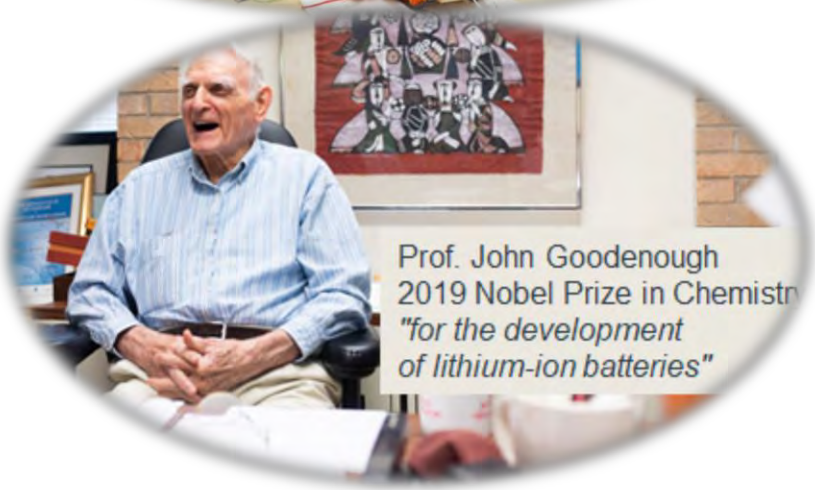

The University of Texas at Austin
Walker Department
of Mechanical Engineering
Cockrell School of Engineering
Graduate Programs

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.)

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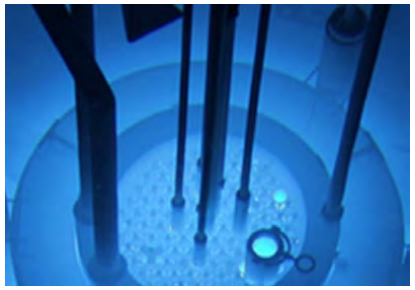
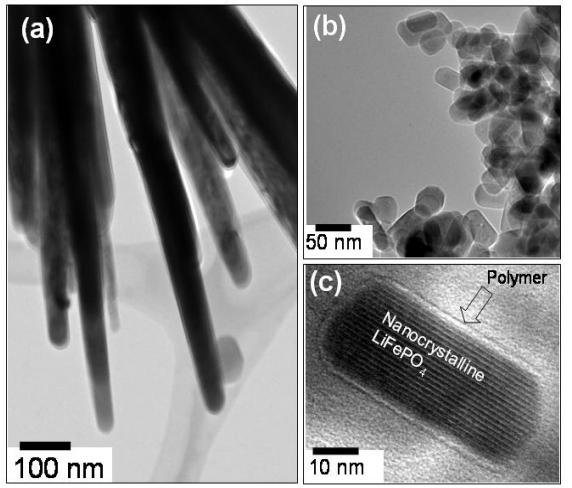
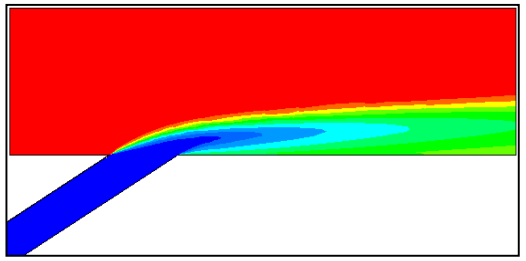
Academic Areas

- 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







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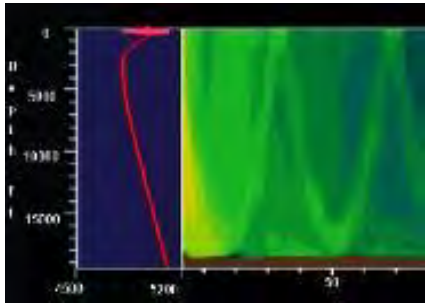
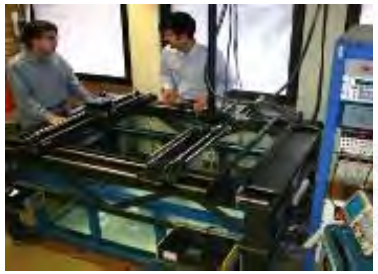
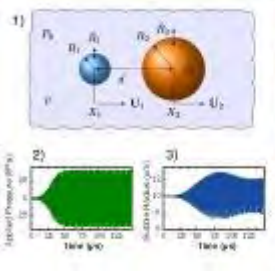
Acoustics

