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A message from the department head

Bazinga! The catchphrase by Sheldon Cooper of The Big Bang Theory was used to name our Fall Semester Welcome-Back-To-School event on August 20 that had nearly 400 student participants. The event was organized by Systers (page 9), a new women in EECS club, as a means of welcoming freshman and other new students to the Department and to highlight some of the research and other activities in the department that we have ongoing.

Our freshman enrollment for Fall 2013 of 157 students is an increase of more than 30% compared to the previous year. These students are spread evenly among our three B.S. programs: Computer Science, Computer Engineering, and Electrical Engineering. This highlights an increasing interest by high school students in STEM areas, and continues the increase in enrollment that the Department has seen during the last several years.

For 2013-2014, our department has awarded more than 100 scholarships to undergraduate students valued at more than $240,000 (page 15). The College of Engineering awarded more than 50 additional scholarships to students in our department. However, with our continuing increases in enrollment, we still have good students that may not be receiving scholarships from our department, and I encourage you to consider donating to our department to set up additional endowments that can benefit our undergraduate students (scholarships), graduate students (fellowships), or faculty (professorships).

Large donations to the department have resulted in naming some of our classrooms, conference rooms, and laboratories. The Min H. Kao Building now has the Dr. Don Bouldin Lounge established through a donation by Michael Crabtree, the Louis Arthur King Conference Room established by the King family, and the James W. McConnell Conference Room established by an estate gift. We have the Daw and Jing Lu Family Suite for EECS student organizations. We have the Eaton Power Laboratory established by a donation of equipment from Eaton Corporation. These contributions made by individuals and corporations have enabled the department to purchase additional equipment and software so that students are trained with the most modern tools available.

Two new professors joined the EECS faculty in Fall 2013: (1) Dr. Daniel Costinett (page 23), an assistant professor whose research area is in power electronics, and (2) Dr. Mark Dean (page 23), the Fisher Distinguished Professor who is an IEEE Fellow and National Academy of Engineering Member and joins us after a long career at IBM. We have searches underway for five faculty positions that will enable us to bring in additional talented professors to contribute to our teaching, service, and research mission.

After moving to our wonderful new Min H. Kao Building in January 2012, the faculty, staff, and students have now “settled in.” Construction was completed on the first floor of the Min Kao Building in April of 2013 that enabled CURENT (article on page 7), our NSF/DOE Engineering Research Center, to have additional laboratory and meeting space for the construction of their power system and power electronics engineered system demonstrations.

After 14 years as a professor at the University of Tennessee, I began service as the Department Head for Electrical Engineering and Computer Science on January 1, 2013. I will build on the momentum that has been established in the last 5 years, and emphasize that we continue to grow our department not just in numbers of students, faculty, and research dollars, but also grow it in terms of increasing the quality of the education that all of the students receive and to increase our visibility and recognition of the exceptional research and scholarship by our faculty and students. I look forward to working with our faculty, staff, students, and alumni in making sure that a degree from UT is a hallmark of excellence, such that our graduates are in high demand by industry and other universities.

Best regards,

Leon M. Tolbert
Knoxville could soon become a global center for proton therapy, due in large part to the efforts of local entrepreneur and University of Tennessee Electrical Engineering Ph.D. Terry Douglass.

Proton therapy is an advanced form of radiation treatment for cancer. Conventional radiation therapy (photons or x-rays) deposits energy both entering the tumor and exiting the tumor, potentially damaging healthy tissue. In contrast, with proton therapy, protons deposit their maximum energy in the tumor and then stop, sparing vital, healthy organs. Collateral tissue damage, side effects, secondary tumors and total treatment costs are all reduced with proton therapy.

Dr. Douglass’ health care company, Provision Health Alliance (PHA), is a comprehensive clinical outpatient healthcare center consisting of multiple physician practice groups, comprehensive diagnostic imaging, advanced chemotherapy and radiation therapy, wellness center, physical therapy, a cyclotron and nuclear pharmacy, and clinical trials and research capabilities.

Douglass is Chairman of the Provision Center for Proton Therapy (PCPT), which is currently under construction at Dowell Springs in Knoxville and is scheduled to open in early 2014. The PCPT is the key cancer radiation therapy component of the Provision Health Alliance, and is an essential part of what distinguishes PHA from all other outpatient cancer centers in the world. PCPT total initial investment is approximately $110 million, and annual revenue is expected to be about $100 million with 5 treatment rooms.

