



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

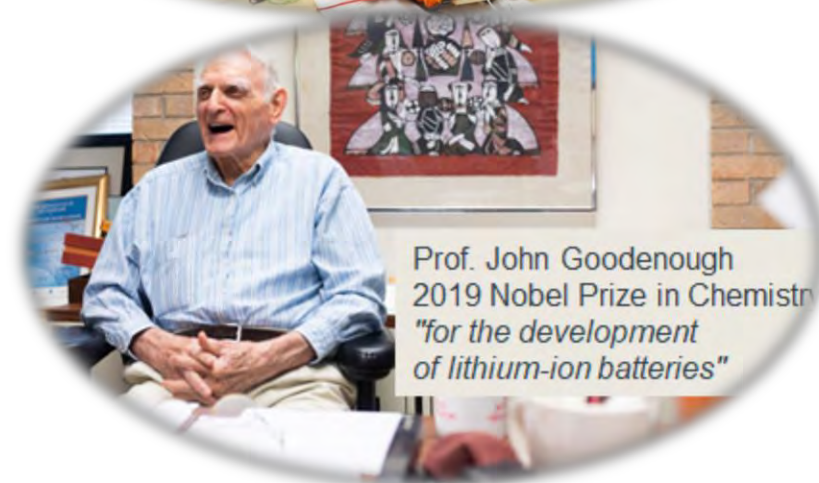
Graduate Programs





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

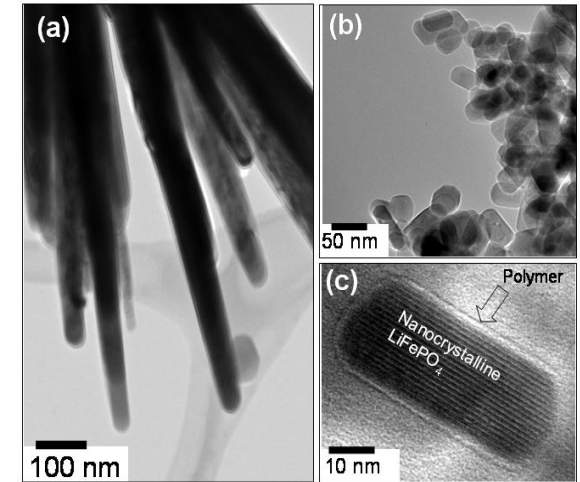
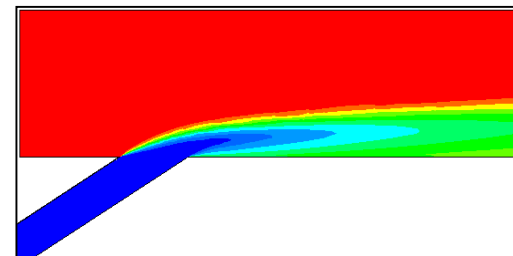
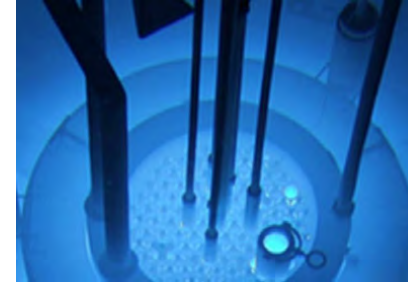
- Master of Science in Engineering in Mechanical Engineering (MSE in ME)
- Doctor of Philosophy (Ph.D.)
- Dual Degree Program
 - McCombs School of Business (MS/MBA)
 - LBJ School of Public Affairs (MS/MPA)
- Affiliated Graduate Programs:
 - Operations Research/Industrial Engineering (M.S. and Ph.D.)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