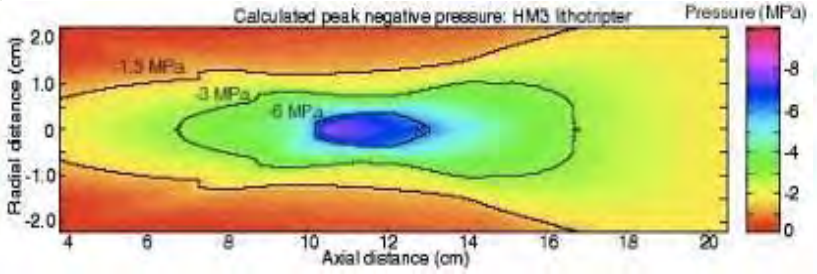


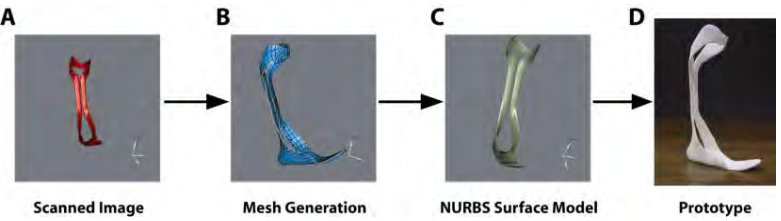
- Interdisciplinary Graduate Program:
  - Departments of Mechanical and Electrical Engineering
  - Applied Research Laboratories (Pickle Research Campus)

- 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









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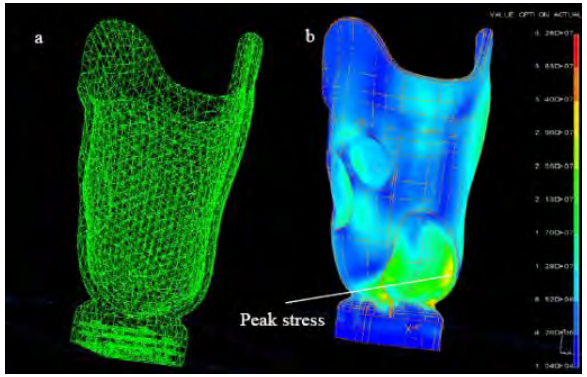
Biomechanical Engineering

- **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



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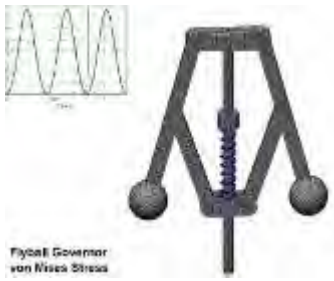
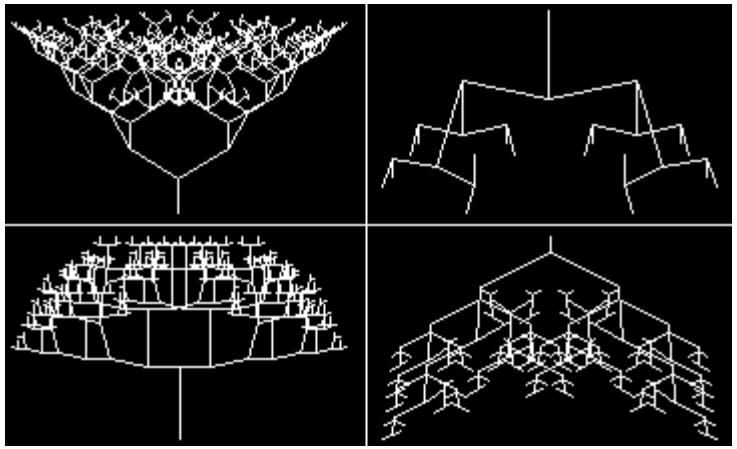
Dynamic Systems and Control

