

THE UNIVERSITY of  
**TENNESSEE** **UT**

KNOXVILLE

COLLEGE of ENGINEERING



**Graduate  
Education  
Program Guide**



## A Message from the Dean

To our prospective students: Welcome to the University of Tennessee College of Engineering.

If you are considering pursuing a graduate education in engineering, you are making a serious decision about your future, one that will require all of your intellect, energy and enthusiasm for several years.

Our graduate students work closely with distinguished COE faculty members, who supervise and mentor the next generation of engineering academics, innovators and investigators.

The COE's alliance with nearby Oak Ridge National Laboratory allows us to extend unique opportunities to pursue research projects working with professors and researchers who are internationally respected in their fields of study.

The University of Tennessee College of Engineering offers you an opportunity for an outstanding graduate education in the engineering field. For more than 150 years, our college has provided the advanced skills and training that place our graduates on the forefront of contemporary technological developments.

We appreciate your interest, and hope you will visit our campus in the near future.

Best regards,

*Wayne T. Davis*

Wayne T. Davis  
Dean of Engineering



## Getting Started

The University of Tennessee College of Engineering, established in the largest educational institution in the state, offers a diverse range of graduate programs leading to master's and doctoral degrees.

Graduate training is essential for engineering faculty positions and numerous research and development programs. A significant number of engineers obtain graduate degrees in engineering or business administration to learn new technology and

broaden their education. Many high-level executives in government and industry began their careers as engineers.

A master's or doctoral degree can significantly impact both earnings and career potential.

For more detailed information, visit the U.S. Department of Labor's Bureau of Labor Statistics Web site: [www.bls.gov/oco](http://www.bls.gov/oco)

## Featured Alumnus

### **Dr. Bryan D. Haynes, Kimberly-Clark Corporation, Senior Research & Engineering Manager, Global Nonwovens**

“When I was a young boy, I dreamed of one day being an astronaut or fighter pilot. My love for aviation took me down the path of obtaining my pilot’s license at the age of 17 and later enrolling into the College of Engineering to study Aerospace Engineering. I will never forget my first day on campus when I went to the bookstore to get my books and looked at a senior level compressible flow course. I saw all of those equations and thought to myself, I may not be able to do this. Fortunately, I had some excellent faculty that taught me the importance of learning the engineering fundamentals, and by the time I took that compressible flow course, I did not have any issues; in fact, I made an A!

To me, the most important skill that I learned at the University of Tennessee was how to apply the engineering fundamentals to creatively solve problems. In my current job at Kimberly-Clark, I am not designing rockets or airplanes, but the skills and education provided by the College of Engineering gave me the tools to solve real world problems and make a difference in nonwoven technologies. During my career, I have obtained 40 U.S. Patents and 12 Trade Secrets, and much of the credit goes to what I learned in the classroom during my undergraduate and graduate studies.

I love returning to campus for any opportunity that arises, such as providing seminars, recruiting or those other events that happen on Rocky Top in the fall. Yes, I mean supporting the Big Orange with 100,000 other fans.”

#### **Dr. Bryan D. Haynes**

*Ph.D., Mechanical Engineering, 1991*

*M.S., Aerospace Engineering, 1987*

*B.S., Aerospace Engineering, 1985*





## Admission Requirements

All students who wish to apply to the COE graduate program must first be admitted through the UT Graduate School.

Prospective admissions candidates for the engineering programs must have earned a bachelor's degree with at least a grade point average of 2.7 out of 4.0 from a college or university accredited by the appropriate regional accrediting agency or a foreign equivalent. For additional information or to apply online, visit <http://graduateadmissions.utk.edu>

The COE also requires that all students take the Graduate Record Exam (GRE) test when applying for admittance. [www.ets.org/gre](http://www.ets.org/gre)

Additionally, students whose native language is not English must submit results of the Test of English as a Foreign Language (TOEFL). [www.toefl.com](http://www.toefl.com)

## Financial Support

The main sources of financial support for graduate students at UT are graduate assistantships provided by academic departments and administrative offices of the university. Assistantships are financial awards to graduate students for part-time work in teaching, administration or research while pursuing an advanced degree.