Academic Areas

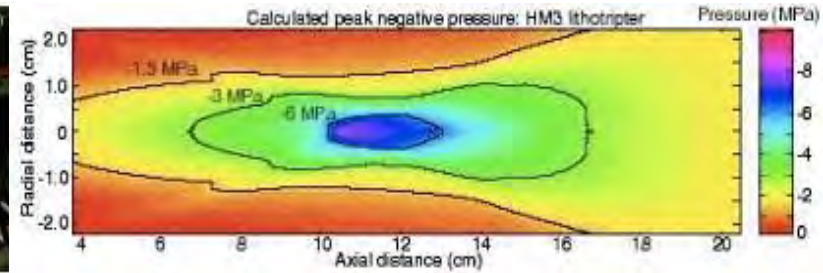
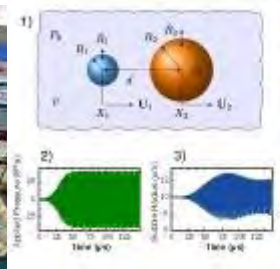
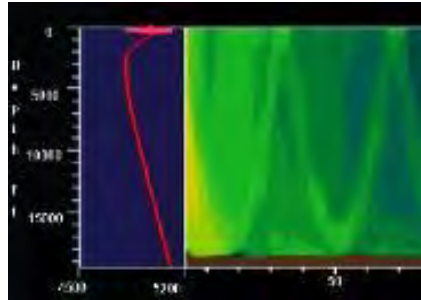
- Acoustics
- Biomechanical engineering
- Dynamic systems and control
- Manufacturing and design
- Materials science and engineering
- Nuclear and radiation engineering
- Operations research and industrial engineering
- Thermal/fluid systems

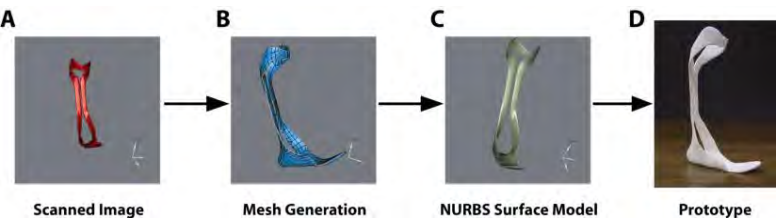




Acoustics

- 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



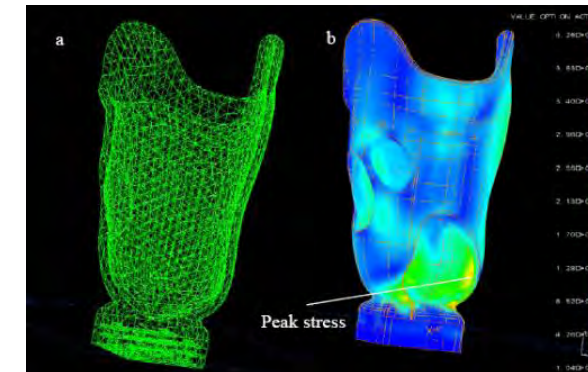



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Biomechanical Engineering

• 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



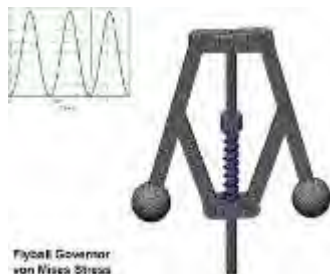


Dynamic Systems and Control

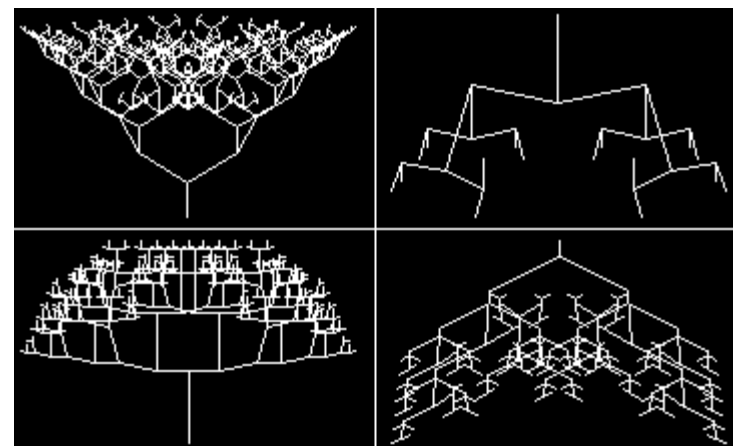
- Current Research Areas:
 - automatic control
 - biomimetics
 - biophysics
 - impact dynamics
 - neural networks
 - mechatronics
 - nonlinear system dynamics