- 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





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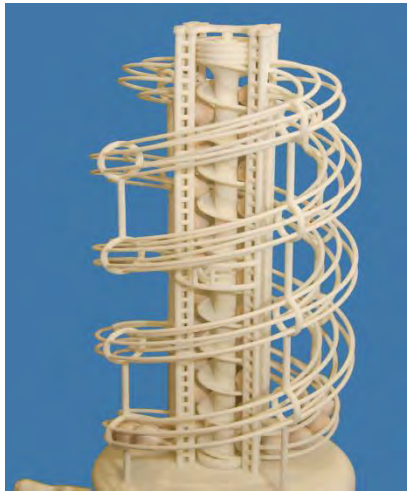
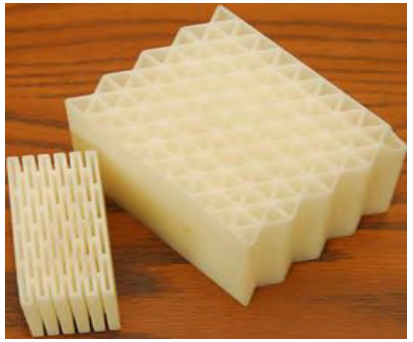
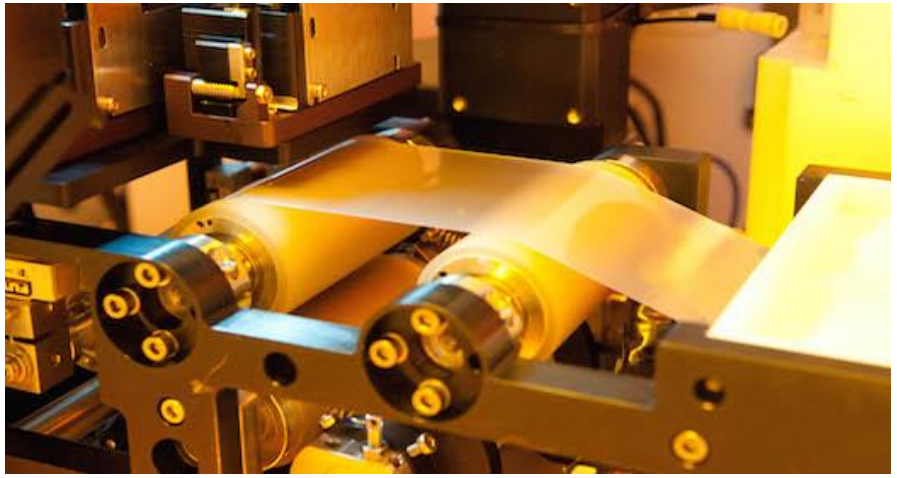
Manufacturing and Design

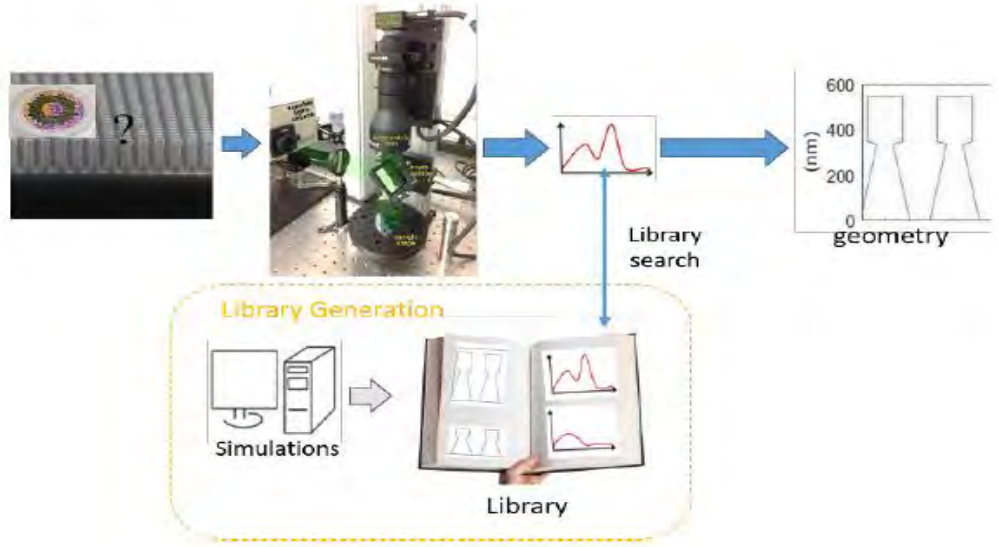
- Design Methodology: Transformer Design, Design for Product Flexibility and Adaptability
- Design Automation: Automated Conceptual Design, Metamodeling, Multiscale Collaborative Design
- Design for Solid Freeform Fabrication: Prosthetic/Orthotic Design, Design of Deployable Structures, Similitude Methods
- Additive Manufacturing: Solid Freeform Fabrication, Selective Laser Sintering
- Nanoscale Manufacturing: Precision Manufacturing, Wafer-scale and Roll-to-roll Fabrication for Electronics and Healthcare Devices
- Bio-manufacturing: Bio-inspired Manufacturing, Cell and Tissue Engineering, Micro- and Nano-Manufacturing of Point-of-Care Diagnostics
- Manufacturing Metrology and Big Data Analytics: In-situ Metrology, Nanoscale Metrology, Physics-based Modeling and Advanced Data Analytics



