

# boundless opportunities

THE UNIVERSITY OF TEXAS AT AUSTIN

WHAT STARTS HERE CHANGES THE WORLD



100  
YEARS

Mechanical  
Engineering

## Welcome to Mechanical Engineering

### A World-Class Education

The Department of Mechanical Engineering (ME) at The University of Texas at Austin (UT) is one of the premier mechanical engineering departments in the country. According to *U.S. News and World Report*, **our undergraduate program is ranked eighth among research institutions, and its graduate program is ranked tenth.** In addition to offering a superior education, **UT ME is the least expensive mechanical engineering top-10 undergraduate program in the United States.** Our graduates enjoy leadership roles in engineering, business, medicine, space, government and education. The department embraces the university's core values— *learning, discovery, freedom, leadership, individual opportunity, and responsibility.*

### History of the Department

Engineering was established as a discipline on campus in 1895, and the School of Mechanical Engineering (now a department) was founded in 1913. Today, as we celebrate our centennial, the department is home to approximately 1,100 undergraduate students, 300 graduate students, 74 faculty members and 30+ staff members. ME is housed in a 10-story, 137,000-square-foot building on Dean Keeton Street. Additional research facilities are located at the Pickle Research Campus in North Austin.

### Research Overview

The undergraduate core curriculum has stayed relatively consistent since the department's inception, but the research and careers of current graduates and faculty have changed dramatically. The main research areas (also known as Thrusts) are Clean Energy, Advanced Manufacturing, Nano- and Micro-Scale Engineering, and Mechanical

Systems Intelligence. Many of our faculty members are world-renowned research scientists. Their leadership provides students an unparalleled opportunity to learn and make valuable contributions to science and industry.

### The Future Is Yours

This is an exciting time to be studying mechanical engineering. Today's global challenges are certainly daunting, and solving them is something many people cannot even begin to fathom. However, they present great opportunities for the next generation of engineers who want to make a difference in the lives of millions worldwide. Mechanical engineering is about developing solutions to everyday problems and using energy wisely to improve the lives of people around the globe. It is a challenging discipline that offers many rewards. Engineering is not easy work, but it is tremendously important and empowering.

