




DEPARTMENT OF
ELECTRICAL ENGR. & COMPUTER SCIENCE
UNIVERSITY OF TENNESSEE, KNOXVILLE

GRADUATE STUDENT HANDBOOK

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DIRECTOR OF GRADUATE STUDIES



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Department Head Welcome Message



Welcome to the Department of Electrical Engineering and Computer Science (EECS). I am delighted that you have chosen our department for your graduate studies.

The origins of our department trace back to the 1890s. EECS was formed on July 1, 2007 when the Department of Electrical and Computer Engineering and the Department of Computer Science merged. This year we will be celebrating our 10th year anniversary. We moved into the Min H. Kao Building in March 2012. Built for EECS, this state-of-the-art building brings almost all our activities

under one roof.

EECS offers three academic programs: Electrical Engineering, Computer Engineering, and Computer Science. Each program provides undergraduate degrees as well as graduate degrees at both the MS and PhD levels. We are a diverse department with research interests spanning numerous fields, including: artificial intelligence and machine learning, bioinformatics, data analytics, embedded systems and Internet of Things (IoT), electronics, high performance computing, power and energy, visualization and image processing, and wireless and sensor networks. Please explore our department web pages to learn more about the research activities. It is critical for you as a graduate student to identify your area of interest early in your studies to take advantage of the available research opportunities.

The faculty and I hope you are as excited as we are about new directions for our programs and will enjoy the educational and research opportunities the department offers.

Dr. Leon Tolbert
Department Head

Introduction

Graduate School Introduction

In order to serve the mission and vision of the Graduate School and preserve the integrity of Graduate Programs at the University of Tennessee, Knoxville, information related to the process of graduate education in each department is to be provided for all graduate students.

Based on Best Practices offered by the Council of Graduate Schools, it is important that detailed articulation of the information specific to the graduate degrees offered in each department/program be disseminated.

The Department Graduate Handbook does not deviate from established Graduate School Policies (tiny.utk.edu/grad-policies) noted in the Graduate Catalog, but rather provides the specific ways in which those policies are carried out.

Department Introduction

EECS offers graduate programs leading to the Master of Science and Doctor of Philosophy with majors in Computer Engineering (CpE), Computer Science (CS) or Electrical Engineering (EE).

Areas of concentration in CS include:

- Computational Imaging
- Computer-Human Interaction
- Cybersecurity
- Cyberinfrastructure
- Data Analytics
- Data Mining
- Data Visualization
- Discrete Optimization
- Energy Science and Engineering
- High Performance Computing
- Intelligent Systems and Machine Learning
- Life Science Applications
- Software Systems

Areas of concentration in CpE include:

- Computer Architecture
- Computer Networks
- Computer Vision
- Cybersecurity
- Data Analytics
- Embedded Systems
- Energy Science and Engineering
- Image Processing
- Information Systems
- Signal Processing
- VLSI System Design

Areas of concentration in EE include:

- Automotive Manufacturing and Technology
- Communications
- Control Systems
- Electromagnetics and RF Circuits
- Energy Science and Engineering
- Fire Protection Engineering
- Power Electronics
- Power Systems
- Signal Processing
- Solid-state Electronics

As a graduate student of the University of Tennessee, Knoxville and while pursuing the MS and/or PhD degree in the Computer Engineering, Computer Science or Electrical Engineering programs, you are considered an educated, responsible adult pursuing the frontiers of these expanding horizons. Look for opportunities beyond the required course work and take advantage of the learning opportunities offered to you. Participate in department and university seminars, professional groups and technical conferences. In graduate school, you have a relationship with faculty that is closer than before, and different - more like a colleague in learning and research. Your program will be more individualized, deeper, and less hurried. There will be chances to further develop your individual talents, be they basic research, analysis, synthesis, design, development, technical writing, or oral presentations. Research on the very frontiers of technology will be a major part of your program as you prepare a thesis or dissertation. There is also financial support available for graduate students through fellowships, teaching assistantships, and/or research assistantships.

EECS along with the College of Business Administration also offers a dual MS-MBA degree program. Students must be admitted by both EECS and the College of Business

Administration. All three majors within EECS support the dual MS-MBA degree program.

This handbook is intended to help you gain as many benefits as possible from your studies and to make the most of the opportunities we have to offer. It contains information for how EECS and the Graduate School function, the range and selection of courses available, and what to do should difficult situations arise. *Please note that this handbook is purely advisory and that the material it contains is not intended to be a comprehensive statement of university policy.* Always consult the Graduate Catalog (tiny.utk.edu/grad-catalog) for procedures and requirements.

We know that it will become apparent to you that the staff, faculty, and you the student are all here for the same purpose: a successful learning experience leading to graduation with an MS or a PhD degree that will foster a successful career in advanced Computer Science, Computer Engineering or Electrical Engineering. Your future begins today and we know that you also will feel the excitement, pride and deep satisfaction that will be yours in the EECS graduate program.