- 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



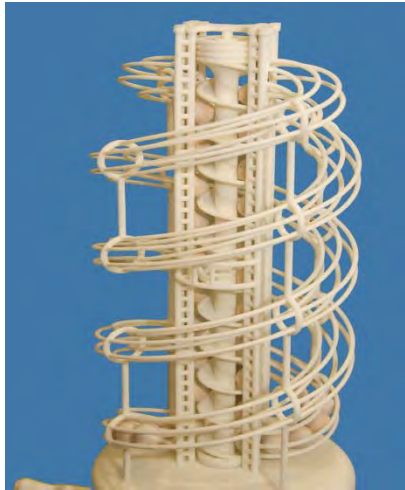
Flyce II Governor
von Nissen Strass



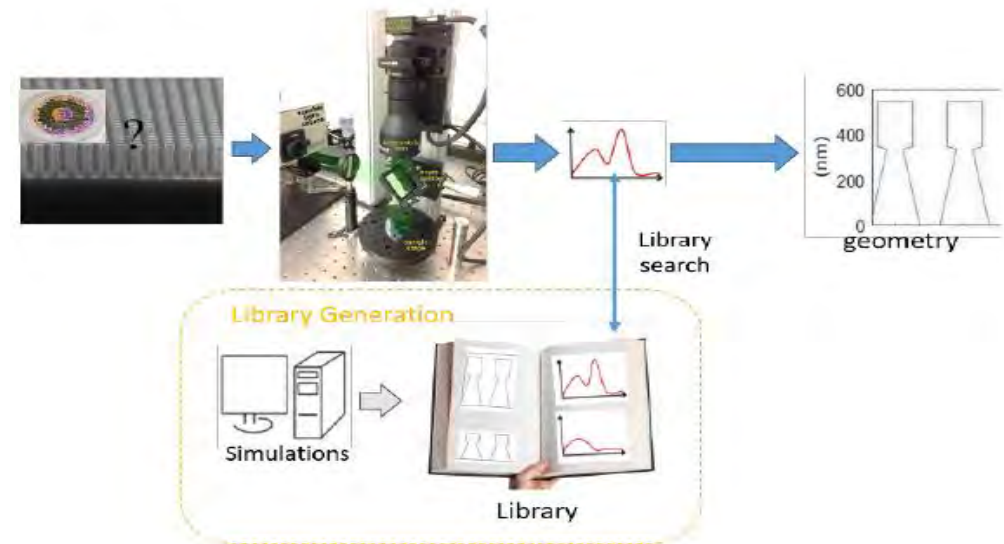
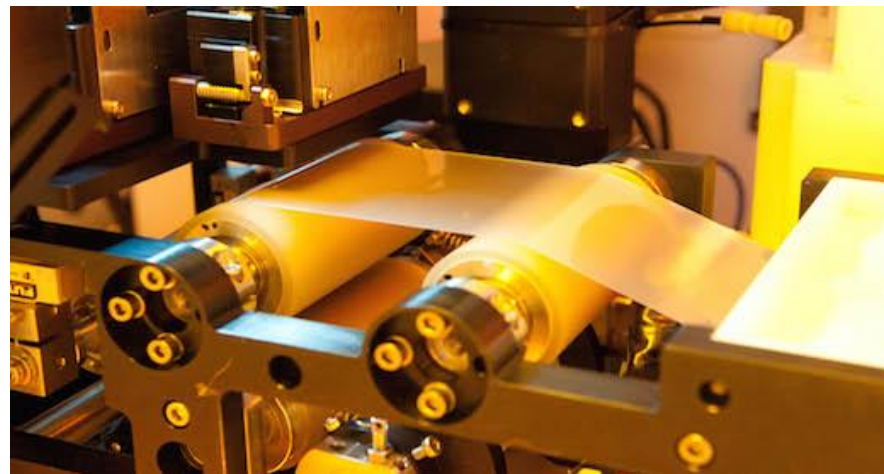
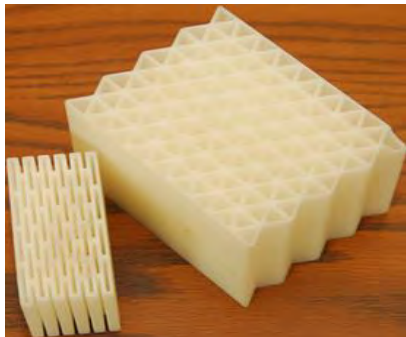