Assistantship appointments usually require a 10 to 20-hour work week with an annual stipend payable

in either nine or 12 monthly installments. Graduate Teaching Assistants (GTA), Graduate Teaching Associates (GTAssoc), Graduate Assistants (GA) and Graduate Research Assistants (GRA) usually receive a waiver of maintenance fees and tuition. Assistantships also provide student health insurance.

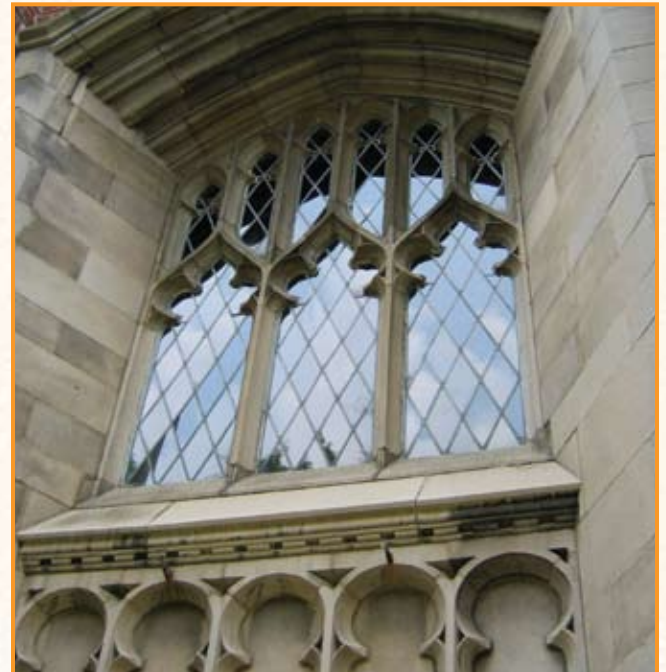
Information about assistantships can be found in advising centers, admissions offices and through the graduate recruiter in your department.

Fellowships are awarded on the basis of academic merit and potential for scholarship. The following awards are offered through the Office of Graduate Studies:

- Herman E. Spivey Graduate Fellowships
- Lori Mayer Re-Entry Women's Graduate Fellowships
- J. Wallace & Katie Dean Graduate Fellowships
- Yates Dissertation Fellowships

Potential and current graduate students are also urged to apply for fellowships or grants from national, international, industrial or foundation sources. These awards usually pay annual stipends in addition to tuition funding. For more information, visit:

<http://gradstudies.utk.edu/gradfund.shtml>



## Lindsay VanBebber

### Graduate Student Materials Science and Engineering

“The decision to continue my education at UT was a direct result of my remarkable undergraduate experience. Throughout the department and college, the faculty, staff, and even other students provide a wealth of encouragement. They are truly concerned about your success, and their interest is excellent motivation.

The significant opportunities available at the university are apparent. Due to the quality of professors and access to Oak Ridge National Laboratory, I have had the chance to learn from and interact with exceptional researchers. The resources available through the university greatly enhance the educational experience. Occasions to apply skills and knowledge from the classroom are abundant, allowing me to develop abilities and build confidence.

Most of all, the environment at UT allows me to balance my life as a wife, mother, and student while preparing for my professional career.”



## Additional Opportunities

### CIRE

The university also offers an interdisciplinary doctoral degree program through the Center for Interdisciplinary Research and Graduate Education (CIRE). This initiative offers a degree in energy science and engineering, as well as concentrations in energy science and engineering through existing doctoral programs. This program is a collaboration between faculty in the College of Arts and Sciences, the College of Agricultural Sciences and Natural Resources, the College of Engineering and the research staff at ORNL.

Concentrations are offered in the following areas:

- Bioenergy/biofuels
- Environmental and climate science
- Nuclear energy
- Distributed energy/grid management
- Energy conversion/storage
- Renewable energy

CIRE offers a \$28,000 stipend along with tuition and fees. For more information on CIRE, contact [coe@utk.edu](mailto:coe@utk.edu).

### UTK-ORNL Distinguished Fellowships

The University of Tennessee has also partnered with Oak Ridge National Laboratory to offer a joint graduate fellowship program. This initiative offers highly motivated doctoral candidates the opportunity to work jointly with faculty at UT and researchers at ORNL. The fellowships can last up to five years and lead to a degree awarded by the university. Participants in the UTK-ORNL Distinguished Fellowships will have the opportunity to pursue research in several areas, including:

- Materials science and engineering, including neutron science
- Computational science and engineering
- Nuclear science and engineering

The stipend includes \$30,000 in support funding and a tuition waiver. For more information please visit: <http://distinguished.utk.edu>.