Department Overview

History

EECS was formed in 2007 out of a merger between the Department of Electrical and Computer Engineering and the Department of Computer Science. Though EECS is a relatively new, the two long-established departments from which it was created have given it a rich heritage that can be traced back more than 120 years.

Electrical engineering was first added to the university's curriculum in the late 19th century, around the same time incandescent lighting started illuminating campus. Dr. Charles Perkins, an associate professor of physics and electrical engineering, was the only faculty member teaching electrical engineering courses to a handful of students. In 1892, the university had its first electrical engineering bachelor's student graduate, Sidney Albert Beyland. By 1896, the program was gaining steam with 85 students pursuing electrical engineering degrees. The influx of students and the addition of new equipment expanded the university's electrical laboratory to its limits in Science Hall. The addition of Estabrook Hall to campus in 1899 made room for a new power plant in addition to experimental labs.

In 1907, electrical engineering became its own department. Perkins, who still served as

electrical engineering's only faculty member assumed the position of department head. He would also teach the department's first graduate course offerings in 1913.



In 1942, the United States' entrance into World War II caused a significant drop in the number of students studying electrical engineering at UT. During the early years of the war, the electrical engineering department was instrumental in training members of the U.S. Army Air Corps. Following the war, student numbers skyrocketed with veterans returning to earn degrees under the G.I. Bill. More than 300 undergraduates were enrolled in electrical engineering courses by 1947. In the 1950s computers began appearing on college and university campuses across the country. Computers became a vital tool in research, speeding up the process of calculating complex equations and streamlining the storage of vast amounts of data.

Electrical engineering faculty members were at the forefront of the university's new interest in computing science. In 1958, Department Head Paul Cromwell found a way to bring the first digital computer to campus - a Librascope General Purpose 30-bit. As computers became more prevalent, there became an increased in demand for courses in the field of computer science. At the time, however, computer science was still considered a field under electrical engineering and mathematics. Courses in programming and numerical methods were offered by the Mathematics Department, while courses on computers continued to be taught in the electrical engineering department.

In 1972, the Department of Computer Science was created to offer a master's degree within the College of Liberal Arts. Approximately 150 students were enrolled in the master's program in the fall of 1972. In 1974, the Tennessee Higher Educational Commission approved the proposal for the addition of an undergraduate degree program to be added to the department, a Bachelor's of Arts in Computer Science. The same year, Robert Gregory became the first department head for computer

science.

During the late 1980s, UT's Department of Computer Science gained national recognition in networking and supercomputing. The first appearance of the PhD program in computer science was in the 1986-87 catalog. Professor Michael Thomason directed the first Ph.D. that was awarded to Robert England in 1989.

Throughout the next two decades, the Department of Computer Science moved into the top ranks of the university's departments in contract and grant funding per full-time equivalent faculty, earning two multi-year NSF Infrastructure Grants to support its work in parallel computation on multiple processors and grids of shared resources.

On July 1, 2007, the Department of Electrical Engineering and Computer Science was formed by the merger of the Department of Electrical and Computer Engineering and the Department of Computer Science. In 2012, the merged department moved into the new 150,000-square foot Min H. Kao Electrical Engineering and Computer Science Building, made possible through a generous \$12.5 million gift from alumnus Dr. Min H. Kao, CEO and chairman of Garmin International. This will be your home while you pursue your graduate studies.



EECS Faculty

Full-Time Faculty

Dr. Mongi A. Abidi - Image Processing, Robotics, Artificial Intelligence

Dr. Micah Beck - Parallel and Distributed Computing, Automatic Program Parallelization, Program Development Tools, Distributed and Fault Tolerant Systems

Dr. Michael Berry - Scientific Computing, Parallel Numerical Algorithms, Information Retrieval, Data Mining, Bioinformatics, Computational Science and Performance Evaluation, Visual Analytics

Dr. Benjamin J. Blalock - Analog/Mixed-Signal Integrated Circuit Design, SOI CMOS Analog/Mixed-Signal IC Design, Ultra Low Voltage CMOS IC Design, Programmable Analog Circuits

Dr. Qing "Charles" Cao - Networked Embedded Systems

Dr. Daniel Costinett – Power Electronics, Soft Switching Converters, Electric Vehicles

Dr. Judy Day – Dynamical systems, Acute Inflammation/Immunology, Model Predictive Control, Translational Medicine, Transient Dynamics

Dr. Mark Dean – Advanced Computer Architectures - cognitive system devices, structures, architectures and learning models, non-Von Neumann data-centric computer architectures and programming models; Big Data Systems - deep Q/A systems, evidence based delivery of information and services; Computational Science - improved utilization of high performance computing to support scientific study and exploration

Dr. Seddik M. Djouadi – Systems and Control, Power Control in Wireless Networks, Stochastic Resonance

Dr. Jack Dongarra – Scientific Computing, Numerical Linear Algebra, Parallel Processing, Software Tools, Mathematical Software and Software Repositories