Archimedes Screw







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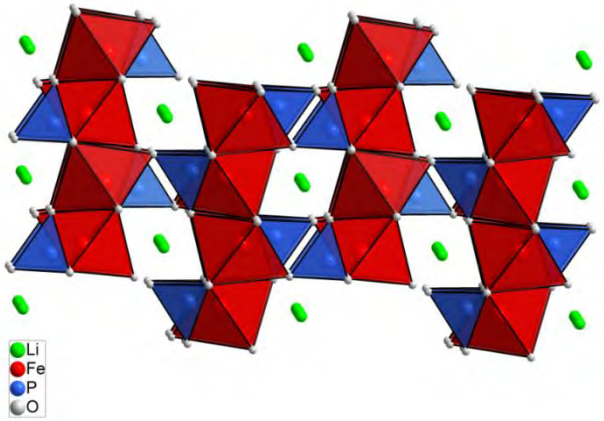
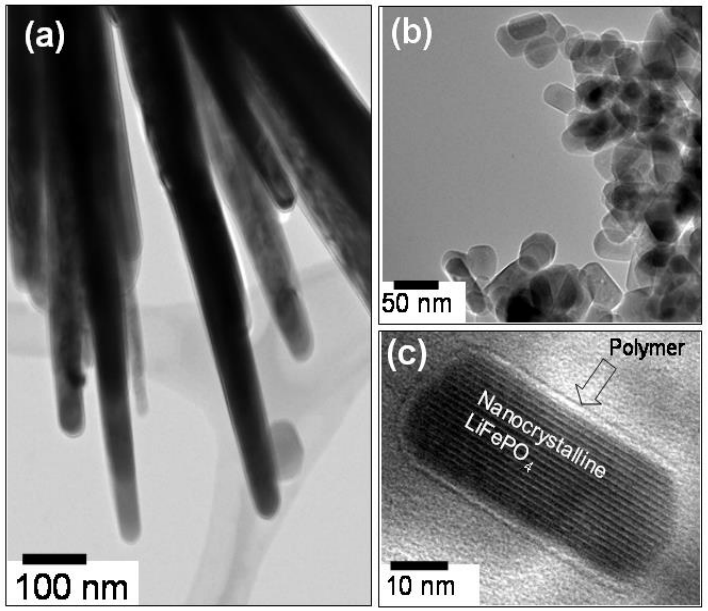
Materials Engineering

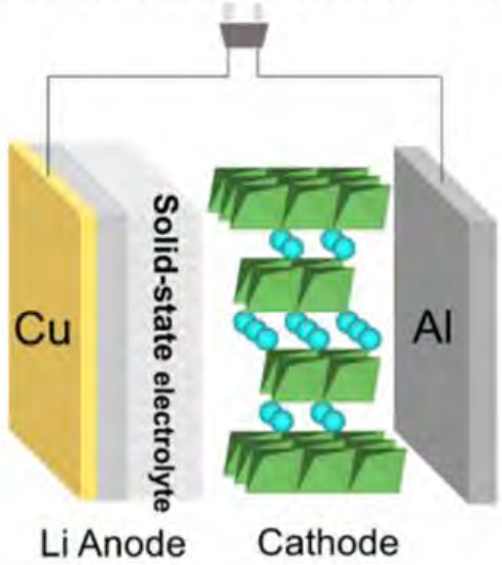
- **Materials for energy systems**
- **Fuel cell materials; battery materials; electrochemical processes**
- **Electronic materials**
- **Microelectronic packaging, interconnect materials**
- **Developing & characterization of new engr. materials.**
- **Structural materials, metals and alloys; microstructure evolution and control; forming processes**