### UT Athletic Graduate Engineering Fellowship

Based on recommendation by the departments, prospective graduate students with high GRE scores may be eligible to receive this supplemental fellowship offered to the incoming Engineering graduate students. This fellowship will be included as part of a \$25,000 stipend along with tuition and fees. Upon successful student academic progress, this fellowship could be renewed for up to three years.

### IGERT/STAIR

The UT College of Engineering is also a participant in National Science Foundation's Integrative Graduate Education and Research Traineeship (IGERT) program, which was initiated in 1997. The IGERT program was developed to meet the challenges of educating U.S. Ph.D. scientists, engineers and educators with interdisciplinary backgrounds.

The Sustainable Technology through Advanced Interdisciplinary Research (STAIR) initiative is a new, interdisciplinary doctoral program funded through IGERT that links researchers in the following departments:

- Chemical and Biomolecular Engineering (CBE)
- Materials Science and Engineering (MSE)
- Biochemistry and Cellular and Molecular Biology (BCMB)
- Chemistry (Chem)
- Civil and Environmental Engineering (CEE)

The STAIR program provides an opportunity for talented scientists and engineers to earn a Ph.D. in one of three areas in sustainable energy including:

- Production of hydrogen through biological pathways
- Discovery of nanoporous materials for hydrogen storage
- Identification of structure/property relationships in hydrogen-based fuel cells

Interested applicants may contact the program director at [stair@utk.edu](mailto:stair@utk.edu).

# Engineering Departments and Degree Programs

The UT College of Engineering is home to seven departments and is academically associated with another in the College of Agricultural Sciences and

Natural Resources. Together, these eight departments offer 16 master's and 14 doctoral degrees for a total of 30 graduate degree options.



The Department of Biosystems Engineering & Soil Science in the College of Agricultural Sciences and Natural Resources offers master's and doctoral degrees in biosystems engineering. <http://bioengr.ag.utk.edu>



The Department of Chemical & Biomolecular Engineering offers master's and doctoral degrees in chemical engineering. [www.engr.utk.edu/cbe](http://www.engr.utk.edu/cbe)



The Department of Civil & Environmental Engineering offers master's and doctoral degrees in civil engineering and a master's degree in environmental engineering. [www.engr.utk.edu/civil](http://www.engr.utk.edu/civil)



The Department of Electrical Engineering & Computer Science offers master's and doctoral degrees in electrical engineering, computer engineering and computer science. [www.eecs.utk.edu](http://www.eecs.utk.edu)



The Department of Industrial & Information Engineering offers master's and doctoral degrees in industrial engineering. [www.engr.utk.edu/ie](http://www.engr.utk.edu/ie)



The Department of Materials Science & Engineering offers master's and doctoral degrees in both materials science and engineering and polymer engineering. [www.engr.utk.edu/mse](http://www.engr.utk.edu/mse)



The Department of Mechanical, Aerospace & Biomedical Engineering offers master's and doctoral degrees in mechanical engineering, aerospace engineering, biomedical engineering and engineering science. [www.engr.utk.edu/mabe](http://www.engr.utk.edu/mabe)



The Department of Nuclear Engineering offers master's and doctoral degrees in nuclear engineering. [www.engr.utk.edu/nuclear](http://www.engr.utk.edu/nuclear)

## Dr. George Pharr

**Chancellor's Professor,  
McKamey Professor, and Head,  
Department of Materials  
Science and Engineering.**

"It is a tremendously exciting time to be a graduate student at the University of Tennessee College of Engineering.

Our unique partnership with Oak Ridge National Laboratory, one of the world's premier research facilities, offers numerous research opportunities with internationally known academics and scientists in a wide variety of disciplines.

The college provides many avenues of financial support, including fellowships and assistantships, as well as initiatives such as the UT-ORNL Distinguished Fellowships and the new Ph.D. program in energy science.

Whether you are considering an advanced degree to enhance your employment opportunities or are planning a career in academia, the UT College of Engineering offers you many distinct advantages for your education.