Dr. Aly Fathy – Electromagnetics, Antennas, Microwave Circuits, Propagation, UWB Systems

Dr. Jens Gregor – Associate Department Head, Pattern and Image Analysis, Computed Imaging

Dr. Gong Gu – Electronic Devices based on Emerging Materials in the Interdisciplinary Junction of Physics, Materials Science, Electrical Engineering

Dr. Jian Huang – Visualization and Computer Graphics, Large Scale Distributed Visualization, Remote Visualization and Real Time Graphics

Dr. Syed Islam – Associate Department Head, Electronics

Dr. Michael Jantz – Virtual Machines, Operating Systems, Compilers, Program Optimization, Performance and Power Efficiency

Dr. Michael A. Langston – Combinatorial Algorithms, Computational Biology, High Performance Computing

Dr. Fangxing "Fran" Li – Power Systems Engineering and Economics

Dr. Husheng Li – Wireless Communications and Networks, Statistical Signal Processing, Information Theory, Theory of Random Matrices

Dr. Yilu Liu – Power Systems and Smart Grids

Dr. Bruce MacLennan – Neural Networks and Connectionism, Theory of Knowledge, Massively Parallel Analog Computation, Emergent Computation

Dr. Donatello Materassi – Stochastic Systems, System Identification and Modeling, Graphical Models, Cybernetics

Dr. Nicole McFarlane – Mixed Signal Circuit Design, Biotechnology and Bio-sensor Design, Noise Theory for Electronic Systems, Energy and Power Trade-offs in Mixed Signal Circuit Design, Microfabrication and Development of Devices

Dr. Audris Mockus – Software Engineering, Data Science, Digital Archaeology

Dr. Lynne E. Parker – Associate Dean, Distributed Mobile Robotics, Human-Robot Interaction, Distributed Intelligence, Sensor Networks, Machine Learning, Embedded Systems, Multi-Agent Systems

Dr. Gregory Peterson – Computer Engineering, Digital Systems

Dr. James Plank – Fault-Tolerance, Erasure Codes, Storage Systems, Distributed Computing, Operating Systems

Dr. Hector Pulgar - Power System Dynamics and Stability, Power System Operation and Control, Renewable Energy Integration

Dr. Hairong Qi - Computer Engineering, Image Processing, Sensor Networks

Dr. Garrett Rose - Nanoelectric Circuit Design, Memristors and Memristive Systems, Emerging Nanoelectric Computer Architectures, Hardware Security and Security Implications of Emerging Computer Systems

Dr. Max Schuchard- Computer Security and Privacy, Crypto-Currencies

Dr. Jinyuan "Stella" Sun - Security and Privacy in Wired/Wireless Networks and Critical Application Systems

Dr. Kai Sun - Power system stability, control and optimization

Dr. Leon Tolbert - Power Electronics, Renewable Energy, Electric Vehicles, Microgrids

Dr. Kevin Tomsovic - Power Systems, Optimization

Dr. Bradley Vander Zanden - Graphical Programming Environments, Programming Languages, Constraint Solving, Graphical User Interfaces

Dr. Fei "Fred" Wang - Power Electronics, Microgrids, Motor Drives, Electric Machines

Dr. Jayne Wu - Microelectronics, Microfluidics, MEM

Professor of Practice

Dr. David Icové - Fire Protection, Radio Systems

Dr. Yan Xu - Power Electronics, Power System

Lecturer

Dr. Stephen Marz - Introduction to Programming, Computer Architecture



<https://www.eecs.utk.edu/people/faculty/>

Areas of Research

The University of Tennessee's flagship campus in Knoxville boasts a vigorous research agenda engaging scholars and students with expertise in issues vital to local and global interests. The Knoxville campus is the hub of a vibrant research community that includes Oak Ridge National Laboratory and other University of Tennessee System campuses and institutes. EECS engineers and scientists are actively engaged in the following areas of research:

Area of Strength	Faculty
BIOLOGICAL APPLICATIONS	Berry, Day, Islam, Langston, McFarlane, Peterson, Wu
COMPUTER SYSTEMS AND ARCHITECTURE	Beck, Dean, Jantz, Mockus, Peterson, Plank, Rose, Vander Zanden
HIGH PERFORMANCE AND SCIENTIFIC COMPUTING	Berry, Dean, Dongarra, Gregor, Huang, Langston
INTELLIGENT SYSTEMS, DATA MINING AND MACHINE LEARNING	Berry, Gregor, MacLennan, Mockus, Parker, Qi
MICROELECTRONICS, MICROWAVE AND MEMS	Blalock, Fathy, Gu, Islam, McFarlane, Wu
NETWORKED AND EMBEDDED SYSTEMS AND CYBERSECURITY	Beck, Cao, Djouadi, H. Li, Parker, Qi, Schuchard, J. Sun
POWER SYSTEMS, POWER ELECTRONICS AND RENEWABLE ENERGY	Costinett, F. Li, Liu, Pulgar, K. Sun, Tolbert, Tomsovic, F. Wang
SIGNAL PROCESSING, SYSTEMS AND CONTROLS	Djouadi, H.Li, Materassi, Qi
VISUAL COMPUTING AND IMAGE PROCESSING	Abidi, Gregor, Huang, Qi, Vander Zanden