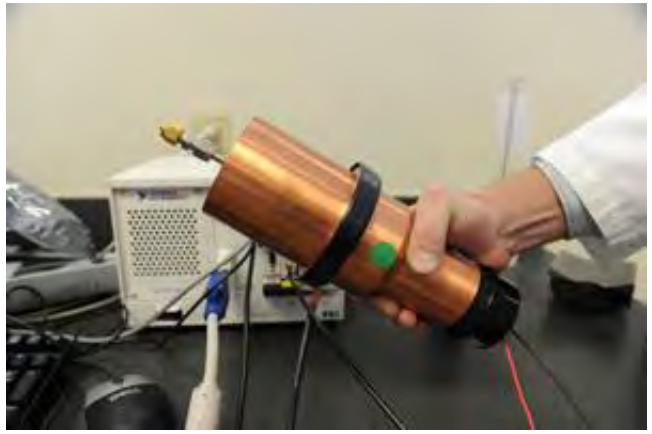


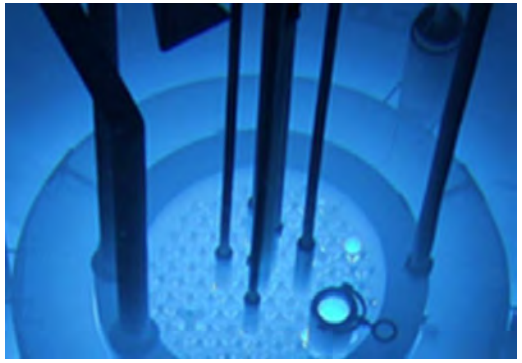
$LiFePO_4$ is a cathode material for Li ion batteries. Li diffusion is slow; we have to synthesize very small nano-particles. The diffusion direction is along the short axis, which allows for better diffusion rates.

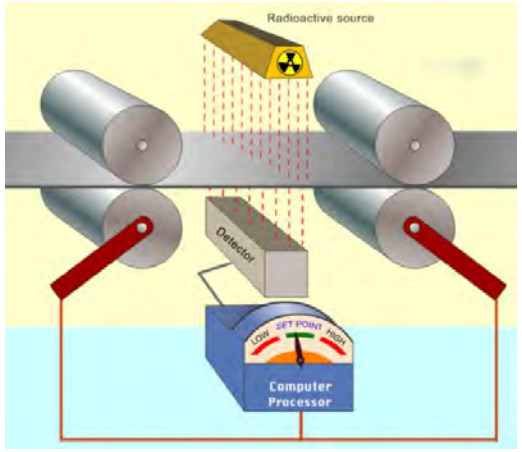


All-solid-state lithium-metal anode battery









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Nuclear and Radiation Engineering

- 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

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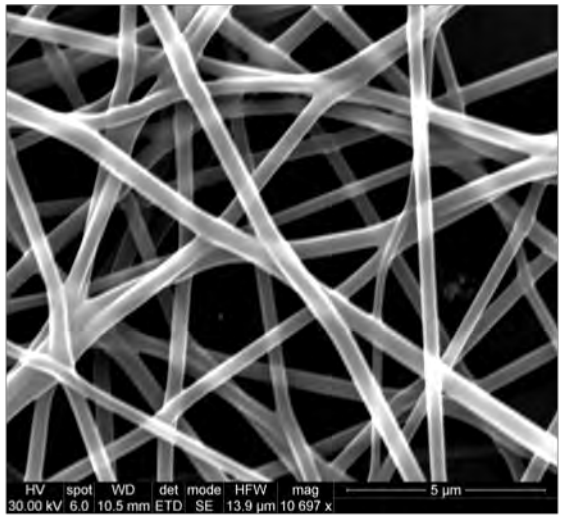
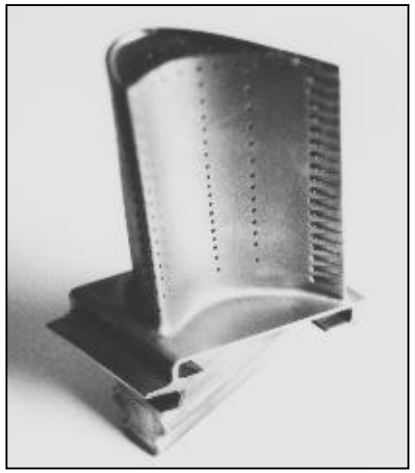
Thermal/Fluid Systems



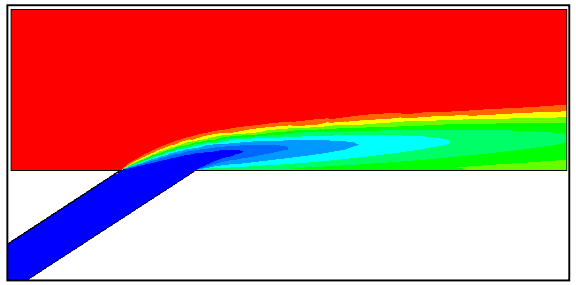
High surface area TiO_2 nanofibers fabricated in our laboratory, each fiber is ~ 200-300 nm in diameter.