If you are interested, please contact any of the college's departments for more information, or visit our Web site at [www.engr.utk.edu](http://www.engr.utk.edu). You can also arrange a visit to our campus. We hope to see you soon!"

**Dr. George Pharr**

*Ph.D., Materials Science and Engineering, 1979*



## Multidisciplinary Programs



### MS-MBA Dual Degree Program

The UT MS-MBA program is designed to give recent engineering graduates and practicing professionals the skills necessary to become the next generation of new business owners and CEOs. In less than two years, you can simultaneously earn a Master of Science degree in your chosen engineering discipline and a Master of Business Administration. The program focuses on entrepreneurship and new product creation. [www.engr.utk.edu/ms-mba](http://www.engr.utk.edu/ms-mba)



### M.S. Degree in Reliability and Maintainability Engineering

The College of Engineering and the Department of Statistics, Operations and Management Science in the College of Business Administration have teamed up to offer an interdepartmental Master of Science degree in Reliability and Maintainability Engineering

(RME). Thesis and non-thesis options are available for students, and the program can be completed on campus or online through distance education.

[www.engr.utk.edu/rme](http://www.engr.utk.edu/rme)



### Certificate Programs

Graduate certificate programs offer opportunities to primarily part-time students who are interested in obtaining certification via distance education. Applicants must still meet the minimum criteria for admission, including a bachelor's degree and successful completion of the GRE examination.

The COE offers six certificate programs:

- Graduate Certificate in Sustainability Science
- Graduate Certificate in Engineering Management
- Graduate Certificate in Reliability and Maintainability Engineering
- Graduate Certificate in Computational Fluid Dynamics
- Graduate Certificate in Nuclear Criticality Safety
- Graduate Certificate in Nuclear Security Science and Analysis

<http://anywhere.tennessee.edu>

### International Education

The UT Center for International Education collaborates with the COE to create opportunities for engineering studies in other countries. <http://web.utk.edu/~global>

## Molly S. Wood

**Water Resources Engineer, U.S. Geological Survey; Task Lead, Department of Defense Task Force to Improve Business and Stability Operations, Iraq**

“I’m a proud graduate of the UT College of Engineering and a former UTK Whittle Scholar. I currently work as a Water Resources Engineer for the U.S. Geological Survey in Boise, Idaho. One of my responsibilities is to serve as Task Lead on a large-scale water development project in Iraq in cooperation with the Department of Defense Task Force to Improve Business and Stability Operations. My experience at UT was invaluable in my development as an international water resources engineer. I gained ‘real-world’ knowledge, was taught how to convey technical information to a varied audience, and was given the chance to study abroad and develop an understanding of other cultures.”

### **Molly S. Wood**

*M.S., Environmental Engineering, 2000*

*B.S., Civil & Environmental Engineering, 1998*



## Partner Facilities

In 2000, the team of UT-Battelle LLC assumed management responsibilities for nearby Oak Ridge National Laboratory (ORNL), one of the nation's foremost scientific research centers. This unique partnership has allowed the university to establish a growing number of joint research centers and interdisciplinary collaborations, as well as a joint faculty program that provides many opportunities for focused student research.

ORNL is home to a number of internationally recognized research facilities, including:

- **The Spallation Neutron Source (SNS)**, an accelerator-based neutron source that will provide the most intense pulsed neutron beams in the world for scientific research and industrial development.
- **The High Flux Isotope Reactor (HFIR)** Center for Neutron Scattering is the highest flux reactor-based source of neutrons for condensed matter research in the United States, producing thermal and cold neutrons used to study physics, chemistry, materials science, engineering and biology.
- **The Joint Institute for Computational Science (JICS)**, which houses a number of leadership-class computers, including the "Jaguar," presently the second fastest computer in the world with a peak capability of 101.7 teraflops (over 100 trillion calculations per second).

## Campus Resources

The University of Tennessee is designated by the Carnegie Foundation as a Research University with Very High Research Activity. The College of Engineering is home to more than 100 research labs.

Research buildings on the UT-Knoxville campus include the Science and Engineering Research Facility (SERF), a 230,000 square foot facility dedicated to research laboratories utilized by both the COE and the College of Arts and Sciences.



The Min Kao Electrical Engineering and Computer Science Building, a brand-new, state-of-the-art 150,000 square foot building that will house laboratories, classrooms and offices, is currently under construction and expected to be completed by 2011.



