

COLLEGE OF ENGINEERING, ARCHITECTURE & TECHNOLOGY

MATERIALS SCIENCE & ENGINEERING

STRATEGIC PLAN 2014-2018



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MATERIALS SCIENCE AND ENGINEERING AT OKLAHOMA STATE UNIVERSITY

was started in 2012. It is located at OSU-Tulsa's Helmerich Research Center, a premier facility that was created to fulfill the commitment made to the citizens of Tulsa for Vision 2025. The School of Materials Science and Engineering graduate program at Oklahoma State University was approved in Fall 2013, which places the College of Engineering, Architecture and Technology (CEAT) in a unique position to conduct world-class education, research and technology development in advanced materials of strategic importance to our nation. It supports Oklahoma's key industries, develops new industries, contributes to national defense, and provides well-trained professionals to lead our businesses and communities.

One of the guiding principles of the Materials Science and Engineering program is to demonstrate that job creation can be a priority of a university research facility while at the same time preparing the U.S. workforce that can create prosperity through materials discoveries in the twenty-first century. The graduate program in Materials Science and Engineering is already contributing towards materials based innovations in aerospace, energy and biotechnology. It is expected that the demand for its services and its graduates will outpace its capacity to create top-level engineering talent pool for Tulsa, the State of Oklahoma and Midwest USA.

The graduate program in MSE at OSU is established to train our next generations to design materials for specialized uses, making materials reliable and useful to mankind. It fits with OSU's Land-Grant mission and the CEAT vision by providing training in an underserved area of Materials Science and Engineering. The graduate degree is providing opportunities for training in research and technology development in advanced materials to act as a catalyst for the long-term economic viability of the surrounding region. The proposed program is also promoting teaching and research focused on specific advanced technologies such as advanced materials for energy, aerospace, medicine, and electronics. It is also promoting research and technology development associated with creating new products and processes leading to new enterprises in Northeast Oklahoma, as well as promoting knowledge and information exchange through partnership with industry.

The strategic plan is described here to serve as a guide to position the school to meet and exceed the vision and goals of the graduate program. It is expected that it will lead to national and international recognitions amongst peer programs, academia, research community and industry.

MISSION

The field of materials science and engineering is expanding into a period of unprecedented intellectual challenges, opportunities and growth. Products of materials science and engineering research contribute to the economic strength and security of our state and the country.

VISION

The vision for the MSE department is to create novel materials for the current and future technologies for energy, aerospace, medical, and electronic systems, and the mission is to educate and train excellent students for the academia and industries. Collectively, the goal for the MSE program is to be known as one of the highly ranked programs in the nation.



ACADEMIC GOAL: Be a renowned leader in education and mentoring of next generation of materials scientists and engineers who can develop innovative and creative technologies for the twenty-first century with applications in the aerospace, energy and biotechnology sectors.

STRATEGIES FOR ACADEMIC GOAL

- Develop required and elective courses for the graduate programs with specialization in advanced materials for energy, nanotechnology, and medical systems.
- Admit 10-15 new graduate students each year for M.S. and Ph.D. degrees.
- Hire 4 new tenure-track faculty members over the 5-year period in strategic areas of materials for energy, nanotechnology, advanced characterization, processing and biotechnology.

5-YEAR BENCHMARK FOR ACADEMIC GOAL

- Award 10 M.S. and 2 Ph.D. degrees of the highest caliber annually to talented engineering students.
- Attract at least 5 students annually from the undergraduate programs at Oklahoma State University and other undergraduate programs from across Oklahoma to enter the graduate program in Materials Science and Engineering.
- Provide a complete educational experience with 8 full-time faculty (combination of tenured and tenure-track faculty), 2-research staff/faculty and 3 post-doctoral fellows.
- Develop and offer a complete curriculum of courses for graduate education in Materials Science and Engineering including: 6 core courses, and 12 elective courses in advanced topics.
- Advance pedagogy in graduate engineering education in Materials Science and Engineering.
- Implement a bi-annual curriculum development plan.

RESEARCH GOAL: Develop a top-quality research program that encourages faculty to conduct cutting-edge research in materials science and engineering supported through intra-mural and extra-mural funds.

STRATEGIES FOR RESEARCH GOAL

- Conduct research at the forefront of Materials Science and Engineering.
- Recruit research active faculty with an average research expenditures >\$250/year.
- Support nominations of faculty and students for professional awards.
- Support faculty for active participation in professional societies.

5-YEAR BENCHMARK FOR RESEARCH GOAL

- Be recognized as one of the leading research and graduate programs in Material Science and Engineering graduate schools in South Eastern/Mid West US.
- Be recognized as one of the top 40 US graduate programs in Material Science and Engineering, as measured by US News and World Report, NSF and ASEE.
- Conduct more than \$1 million in research expenditures annually from tenured and tenure track faculty.
- Publish more than 15 research articles in leading archival journals each year.
- Research presentations at leading national and international conferences/workshops on topics in Materials Science and Engineering.

OUTREACH GOAL: To make a significant positive impact on the economic vitality of the Nation with an emphasis on the Tulsa and North Eastern Oklahoma area through research, technology creation, and commercialization.

STRATEGIES FOR OUTREACH GOAL

- Engage local industries with MSE faculty, graduate students, and research staff.
- Support faculty to write patent disclosures and patents.
- Encourage applied research projects leading to creation of novel technology and products.
- Provide training to faculty and research staff in product development and importance of intellectual property.

5-YEAR BENCHMARK FOR OUTREACH GOAL

- Submit at least 5 patent disclosures per year
- At least 2 issued patents
- Sign at least 1 license or option to license with our industrial partners
- Through technology transfer, create measurable economic impact and jobs for the industrial partners
- Involve local industries and develop projects of importance to them.

STUDENTS GOAL: Develop an atmosphere where students work together with faculty and industries, while encouraging diversity, academic success, leadership, professional development, and high ethical standards.

STRATEGIES FOR STUDENTS GOAL

- The School will work towards recruiting and retaining ethnically, racially, and gender diverse students and faculty that succeed in maintaining or raising our academic, research and ethical standards. Through school, college, NSF and private partnerships, the school will recruit graduate students nationally and internationally, and in particular from 4-year regional universities across Oklahoma, representing the diverse demographics of Oklahoma, and the undergraduate student population from OSU engineering undergraduate programs.
- The School will provide broad opportunities, course offerings and mentoring to encourage all students to graduate within 2-3 years with a M.S. or within 4-5 years with a Ph.D. The School will ensure that all students will pursue their graduate degrees and complete the degree according to the graduate committee approved course plan.
- The School is committed to working with alumni and industry to provide scholarship, paid internships and paid research opportunities to encourage students to pursue educational and professional training in materials science and engineering.

5-YEAR BENCHMARK FOR STUDENTS GOAL

- Graduate an average of 10 M.S. and 2 Ph.D. degrees per year in MSE.
- Reach 25% female student population and strive to hire and retain 20% female faculty.
- Reach 10% Hispanic/African American/American Indian student populations and strive to hire and retain 10% Hispanic/African American/American Indian faculty.
- Reach 25% Native Oklahoma students out of the graduate student population to pursue full-time graduate studies.
- Support at least 80% of the graduate students through GRA positions.