Manufacturing and Design

- 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



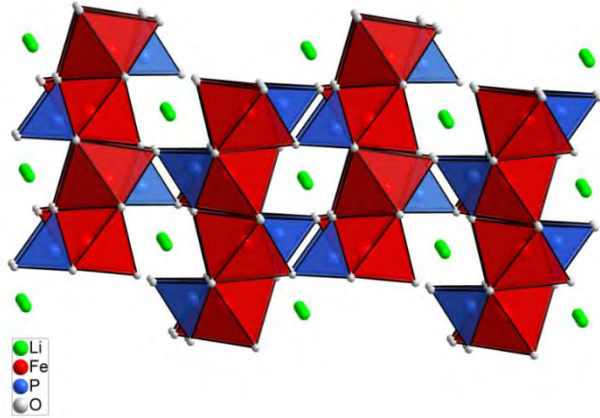
Archimedes Screw



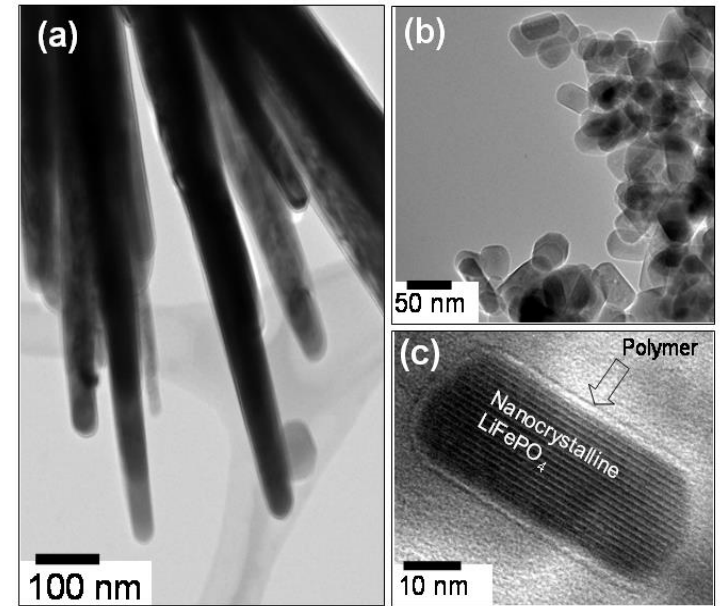


Materials Engineering

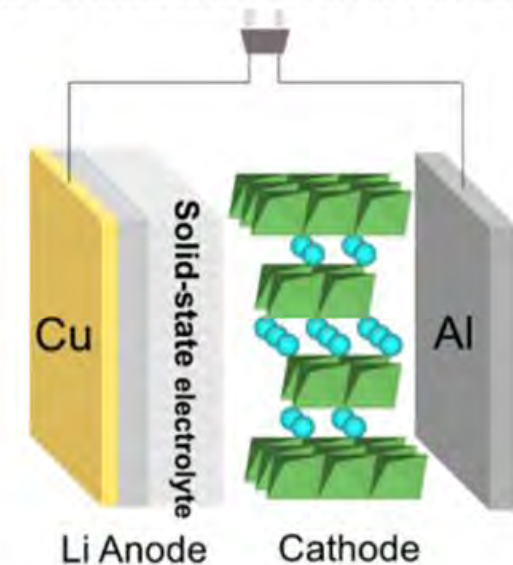
- Materials for energy systems
- Fuel cell materials; battery materials; electrochemical processes
- Electronic materials
- Microelectronic packaging, interconnect materials
- Developing & characterization of new engr. materials.
- Structural materials, metals and alloys; microstructure evolution and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