Graduate Program Administration

Director of Graduate Studies: Dr. Jens Gregor

<http://www.eecs.utk.edu/people/faculty/jgregor/>

Graduate Committee Chair: Dr. Kevin Tomsovic

<http://www.eecs.utk.edu/people/faculty/tomsovic/>

Graduate Admissions: Dr. Donatello Materassi

<http://www.eecs.utk.edu/people/faculty/dmateras/>

Administrative Assistant: Ms. Dana Bryson

<http://www.eecs.utk.edu/people/business-office/>

Director of Graduate Studies: This person oversees departmental aspects of the graduate program, approves and signs forms and petitions, and interacts with the Graduate School on behalf of the department and graduate students when needed.

Graduate Committee: This group of faculty oversees the academic aspects of the curriculum including but not limited to catalog changes and procedural matters.

Graduate Admissions: This person handles the initial entry of students into the different graduate degree programs as well as subsequent status changes (e.g., PhD to MS), and interacts with the Office of Graduate Admissions.

Administrative Assistant: This person handles day-to-day matters including departmental communication with the graduate student body and submits forms to the Graduate School.

Services Provided by Faculty and Staff

The main Business Office of the department is located in the Min H. Kao Electrical Engineering and Computer Science Building, Suite 401, and serves as the focal point for undergraduate and graduate activities. The staff in this office has detailed knowledge of the day-to-day operations of the department and will be your initial point of contact if any difficulties arise. They provide office support for the faculty and help facilitate the graduate and undergraduate programs.

The faculty (who teach the classes and supervise graduate student research) and the staff (who provide the supporting services) are whom you might consider to be the

permanent residents of the Min H. Kao Building. A graduate student population of ~300 students, many of whom you will encounter in labs and occasionally in classes, also have places of work in the Min H. Kao Building and the Science and Engineering Research Facility (SERF).

You will receive most of your instruction from the department's faculty. They are reasonable people and very interested in helping you, especially if they sense that you are a capable and serious student and doing all you can to help yourself. In addition to teaching responsibilities, the faculty is involved in research and the oversight of graduate student research programs. The specific interests of the faculty, listed above, can help you determine where to go for further information on a particular aspect of the fields of Computer Engineering (CpE), Computer Science (CS) or Electrical Engineering (EE).

The staff is responsible for the smooth, orderly, day-to-day operation of the department. The staff in the main business office maintains advising files on all graduate students. These files contain semester grade reports, an academic history, other academic records, and comments from advisors where appropriate. Most forms and student information sheets are available in the main business office and can be returned there after completed and the appropriate signatures have been obtained. The staff in the business office is frequently in contact with the faculty and can act as a good communications link between you and them, arranging contacts convenient to both. The staff is also the principal source of information of a general nature concerning the department. Lost and found items can be reported to the staff in 401 Min H. Kao Building.

Another important component of the staff can be found in the Information Technology group. The EECS IT staff are located in the Min H. Kao Building, Suite 423. They make sure that all the laboratory and computer equipment is in working order, oversee use of the small machine shop in which students are able to build up the hardware needed for class projects, and operate a parts store from which you can purchase most of the electronic components needed for project assignments.

Graduate Student Duties/Responsibilities

General Duties/Responsibilities

Graduate students are expected to be aware of and satisfy all regulations governing their work and study at the university. See the Graduate Catalog (tiny.utk.edu/grad-catalog), Hilltopics (hilltopics.utk.edu), and the publications on the Appeals Procedure (gradschool.utk.edu/graduate-student-life/understanding-your-rights-and-obligations/).

When in doubt about policies, students should confer with the above mentioned resources, then with their major advisor. If he/she does not know the answer, they should contact Dr. Jens Gregor, Director of Graduate Studies.

All graduate students are expected to work diligently toward their degree. Not doing so may lead to termination from the program. All graduate students are also expected to attend departmental functions when invited such as department seminars, guest speakers, and awards banquet.

Graduate Teaching Assistants (GTAs) report to the instructor of the course to which they have been assigned. Graduate Research Assistants (GRAs) report to the principal investigator(s) (PIs) of the project(s) on which they work. Typically, that is also their major advisor.

GTAs and GRAs are expected to carry out the tasks assigned to them in a thorough and timely manner. Not doing so may lead to loss of assistantship as well as any fellowship they might hold.

Hilltopics Student Handbook

Each year the university produces the Hilltopics Student Handbook (<http://hilltopics.utk.edu>). This handbook documents general campus policies and procedures, standards of conduct, academic policies and procedures and information about student support, services and organizations.