Design and construction plans are also underway for the John Tickle Engineering Building, a five-story, 110,000 square foot facility that will house the Department of Civil and Environmental Engineering and the Department of Industrial and Information Engineering.



Another research facility, the Joint Institute for Advanced Materials (JIAM), a joint institute for multidisciplinary research of advanced materials, is slated for future construction on the university's new Cherokee Farm Campus, located on the banks of the Tennessee River just a few minutes from the main campus.



## Research Centers

The college has four distinguished research centers:

- **Center for Materials Processing (CMP)**— Designated by the state of Tennessee as a Center of Excellence, the CMP's research efforts focus on the control of material properties through their composition and molecular structure as well as how these factors relate to materials processing. Participating researchers come from all engineering disciplines. [www.engr.utk.edu/cmp](http://www.engr.utk.edu/cmp)
- **Center for Transportation Research (CTR)**—A nationally and internationally recognized research entity, CTR was created in 1970 to foster and facilitate interdisciplinary research, public service and outreach in the field of transportation. <http://ctr.utk.edu>
- **Reliability and Maintainability Center (RMC)**— This partnership between the university and industry is dedicated to improving industrial

productivity, efficiency, safety and profitability through the use of management systems, analysis techniques and advanced predictive and preventive technologies to identify, manage and eliminate failures. [www.rmc.utk.edu/](http://www.rmc.utk.edu/)

- Scintillation Materials Research Center (SMRC)— Formed by a collaboration between UT and Siemens Medical Solutions Molecular Imaging, this unique, multidisciplinary research facility’s mission is to discover and develop new scintillation materials and provide the foundation for advances in gamma ray, x-ray and neutron detectors. [www.engr.utk.edu/smr](http://www.engr.utk.edu/smr)

### The University of Tennessee Space Institute (UTSI)



UTSI is a graduate education and research institution located in Middle Tennessee, adjacent to the U.S. Air Force Arnold Engineering Development Center. It

was established in 1964 as part of the University of Tennessee and has become an internationally recognized institution for graduate study and research in engineering, physics, mathematics and aviation systems. [www.utsi.edu](http://www.utsi.edu)

### Diversity Initiatives

The college strives to maintain a diverse student body. Organizations such as the National Society of Black Engineers and the Society of Women Engineers contribute to the base of support minority engineering students have in the college.

[www.engr.utk.edu/currentstudents/orgs.html](http://www.engr.utk.edu/currentstudents/orgs.html)

### Life on Campus and Beyond...

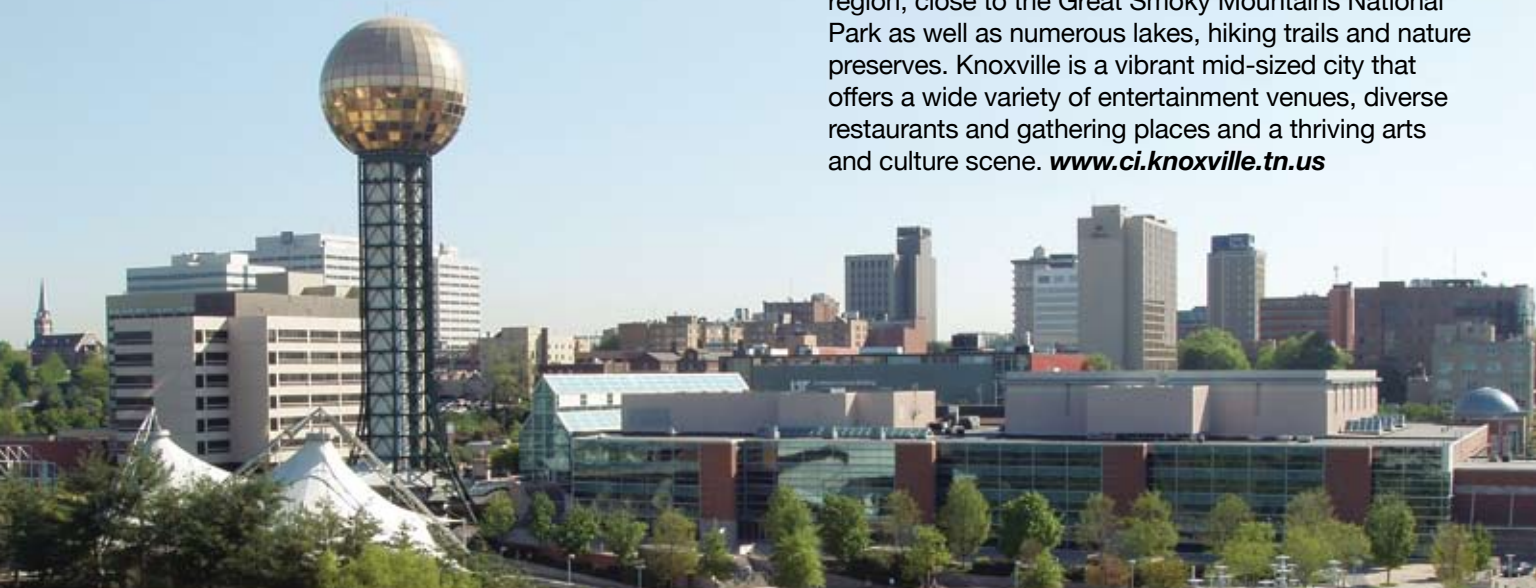
The University of Tennessee offers students numerous cultural, social, recreational and community events and activities. The Adult Student Services Center is a great place to find out what is going on around campus. <http://web.utk.edu/~adultssc>