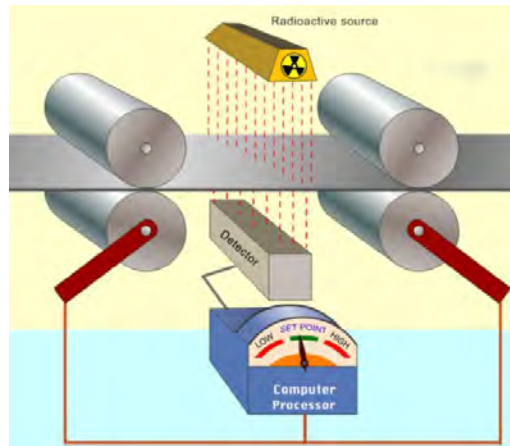
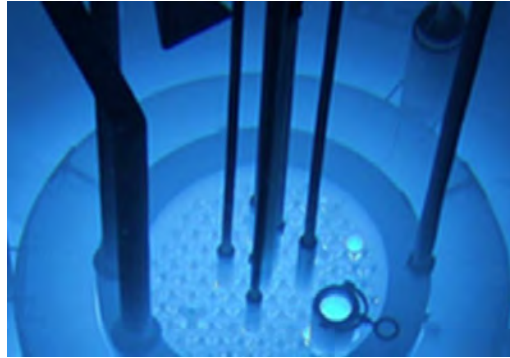
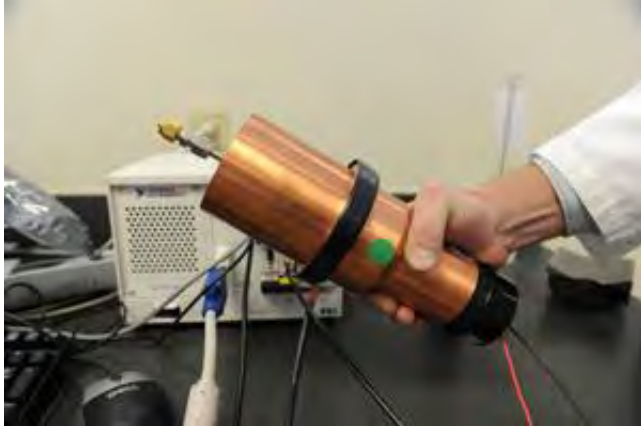


All-solid-state lithium-metal anode battery



Nuclear and Radiation Engineering

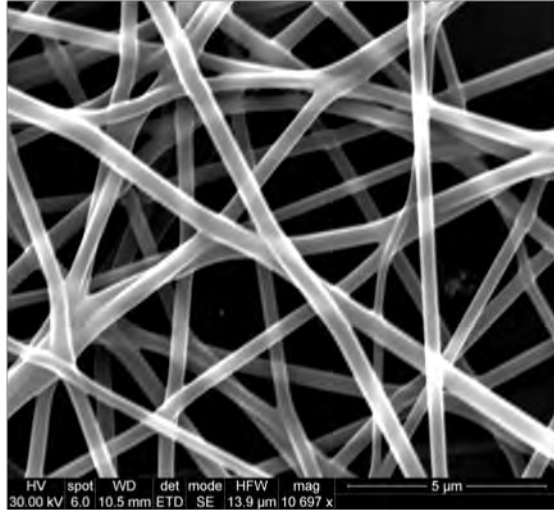
- In addition to nuclear energy systems, we study nuclear forensics, radiochemistry, radiation effects on materials and biological systems
- Our work is funded by DOE, NASA, DND, NSF, NNSA and several National Labs (LANL, ANL,...)
- Many PhD students complete part of their research at a national lab
- Most are offered a career position at the host lab