Things to Do Your First Semester

- a. Obtain an advisor: Your default departmental advisor is the Director of Graduate Studies. GRAs should (in most cases) switch to the person sponsoring them. All other graduate students should find an advisor on their own. For those doing an MS project, an MS thesis, or a PhD, this will be their research advisor. For those going the MS course-only route, this should be one of their course instructors.
- b. Obtain a UT email account.
- c. Acquaint yourself with departmental requirements and course sequencing and learn how to register for courses using One Stop Express Student Services.

- d. Read the Graduate School publications including the Graduate Catalog's introductions to the Graduate School and EECS procedures and requirement.

Computer Accounts

University accounts: In some courses, you may be specifically directed to use one of the many computer systems available for student use on campus. Students can obtain their own personal account, which will remain in effect as long as the student is registered at the University. To register for an account, you need to contact OIT (Office of Information Technology).

EECS accounts: EECS computing resources are restricted to departmental faculty, staff and students. This restriction depends on EECS department computer accounts and should not be confused with University computer accounts.

Accounts for most students are created from class enrollment data. Accordingly, account information may be distributed during class at the beginning of each semester. Otherwise, students should see EECS IT Support in 423 Min H. Kao to obtain an account.

Using the Web to Register with Career Services

Students can register with the Center for Career Development (<http://career.utk.edu/>) for all things career-related. They provide career counseling, interviewing and resume advice, and updated information on career fairs and workshops. By registering with their HIRE-A-VOL system, you will gain access to job postings and other employment opportunities that include full/part time positions and internships. Students are encouraged to use Career Services and the many features they offer.

Admission Requirements and Application Procedure

[The Graduate School - The University of Tennessee](#)

The following are the general requirements for admission to the Graduate School at the University of Tennessee, Knoxville. Many programs also require departmental

applications and have additional departmental requirements. Please contact your department directly for the specific program requirements.

1. Applicants must have obtained a bachelor's degree from a college or university accredited by the appropriate regional accrediting agency. A non-U.S. degree must be equivalent to a bachelor's degree from the United States and must be accredited by its regional or national accreditation agency.

2. United States degree holders must have earned a minimum of 2.7 out of a possible 4.0 GPA or a minimum of 3.0 during the senior year of undergraduate study. If you have completed previous graduate coursework, you must have earned a minimum of 3.0 out of a possible 4.0 GPA.

3. Applicants with non-U.S. degrees must have earned a minimum of 3.0 on a 4.0 scale or other equivalent to a 'B' average. If you have completed previous graduate coursework, you must have earned a minimum of 3.3 out of a possible 4.0 GPA or other equivalent to a 'B+' average.

4. Applicants may require [standardized test scores](#), depending upon their program requirements. Applicants whose native language is not English must submit [TOEFL](#) or [IELTS](#) test scores in order to be fully admitted. See below for more information on standardized testing.

For additional information, refer to the statement on [Admission Requirements and Application Procedures](#) in the [Graduate Catalog](#).

GRE/GMAT

The program to which you are applying may require test scores, such as the [GRE](#) or the [GMAT](#). Please check with your desired program to see if they require any standardized test scores. Registration information for the GRE is available at [Educational Testing Service \(ETS\)](#). Registration for the GMAT is available at [mba.com](#). There is no minimum score for the GRE or the GMAT, but you may wish to check with your desired program to see if your score is competitive. After taking your exam, have your scores sent to the University of Tennessee, Knoxville. For the GRE, you will be asked for an institution code (1843 for UT). For the GMAT, simply select UT as a recipient.

English-Proficiency

All non-native speakers of English are required to take either the TOEFL (Test of English as a Foreign Language) or the International English Language Testing System (IELTS). Find out how to register for the [TOEFL](#) or the [IELTS](#).

To be fully admitted, applicants must submit a minimum score of 550 on the paper-based TOEFL; 80 on the TOEFL iBT or 6.5 on the IELTS. Applicants may be eligible for [English Proficiency Conditional Admission](#).

After taking your exam, have your scores sent to the University of Tennessee, Knoxville. If you have taken the TOEFL, please use the institution code of 1843. For the IELTS, you will need to provide the mailing address for the Office of Graduate Admissions: 201 Student Services Bldg.
Knoxville, TN 37996-0221

Admission Policies and Application Procedures

Anyone with a bachelor's degree from a regionally accredited institution or foreign equivalent who wishes to take courses for graduate credit, whether or not the person desires to become a candidate for a degree, must submit a formal online application for admission to graduate study or apply for transient status. No action is taken until a file is complete. An applicant will be notified once action has been taken by the department/program and the Office of Graduate Admissions. Applicants should check their status online.