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



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

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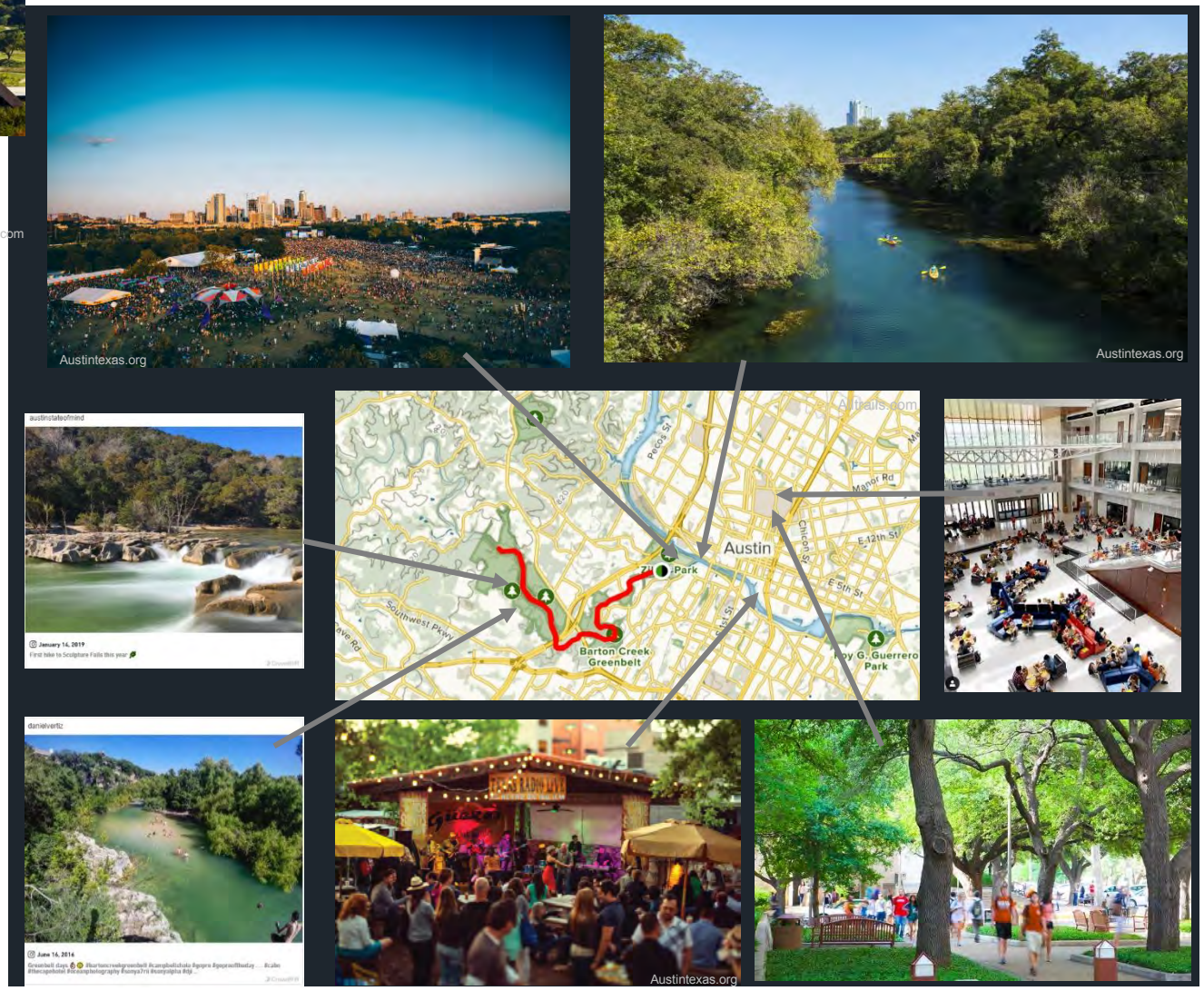
Student Life

Consistently ranked #1 city in US
100,000+ people 18-24 years old
Strong tech community
Music, art, and tech festivals



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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

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National Fellowship Application Workshop

- Seminar to help students who are applying to the NSF, DoD, NASA, etc. fellowships

Girls Day Outreach

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- 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

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Questions

- **Please contact the graduate office if you have any questions regarding the application process or the program.**
- **Email: graduate-office@me.utexas.edu**