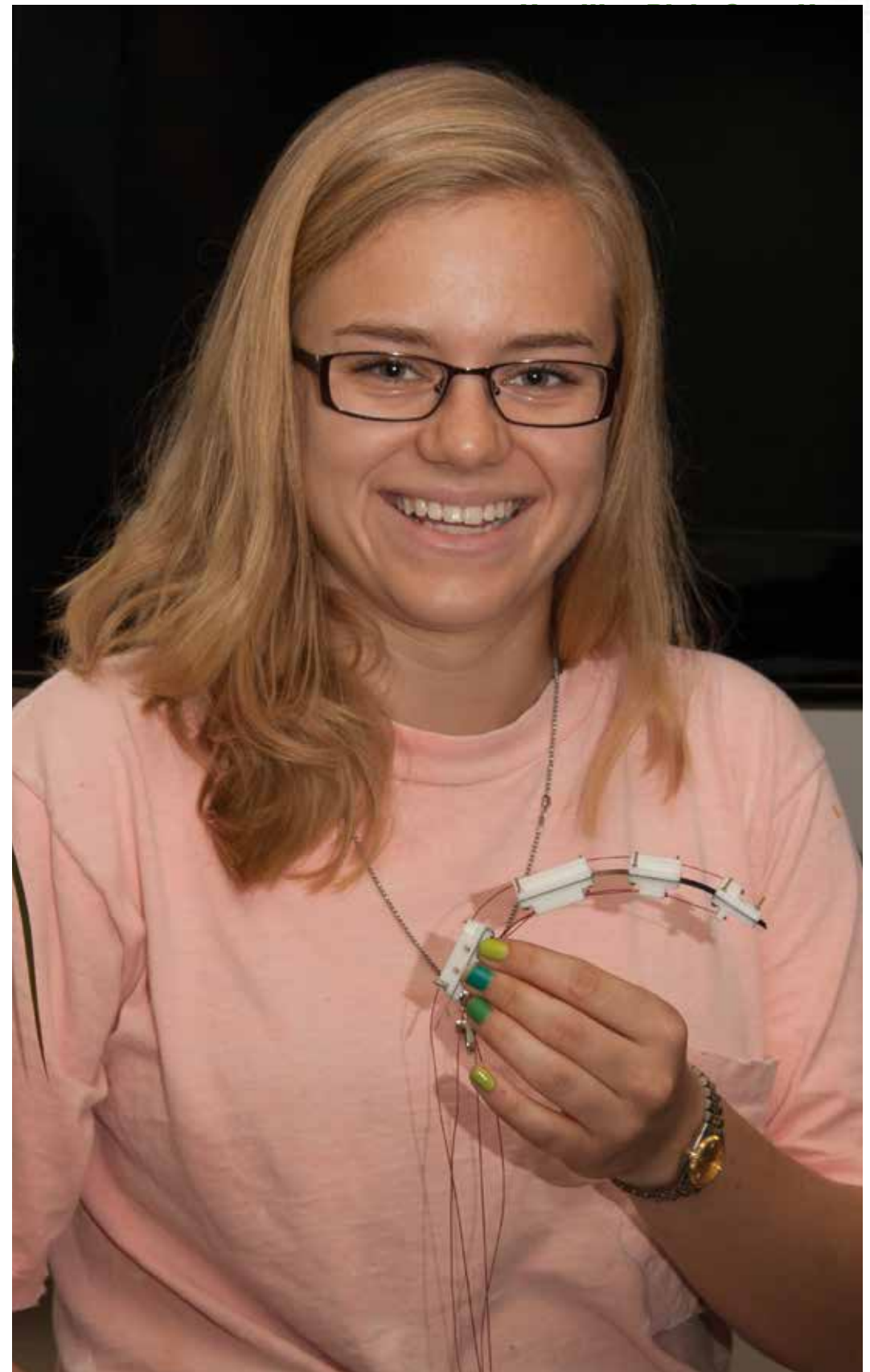
### Find Out More

Read more about the stories featured in this booklet on the Mechanical Engineering web site. See our home page for recent news and information:

<https://www.me.utexas.edu>.

Links to all archived news stories are in the top navigation (News Story Archive), which you can find by selecting the "Home" link. There is also another link to archived news at the bottom of the right column on the home page.

Another way to keep up with current news is through the department's social media. All links are in the web site footer or search "*Department of Mechanical Engineering, The University of Texas at Austin.*"



## The Path to a Mechanical Engineering Career

### An Industry Overview

No profession unleashes the spirit of innovation like engineering. Mechanical engineers are often described as the “**general practitioners of engineering**” because the scope of the profession is so diverse. From research to real-world applications, engineers improve our lives by creating bold new solutions that connect science to life in unexpected, forward-thinking ways. Few professions have such a direct and positive effect on people’s everyday lives.

Mechanical engineering involves the design and implementation of various kinds of mechanical systems and technologies. Currently, green energy solutions make up the broadest area of departmental research. UT ME researchers are studying solar and nuclear energy, lithium-ion battery design and production, fuel-efficient engines, wind turbine design and oil from synthetic trees as a possible environmentally safe biofuel. But that’s not all. We also have teams working in nano- and micro-scale engineering, bio-medical laser surgery, biomechanics and the development of prosthetics for amputees and post-stroke patients.



*An engineering career can take you to the edge of the world. Shilpa and colleagues did some sightseeing and explored an ice cave in Antarctica.*

### Getting Started Early

Students desiring a career in mechanical engineering may want to start preparing for it while still in high school by taking as many math and science courses as their school offers. Most of our students have taken either pre-calculus or calculus before starting their college career.

### How Women Fit into the Picture

ME students are bright, curious, hard-working and industrious. Our female undergraduates are some of the hardest-working, most successful students in the department. Female students, on average, have higher GPAs than their male counterparts, and often are actively involved in various student organizations. Many held leadership roles in high school, and the desire to lead and contribute to society continues to define who they are.

*Below: ME graduate student **Shilpa Gulati**, who specializes in artificial intelligence, worked as the software engineer for an Antarctic expedition to map the topography of an underground lake. She is standing in front of the submarine robot at a testing site. The robot went under the ice in Lake Bonney, Antarctica. In the future, the research will be used by NASA to map underwater terrain on other planets.*



*Photos courtesy, Shilpa Gulati.*

**Below:** Women in Engineering (WEP) hosts Consider Every Option (CEO) summer camps. Campers dine with professional engineers and engineering students who give them advice and answer questions. Pictured clockwise: **Courtney Grosvenor** (ME senior and intern, Austin Energy), **Kelly Morrelli** (CP&Y), **Anne Johnson** (Austin Energy Green Building) and **Maggie Chen** (Assistant Professor, Mechanical Engineering).