To apply for admission, the following materials must be submitted to Graduate Admissions through the on-line application submission process:

1. *The completed online Graduate Application for Admission (<http://graduateadmissions.utk.edu/>).*

2. *A \$60 non-refundable application fee - paid by credit card or electronic check. (U.S. citizens can request a waiver of this fee by submitting a request to the Graduate Admissions Chair, Dr. Donatello Materassi.)*

3. *One unofficial transcript from all colleges and universities attended submitted on-line at the time of application to the Graduate School. An unofficial transcript or university record is defined as a scanned version of the transcript or university record that would be sent by mail as an official transcript. The document must contain the institution name, course names, grade information, terms of attendance and any academic notations. Transcripts or academic records uploaded from the institution's student information system portal will not be accepted. Transcripts or university records that are not in the English language must be submitted in both the original language and a certified English translation.*

4. *The submission of official transcripts, degree certificates, and English translations to the Graduate Admissions Office is required following the offer of admission. In order for transcripts to be considered official, they must be sent directly from the institution. The Graduate School will reserve the right to revoke admission to a student if any unofficial or official documents are found to be fraudulent following review and comparison. Registration is prohibited after the first semester of enrollment until students have submitted the official copy of transcripts, including any degree certificates or degree confirmations, from all institutions previously attended.*

5. *Official scores from Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) if native language is not English (refer to section on English Certification).*

Additional departmental/program requirements may include but are not limited to:

1. Departmental application.
2. Reference letters or rating forms.
3. Statement of interest
4. GRE/GMAT scores.

To register for the IELTS, contact IELTS at <http://www.ielts.org>.

To register for the GMAT, go to the GMAT website at <http://www.mba.com/>.

To register for the GRE and TOEFL, contact

Educational Testing Service
Princeton, New Jersey 08450
<http://www.ets.org>

The ETS UT code is 1843. Test results reach the university in approximately three weeks.

All documents submitted become the property of the university and will not be returned. For international graduate student application procedures, see Admission of International Students.

Financial Support

General Statements

Graduate assistantships are the primary source of funding for graduate students at UT and are offered by academic departments and administrative offices of the university. An assistantship is a financial award to a graduate student for part-time work in teaching, administration, or research while pursuing an advanced degree. Appointments are normally on a one-fourth (10 hours/week) to one-half (20 hours/week) basis. The stipend is payable in twelve monthly installments. In addition to the stipend, Graduate Teaching Assistants (GTA), Graduate Teaching Associates (GTAssoc), Graduate Assistants (GA), and Graduate Research Assistants (GRA), with appointments on a one-fourth time basis or higher, are entitled to a waiver of maintenance fees and tuition for the period of appointment in accordance with university policy. These appointments also include a benefit of health insurance for the student. While there is no central point of contact for information on GA positions in administrative offices around the university, some positions are filled periodically in college advising centers, admission offices, residence halls, and other service offices.

Fellowships: Fellowships are awards that typically require no service. Most fellowships are awarded on the basis of academic merit and potential for scholarship. (descriptions on the Graduate School website)

Loans: Administered by the Financial Aid office

Employment: On-campus and off-campus; statements clarifying the number of hours a graduate student may work in on-campus jobs/assistantships and the departmental attitude toward outside employment. International students should check with CIE to determine eligibility.

Support for travel (**policies and procedures**) available from department/program, college, and university's Graduate Student Travel Fund administered by the **Graduate Student Senate (GSS)**.

Graduate Teaching Assistantship (GTA)

One form of assistantship in the department is the Graduate Teaching Assistantship (GTA). Each GTA position currently pays tuition plus a monthly stipend. A Bachelor of Science in Computer Engineering, Computer Science or Electrical Engineering with at least a 3.0 GPA average is required. These are highly competitive, prestigious positions of responsibility, with office space, and facilities are provided accordingly. The department has approximately 65 graduate teaching assistantships that it awards each year. A limited number of these are 20 hours/week assistantships (referred to as ½-time GTAs) with the majority being 10 hours/week assistantships (referred to as ¼-time GTAs). These assistantships are generally used as a recruiting tool to bring in

outstanding prospective graduate students from around the world to the UTK EECS department. Many ¼-time GTAs also hold a ¼-time GRA (Graduate Research Assistantship) and work in conjunction with a faculty member. GTAs generally help with the laboratories associated with undergraduate courses in Computer Engineering, Computer Science or Electrical Engineering. They also assist in grading homework and debugging computer programs. The GTAs should take course loads prescribed under “Policy for the Administration of Graduate Assistantships” in the Graduate catalog, and engage only in the assistantship and their degree program. Students should find a graduate advisor with similar research interests to act as a sponsor for their application to be a GTA. Applications are available in 401 Min H. Kao.

The Graduate School requires the ACTFL OPIc Test for GTAs whose first language is not English. Students who score less than “Advanced High” (AH) should retake these tests every semester until the score is AH or better. Students with scores lower than AH may have their GTA revoked and/or their activities regulated based on the test results. For complete details see “Policy for the Administration of Graduate Assistantships” in the Graduate School section of the Graduate Catalog. Please see the **International Teaching Assistant (ITA) Testing Program** webpage (<http://gradschool.utk.edu/graduate-student-life/ita-testing-program/>) for further information regarding testing dates/locations and other frequently asked questions.)