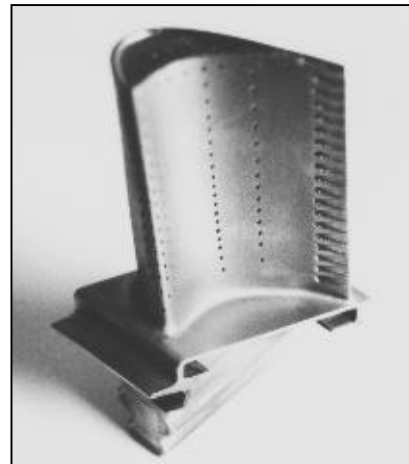
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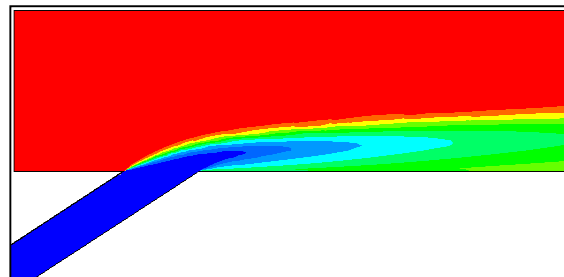
Thermal/Fluid Systems



High surface area TiO_2 nanofibers fabricated in our laboratory, each fiber is $\sim 200\text{-}300$ 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.



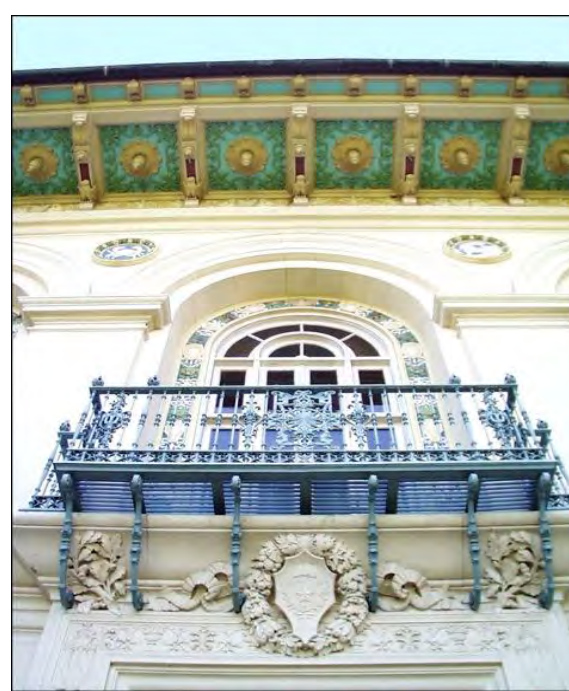
Current Research Areas:

- 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



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

TexasHillCountry.com



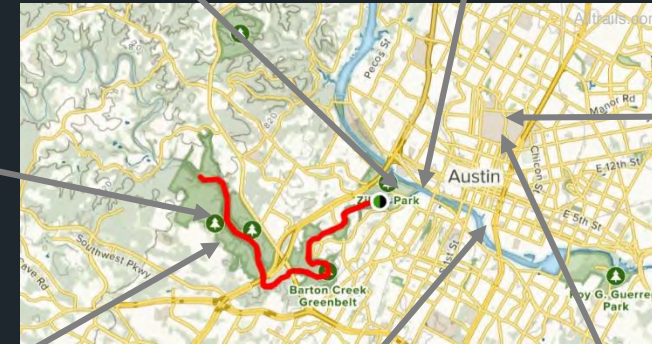
Austintexas.org



Austintexas.org



January 14, 2019
I'd like to see you take a picture of this year.



June 16, 2014
Greenbelt days



Austintexas.org





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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





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?



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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.**
- **Phone: 512-475-6091**
- **Email: micah.jackman@austin.utexas.edu**