## The World Needs More Female Engineers

### Who Are They?

Women in mechanical engineering are leaders, honor students, innovators, entrepreneurs and researchers. ME women embrace the opportunity to make important contributions to society in a leadership capacity. Currently 20% of ME students are women, but we are working to bring the percent of female students to 35% within five years.

### High Salaries and Leadership Opportunities Will Be Yours

Due to the wide spectrum of career choices open to mechanical engineers, our students look forward to a career that is as emotionally fulfilling and exciting as it is lucrative and prestigious. Motivations include the opportunity to work overseas, as well as a future filled with leadership, adventure and challenge. Our 2012 ME graduates received an **average starting salary of \$69,014, compared to \$61,872** (CNN Money 2011 engineering students) for engineering graduates at other institutions.\* The rewards reaped from this career path are often staggering — both personally and financially.

### The Women in Engineering Program (WEP)

The mission of the Women in Engineering Program is to increase the overall percentage of women in the Cockrell School of Engineering at The University of Texas at Austin. Participation in WEP is an excellent way for incoming female students to meet other engineering women and begin to forge strong personal and professional relationships. WEP's First Year Initiative (FYI) provides academic and peer support to connect first-year students to the engineering community. First-year students may enroll in a First-year Interest Group (FIG) with other engineering women, live with other female

engineering students in the most convenient university residence hall Kinsolving and be matched with Peer Assistance Leaders (PALs) through the WEP mentoring program.

Year Two (Y2) provides a career exploration network that helps second-year students explore all possibilities and make informed decisions for their future. Graduates Linked with Undergraduates in Engineering (GLUE) gives students practical research experience, and WEP Leadership and Career Development Seminars prepare students to lead and make our world a better place. WEP will help you get connected and develop leadership skills for life!

### ME Scholarships

To encourage more young women to become mechanical engineers, the **Women in Engineering Program (WEP) offers a limited number of scholarships to incoming first-year mechanical engineering students.** To be eligible to apply for a WEP ME scholarship, students need to attend at least one WEP function. WEP hosts a summer day camp, Consider Every Option (CEO), and other summer and weekend events for high school students.

<http://www.engr.utexas.edu/wep/>.

### Applying to the Department of Mechanical Engineering

To apply to the Mechanical Engineering Department, please visit <http://bealonghorn.utexas.edu/>. *Even if you are in the top eight percent of your Texas high school class, you still must complete the application online by the date specified to gain acceptance to the university.* The entire application process is online, and no interview is needed.



## The Research Institution Advantage

### Research Groups as Small Business Entities

The University of Texas at Austin is a major research institution. You may wonder why that is important to you as an undergraduate. While some of your professors do not maintain active research programs and simply focus on being masterful teachers and communicators, most conduct research in a particular aspect of mechanical engineering, as well as teach undergraduate courses. These professors are much like small, entrepreneurial business owners. They promote their research efforts and acquire funding to keep their projects afloat, which provides students the opportunity to work on research teams. Not only can students learn from top researchers, but they are often paid for their efforts and may be able to earn course credit toward their engineering degree.

### The Vital Link between Science and Industry

Research serves as a way to test the scientific process, to make new discoveries, to create new inventions, and to lay the groundwork for new products, services and technologies. Much of the technology we take for granted in our everyday lives stems from academic research. Research institutions have some other advantages to offer undergraduate students. Faculty and research scientist positions are extremely competitive, and the top research institutions like The University of Texas at Austin attract only the best.

UT's mechanical engineering research can be grouped into a number of areas. We are working on energy and global warming issues from a number of different angles. We have a team that is developing a faster

process for making lithium-ion batteries. Others are working in nuclear energy, wind turbine design to increase the production capacity of wind energy, and the design of longer-lasting batteries and capacitors through the development of new conductive materials. Research is also being conducted in fuel-efficient hybrid-engine design, solar-energy solutions and green-manufacturing techniques. Research in robotics includes humanoid robots for use on earth and in space, medical robotics for amputees and stroke victims, and wearable exoskeletons to enhance strength and agility.