Graduate Research Assistantship (GRA)

Another form of assistantship in the department is the Graduate Research Assistantship (GRA). At present, there are approximately 200 GRAs in the EECS Department. A GRA is paid through the University by a sponsor (government agency or company) to do research on a project. GRAs are chosen by the faculty principal investigator as positions become available. They are generally quarter time or half-time appointments with paid tuition and fees, plus a monthly stipend appropriate to the student’s level and the research project. A GRA is especially useful in your program since the involved research usually provides an excellent thesis or dissertation topic and computer and laboratory facilities to conduct the research. Students should contact faculty who have similar research interests to inquire about the availability of being sponsored by a GRA.

General Guidelines for Assistantships

Note that among the procedures and regulations of the Graduate School are some regarding assistantships. For example, the Graduate School requires that the course load of a half-time assistant (GA or GRA) be 6 to 11 hours. The Graduate School limits

the time for holding an assistantship to 3 years for a MS student and 5 years for a PhD student. The Graduate School requires the ACTFL OPIc Test for GTAs whose first language is not English, and regulates their activities based on the results. For complete details see “Policy for the Administration of Graduate Assistantships” in the Graduate Catalog.

Fellowships

EECS provides several fellowships and assistantships for graduate students.

The Bodenheimer Fellowship provides \$10,000 per year per person to superior EECS graduate students (both M.S. and Ph.D. students). This fellowship is combined with a graduate teaching assistantship (GTA) or graduate research assistantship (GRA) to bring the total value to more than \$30,000. These fellowships were established by alumnus Michael Crabtree in honor of Professor Robert E. Bodenheimer who taught in the department for almost forty years prior to his retirement.

The Min Kao Fellowship provides \$7,200 per year per person and a tuition waiver to six superior EECS graduate students. This fellowship was established after UTK EECS alumnus Dr. Min Kao, CEO of Garmin International, Inc., donated \$5 million to the department to establish fellowships, scholarships, and professorships. The Min Kao Fellowship is combined with a GRA to provide students with funding of at least \$25,000/year.

The Ron Nutt Family Fellowship provides funding to an individual interested in studying medical imaging. Dr. Nutt is an alumnus of the department and a founder of CTI Molecular Imaging, Inc.

The Tickle College of Engineering Fellowship provides \$5,000 per year per person to several students in the college. These are highly competitive fellowships, but a few EECS students receive these each year. Students should find a faculty sponsor to nominate them for one of these fellowships.

Other fellowships include the Dr. Vaughn Blalock Graduate Memorial Award, the Chancellor’s Honors Award, the National Science Foundation (NSF) Award, the University of Tennessee, Graduate Fellowship Award and the Department Excellence Awards.

Graduate Assistantship - System and Network Administrator

We have a sizable support staff managing our labs and handling the UNIX system administration and other matters. We usually have two graduate assistants doing system admin work. Students who have good UNIX system/network admin skills can inquire about the availability of such GA positions. The Division of Information Infrastructure (DII) has a variety of systems and network groups, many of which have GA positions. Obtaining a position with DII requires interviews and cannot be done remotely.

Other Financial Support

<http://gradschool.utk.edu/graduate-student-life/costs-funding/>

Other forms of support besides departmental assistantships include: fellowships outside the department, jobs on and off campus and loans. Our students have often found jobs at the Computing Center and Computer Store, as well as other academic departments (such as Biology, the Engineering Fundamentals Division, Psychology, Human Ecology and the Veterinary School) who need students with skills in computer engineering, computer science or electrical engineering in their research. The Graduate School has competitively awarded travel grants which provide partial reimbursement of expenses for graduate students to make scholarly presentations at professional meetings. Application deadlines for each term are in the preceding term. Sometimes research contracts are also able to help fund graduate research assistant's travel to professional meetings. Students should work with their faculty advisor to write and submit papers for conferences. Most of the faculty will try to send students to domestic conferences if research contracts have sufficient funding.

The Graduate School identifies sources of support in its annual publication, "GradSources." For computer science and engineering, the National Science Foundation, the U.S. Department of Energy, and the U.S. Department of Defense are particularly good sources. Notices of financial aid received by the department are posted for you on the various bulletin boards in Min H. Kao and posted on the department web page.

Most importantly, you should be active and early in pursuing the many sources of support that are open.

Research Activities

The Computer Engineering (CpE), Computer Science (CS) and Electrical Engineering (EE) graduate programs contain considerable research for the purpose of providing a

genuine experience in real frontier research in the area of the student's interest. The EECS Department has more than \$18 million worth of research contracts, making it very active in research and one of the most active at UTK. Graduate students should realize that the foremost reason for having this research is for their experience. Matching students to research is done carefully to meet our responsibilities to both the student and the sponsoring agency, who expects completely professional results. You should invest some time, early in your program, in talking with faculty and other graduate students about their research. In some cases, they will have publications or seminars from which you can learn. To become part of a research project you generally must be hired by the faculty member who is the Principal Investigator on that project. Openings occur throughout the year as projects start or students leave them.

