Graduate Programs
# The Walker Department of Mechanical Engineering

- **Program Rankings**
  - #10 Undergraduate Mechanical Engineering (2021 U.S. News & World Report)
  - #10 Graduate Mechanical Engineering (2022 U.S. News & World Report)

- **Graduate Students**
  - 438 Enrolled
  - 25% Women
  - $1.8M in fellowships

- **Faculty**
  - 70 faculty members
  - Nobel Prize, Japan Prize
  - Draper Prize, Copley Medal
  - National Medal of Science
  - Members of NAE, NAS, NAI

- **Research Expenditures**
  - $25.4 Million (2019-20)
ME Degree Programs

- Master of Science in Engineering in Mechanical Engineering (MSE in ME)
- Doctor of Philosophy (Ph.D.)
- Dual Degree Program
  - McCombs School of Business (MS/MBA)
  - LBJ School of Public Affairs (MS/MPA)
- Affiliated Graduate Programs:
  - Operations Research/Industrial Engineering (M.S. and Ph.D.)
  - Materials Science and Engineering (M.S. and Ph.D.)
Academic Areas

- Acoustics
- Biomechanical engineering
- Dynamic systems and control
- Manufacturing and design
- Materials science and engineering
- Nuclear and radiation engineering
- Operations research and industrial engineering
- Thermal/fluid systems
Acoustics

- Interdisciplinary Graduate Program:
  - Departments of Mechanical and Electrical Engineering
  - Applied Research Laboratories (Pickle Research Campus)

- Example Current Research:
  - acoustic cavitation
  - nonlinear acoustics
  - sonar engineering
  - biomedical acoustics
  - ocean acoustics

- transducers
- computational acoustics
- physical acoustics
- ultrasonics
- industrial acoustics
- signal processing
- wave propagation
Biomechanical Engineering

- **Current Research Areas:**
  - Musculoskeletal modeling and simulation of human movement
  - Understanding neuromotor control, muscle function and adaptation in post-stroke hemiparetic and amputee gait
  - Prosthetic and orthotic design optimization
  - Sports biomechanics and equipment design
  - Medical robotics / surgical tools
  - Rehabilitation
  - Cellular biomechanics
  - Micro-biofluidic systems / in-vitro cancer models
Dynamic Systems and Control

- Current Research Areas:
  - automatic control
  - biomimetics
  - biophysics
  - impact dynamics
  - neural networks
  - mechatronics
  - nonlinear system dynamics

- system modeling and analysis
- electromechanical systems
- system dynamics
- energy conversion engineering
- electronics manufacturing
- electronics packaging & interconnects
- fuzzy logic mechanics & design of materials
- vehicle system dynamics and control
- integrated systems design
- nonlinear robust control
Manufacturing and Design

- Design Methodology: Transformer Design, Design for Product Flexibility and Adaptability
- Design Automation: Automated Conceptual Design, Metamodeling, Multiscale Collaborative Design
- Additive Manufacturing: Solid Freeform Fabrication, Selective Laser Sintering
- Nanoscale Manufacturing: Precision Manufacturing, Wafer-scale and Roll-to-roll Fabrication for Electronics and Healthcare Devices
- Manufacturing Metrology and Big Data Analytics: In-situ Metrology, Nanoscale Metrology, Physics-based Modeling and Advanced Data Analytics
LiFePO$_4$ is a cathode material for Li ion batteries. Li diffusion is slow; we have to synthesize very small nano-particles. The diffusion direction is along the short axis, which allows for better diffusion rates.
In addition to nuclear energy systems, we study nuclear forensics, radiochemistry, radiation effects on materials and biological systems.

Our work is funded by DOE, NASA, DNDO, NSF, NNSA and several National Labs (LANL, ANL,...)

Many PhD students complete part of their research at a national lab.

Most are offered a career position at the host lab.
Thermal/Fluid Systems

Current Research Areas:

- Internal Combustion Engines
- Ablation Modeling
- Nongray Gas Radiation Models
- Gas Turbine Cooling
- Laser Material Processing
- Biophotonics
- Renewable Energy

- Structure Fire Experiments
- Energy Policy
- BioMEMS
- Nanoscale Heat Transfer
- Ultrafast Laser Assisted
- Microfluidics
- Computational Fluid Mechanics

High surface area TiO$_2$ nanofibers fabricated in our laboratory, each fiber is ~ 200-300 nm in diameter.

Gas turbines blades are cooled by ejecting coolant out of holes on the surface. We simulate this process in order to optimize performance.
Funding Resources

- Cockrell School of Engineering Multi-Year Fellowships
- Graduate School Multi-Year Fellowships
- Graduate School Diversity Fellowships (minorities and women)
- Department Research Assistantships and Teaching Assistantships
- **For continuing students:**
  - University Continuing Fellowships (includes Endowed Fellowships, Tuition Fellowships)
  - Outstanding RA & TA Awards
  - Professional Development Awards (travel grants to attend conferences)
  - Research Assistantships and Teaching Assistantships
- **Mentoring for National Fellowships:**
  - National Science (NSF) Graduate Fellowships
  - National Defense Science and Engineering Graduate (NDSEG) Fellowships
Consistently ranked #1 city in US
100,000+ people 18-24 years old
Strong tech community
Music, art, and tech festivals
ME Graduate Student Board Events

The Mechanical Engineering Graduate Student Board (MEGSB) Presents:

Pizza & Bowling Night

Where: Texas Union Underground
When: Friday, August 27th, 5–7 PM
Who: ME/ORIE/MSE grad students and faculty
National Fellowship Application Workshop

• Seminar to help students who are applying to the NSF, DoD, NASA, etc. fellowships
Girls Day Outreach

- Run a “float your boat” activity for introduce a girl to engineering day
- How many golf balls can be placed into an aluminum foil boat before sinking?
COVID-19 Impact

- Spring, Summer, Fall 2022 Applicants:
  - GRE scores waived for all applicants. This applies to the Mech. Engr. graduate program only. If applying to multiple programs at UT Austin, please check their GRE requirements.
  - This accommodation does not apply to TOEFL/IELTS requirements for international students.
- Teaching:
  - Fall 2021 mostly in-person
  - No evidence of Covid-19 spread due to teaching in the Cockrell School of Engineering
Questions

• Please contact Micah Jackman (Graduate Program Coordinator) if you have any questions regarding the application process or the program.
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