engineering

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## CEAT EXTENSION HEADS

**Gary Snyder**  
Center for Local Government Technology

**Eldonna Sadler**  
International Fire Service Accreditation  
Congress

**Dr. Robert Taylor**  
New Product Development Center

**Craig Hannan**  
Fire Protection Publications

**Gary Snyder**  
Local Technical Assistance Program

**Jessica Stewart**  
Professional Development

**Caroline Reed**  
Fire Service Training

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## COLLEGE OF ENGINEERING, ARCHITECTURE & TECHNOLOGY

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