Responsible Conduct of Research (RCR) Institutional Plan

The University of Tennessee, Knoxville, takes its obligation to implement and support best practices in research seriously. The University of Tennessee's Office of Research provides guidance and support for the implementation of training for Responsible Conduct of Research (RCR). In response to Section 7009 of the *America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science (COMPETES) Act* (42 U.S.C. 1862o-1) this RCR Institutional Plan has been developed to provide appropriate training and oversight in the responsible and ethical conduct of research.

Responsible and ethical conduct of research is critical for excellence, as well as public trust, in science and engineering. Consequently, education in RCR is considered essential in the preparation of future scientists and engineers. **All EECS graduate students are required to complete RCR online training.** Information on guidelines and requirements, training programs, forms, contact information and additional resources for this program can be obtained through the Office of Research (<http://research.utk.edu/compliance/rcr-institutional-plan/>).

Registration and Advising

Registration for Classes Each Term

To register for classes each term, you will want to see the “Timetable of Classes”. This Timetable covers all undergraduate and graduate procedures and classes. It gives detailed instruction on how to register for each situation you might be in, as well as the times and locations of all classes. The normal procedure is to select classes via Web. These steps must be done well in advance, and if you are too late you may not be able to select the courses that you prefer to take or incur additional fees.

Caution: be sure to register for each course for graduate credit, even if it has an undergraduate number. Only in this way can you count the course toward a graduate degree. The only courses that might be in this category in your program are math courses or some senior-level EECS courses. Often times 4xx courses are co-taught with 5xx courses. When that is the case, sign up for the 5xx course.

Part-Time Students

It is practical to earn a Master’s degree as a part-time student if the student already has an acceptable BS in Computer Engineering, Computer Science or Electrical Engineering. Read carefully “Time Limit” in the first section of the Graduate Catalog, entitled “the Graduate School”.

If the student lacks a BS in Computer Engineering, Computer Science or Electrical Engineering, it is usually not practical to take undergraduate courses as a part-time student to become eligible for consideration in the MS program. This is because undergraduate courses are generally not available in the evenings and must be scheduled in proper sequence to satisfy prerequisite requirements.

It is usually not practical to pursue a PhD entirely as a part-time student (with exception of those with assistantships on campus), except perhaps for some coursework in the early stages. The part-time status is not generally compatible with the level of commitment and intensity of the program, especially in the qualifying examination participation, the dissertation research and the Graduate School’s residence requirement. However, anyone who is working at a research institution and highly qualified and motivated for the PhD should explore these possibilities with faculty in this department. A minimum recommendation is that his/her employer should share the motivation and provide one of the letters of recommendation in support of the student’s application.

Appendix

The following web links point to on-line resources including applications and forms.

- a. International students
 - a. Center for International Education (international.utk.edu)
 - b. International House (ihouse.utk.edu)
 - c. ITA Testing Program (tiny.utk.edu/ita-testing)
- b. Professional development & training
 - a. Office of Graduate Training and Mentoring (gradschool.utk.edu/training-and-mentorship)
 - b. Best Practices in Teaching Program (tiny.utk.edu/bpit)
 - c. UT Libraries Information for Graduate Students (libguides.utk.edu/graduate)
 - d. Center for Career Development (career.utk.edu)
 - e. Tennessee Teaching and Learning Center (tenntlc.utk.edu)
 - a. UT CIRTl: Center for Integration of Research and Teaching (tlc.utk.edu/cirtl-program-center-for-integration-of-research-and-teaching/)
 - f. Experience Learning (experiencelearning.utk.edu)
- c. Funding
 - a. Costs and funding opportunities (tiny.utk.edu/grad-funding)
 - b. Graduate Student Senate Travel Awards (gss.utk.edu/travel-awards)
 - c. Financial Aid and Scholarships (onestop.utk.edu/financial-aid)
- d. Student resources
 - a. Counseling Center (counselingcenter.utk.edu)
 - b. Department of Electrical Engineering & Computer Science (www.eecs.utk.edu)
 - c. Graduate School (gradschool.utk.edu)

- d. Graduation Deadlines (tiny.utk.edu/grad-deadlines)
- e. Graduate School Forms (gradschool.utk.edu/forms-central)
- f. Graduate Catalog (tiny.utk.edu/grad-catalog)
- g. Student obligations and appeals process (tiny.utk.edu/rights-obligations)
- h. Graduate Student Senate (gss.utk.edu)
- i. Office of Graduate Admissions
(gradschool.utk.edu/admissions)
- j. Student Conduct and Community Standards
(studentconduct.utk.edu)
- k. Office of Equity and Diversity (oed.utk.edu)
- l. Sexual Misconduct, Relationship Violence, and Stalking
(sexualassault.utk.edu)
- m. Office of Multicultural Student Life (multicultural.utk.edu)
- n. Office of Research Integrity (research.utk.edu/compliance)
- o. Tickle College of Engineering (www.engr.utk.edu)
- p. Thesis/Dissertation Consultant
(gradschool.utk.edu/thesesdissertations)