In addition to research into green energy solutions, researchers also work on the development of bio-medical tools and devices. One team is developing a laser-surgery tool that may become instrumental in eliminating individual cancer cells. Another team studies human movement and is designing better prosthetics for lower-limb amputees and stroke patients. Even as an undergraduate, you may be able to join a research team.

### Senior Design Projects—Undergraduate Research

There are other ways for undergraduates to get involved in real engineering projects, instead of simply working for a professor. All graduating seniors complete a capstone Senior Design Project (SDP) in their senior year. The students work closely with a sponsor to design and/or build something the sponsor needs. Upon completion, the sponsor owns the technology developed during the semester-long process. The students gain real-world engineering experience and make valuable professional connections in the process. It's a win-win situation for everyone involved.

*Below: Associate Professor Carolyn Seepersad (right) and graduate student Lia Kashdan use a process originally developed at UT called selective laser sintering to design custom products and prototypes. The technique uses a high-power laser to fuse particles into a three-dimensional object. On the table are designs by Seepersad's research group and classes for deployable airplane wings, a customized backrest and bicycle pedals, a clock and tailored honeycomb mesostructures.*



## Life's Lessons

### A College Education—More Than Just an Academic Exercise

“What starts here changes the world” is the motto for the university. Perhaps you’ve seen it on our campus literature and web sites, but have you really thought about what it means? At UT ME, we embrace that concept seriously, and enthusiastically encourage our students to become people who *will* change the world.

### Empowering Experiences

We support our student organizations and our study-abroad program because we understand that the experiences our students take from them are just as important as what they learn in a regular academic setting. At a young age our students are making real-world contributions to the lives of others. Some of these organizations include the Society of Women Engineers (SWE), the American Society of Mechanical Engineers (ASME), Pi Tau Sigma (ME Honor Society), the Society of Automotive Engineers (SAE), the American Nuclear Society (ANS), Student Engineers Educating Kids (SEEK) and Engineers for a Sustainable World (ESW-UT).

### Leadership Opportunities

Many of the student organizations are involved in engineering, social services and construction projects, under the guidance of Cockrell School faculty and professional mentors. UT ME has a strong commitment to hands-on learning because it reinforces both the importance of engineering in our daily lives and the concepts taught in the classroom. Students learn to think critically. Through some of the hands-on classes, students are able to travel, sometimes outside the U.S., to work on engineering projects in impoverished and developing areas. These opportunities give students both project management and engineering experience, thus

building confidence and competence. These experiences make students more competitive when it is time to seek an engineering internship, often paving the way to an exciting and rewarding professional career. In addition to providing opportunities for students to work with under-served communities, the department also encourages students to study abroad. We believe that international exposure is no longer an educational luxury, but a necessity in today’s global economy.

### What a UT Mechanical Engineering Degree Means

A UT ME diploma means a great deal to prospective employers. It is as prestigious as it is versatile, allowing our graduates to work in numerous industries and capacities. We are committed to providing our students with the solid foundation needed to go anywhere with their lives. The education we provide will open doors to places you cannot yet imagine.

### Contact Us

For more information please contact the **Undergraduate Office at (512) 471-1136** or the **Women in Engineering Program (WEP) at (512) 471-5650**. You may also email the ME Undergraduate Office at: [meugo@me.utexas.edu](mailto:meugo@me.utexas.edu) or WEP at: [wep@enr.utexas.edu](mailto:wep@enr.utexas.edu).

Please visit these sites for more information:

#### Mechanical Engineering:

<http://www.me.utexas.edu>

WEP: <http://www.enr.utexas.edu/wep/>

#### Cockrell School of Engineering:

<http://www.enr.utexas.edu>

#### Centennial & New Initiatives:

<http://www.me.utexas.edu/centennial/>

We look forward to meeting you and your parents and are happy to answer all your questions.



Photo courtesy, Daniel Araki.

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**About the Photos:**

**Cover: Astronaut Dr. Karen**

**Nyberg** pictured aboard the Space Shuttle *Discovery*, received her Ph.D. from UT ME in 1996. Photo courtesy of NASA.

**Above:** Undergraduate **Emily Chen** displays the flexible tactile sensor gloves that she and Jack Zheng designed in Dr. Luis Sentis' Human-Centered Robotics class. Photo courtesy of Dr. Luis Sentis.