UT’s Recreational Sports Department provides a wide variety of programs for almost any sport or fitness activity. The Tennessee Recreational Center for Students



(TRECS) features four basketball courts, a one-seventh mile indoor circular track, cardiovascular equipment, strength-training stations, racquetball courts, an outdoor Olympic-sized pool and a station for renting outdoor equipment. [www.utk.edu/athletics](http://www.utk.edu/athletics)

Knoxville is located in the beautiful East Tennessee region, close to the Great Smoky Mountains National Park as well as numerous lakes, hiking trails and nature preserves. Knoxville is a vibrant mid-sized city that offers a wide variety of entertainment venues, diverse restaurants and gathering places and a thriving arts and culture scene. [www.ci.knoxville.tn.us](http://www.ci.knoxville.tn.us)



## Shane Hart

### Graduate Student Nuclear Engineering

“When I chose to come to the University of Tennessee, I didn’t really know what to expect. One of my co-workers attended the University for his Ph.D., and he was positively enthused with the whole experience. When the time came to plot my own graduate path, the University of Tennessee was top on my list due to excellent research opportunities, accessible faculty, and assistantship availability. I made the drive to Knoxville and was impressed by the city and the campus. After meeting with various professors, I was able to find a project that interested me and would be useful in advancing my career.

One of the great draws of doing graduate work at the University of Tennessee is the close proximity of Oak Ridge National Laboratory. ORNL is one of the great research areas in my field, and to be given the opportunity to do research was a great benefit. I am able to go to ORNL every week to work on my thesis research and collaborate with leaders in my field and gain their experiences. For someone who wants to work in the research area when they graduate, this type of work is invaluable.

The professors at the University of Tennessee are extremely accessible and friendly. They make the extra effort to be available outside of class time and answer any questions that I might have. Everyone in the department works extremely hard to ensure that all of the students succeed. I am very happy that I chose to come to the University of Tennessee and pursue my graduate degree in the Nuclear Engineering Department and would definitely make the same decision again.”





# THE UNIVERSITY of TENNESSEE **UT**

KNOXVILLE

COLLEGE of ENGINEERING

If you are interested in an outstanding engineering education, contact the University of Tennessee College of Engineering!

Call, write or e-mail the address below:

**Academic and Student Affairs Office**

**UT College of Engineering**

101 Perkins Hall

Knoxville, TN 37996-2011

E-mail: ***coe@utk.edu***

Phone: (865) 974-2454

Web: ***www.engr.utk.edu***

For engineering campus tours, visit:

***<http://web.utk.edu/~coeamb/tours.php>***

The University of Tennessee is an EE/AA/Title VI/Title IX/Section 504/ADA/ADEA institution in the provision of its education and employment programs and services. All qualified applicants will receive equal consideration for employment without regard to race, color, national origin, religion, sex, pregnancy, marital status, sexual orientation, gender identity, age, physical or mental disability or covered veteran status.

DOP: 10/10 PAN: E01-1301-012-014-11