Douglass is also Chairman of the Board of Directors and Chief Executive Officer of ProNova Solutions, LLC (ProNova), a US-based developer, manufacturer, and distributor of multi-room proton therapy equipment and solutions. In August 2013, ProNova broke ground on its new headquarters and research and manufacturing facility in the Pellissippi Place business park in Blount County. ProNova is expected to invest $50 million in the project and employ 500 people by 2018. Annual sales for ProNova are projected to exceed $2.7 billion in 2022 with more than 4,000 new jobs created.

Dr. Douglass’ business roots run deep in East Tennessee.
From 1968 to 1983, Dr. Douglass was employed at EG&G Ortec in Oak Ridge, where he served as President during the last three years of service. ORTEC designs and manufactures precision detectors, signal processing electronics, software, and systems for industry, academia, and government requirements.

Dr. Douglass served as the Chairman of the Board of CTI Molecular Imaging, Inc., a public company that specialized in the development, production and distribution of products and services for the medical diagnostic imaging market from 1983 to 2005 when it was acquired by Siemens at a market capitalization of $1 billion.

He also served as President and CEO of CTI Molecular Imaging from its formation in 1983 until 2003. During this tenure, Dr. Douglass played an integral role in the development and commercialization of positron emission technology (PET) and its development globally, including PET cyclotron technology that now plays a significant role in proton therapy.

Dr. Terry Douglass’ path to success was established at the University of Tennessee. He earned three degrees, B.S., M.S. and Ph.D. in Electrical Engineering, all at the University of Tennessee. He came to UT because, as he says, “it was the least expensive way to get a good education in engineering. In addition, UT had a very good Cooperative Engineering Scholarship Program, and being a ‘Co-op Student’ was necessary to fund my education. I pursued the three degrees here because the UT Electrical Engineering Department was strong in circuit design and development and systems engineering and because I was able to get good scholarships and fellowships for my Senior year and for the 3 years of Graduate School.”

Dr. Frank Pierce was one UT professor who had a lasting impact on Dr. Douglass’ career. “Pierce was my major professor and head of the EE department at the time and had a great influence on me. Also, Dr. Robert Bodenheimer and Dr. Vaughan Blalock were exceptional teachers and mentors. Dr. Pierce noted when I entered graduate school that no one had graduated with a PhD in EE in 3 years, and the PhD program was supposed to be a 3-year program. So he told me that I was the one who was going to do it, and he would make sure that I did. And he was true to his word in that I had to report to him every week concerning my progress. That was particularly impactful because I experienced personally that you could do something no one else had done through planning, focus, commitment, and hard work.”

“It was Dr. Pierce who connected me with the Oak Ridge National Laboratory to do my Master’s Thesis there and with ORTEC in Oak Ridge to do my PhD dissertation there. After graduation, I was employed by ORTEC, spent 15 years there, and developed the connections and relationships which allowed me to start CTI, the Provision Center for Proton Therapy, the other Provision companies and foundations, and ProNova Solutions in this area.”

“I believe that we are all gifted by God with certain resources, capabilities, and circumstances. I also believe that God is the Creator, Owner, and Sustainer of everything and everyone and that He calls us to a higher purpose than we might choose by ourselves. So our responsibility is simply to be good stewards of the gifts (time, talent, and treasure) to which each of us has been blessed. So for me, being a good steward is not totally about ‘contentment’ or ‘enjoying the fruits of our labors.’ These are blessings which we receive; but these blessings simply add to our responsibility to be even better stewards. I don’t think I could be content to just enjoy the fruits of my labor.”

“At my age, I have experienced many seasons of life, some ‘successes’ by the world’s standards, and many failures from which I have learned much. What I have learned mostly is that circumstances are what they are, and it is not the circumstances, successes, or failures that should define us. It is what we do with the circumstances, successes, and failures in which we find ourselves. Can we say that we have been faithful to what God has called us to do to the best of our abilities? And can we say that we have loved and served to the best of our abilities? Those are the questions that are primary to me.”
EECS faculty member Dr. Michael Thomason has recently retired after four decades of service to the University of Tennessee. After earning his B.S.E.E. from Clemson, M.S. from Johns Hopkins and Ph.D. from Duke, he spent his career here at UT. His interests and research have been in image processing, pattern analysis, stochastic models, and parallel algorithms.

“When I first came was in 1973. We were on quarters still; I came in the spring quarter. And retired this past May, so it was about 40 years. I was hired by Gordon Sherman, the first department head in Computer Science, in Arts and Sciences. At that time Computer Science only offered a master’s degree. There were plans to add a bachelor’s degree, and in the distant future, maybe a Ph.D. We taught a variety of courses. Computer Science was small. We taught introductory programming courses, a few more advanced courses. My own research interest at that time was in pattern analysis and pattern recognition, and Ralph Gonzales in Electrical Engineering worked in that area, so I immediately had some contacts there. We did not have a Ph.D. programming course, so there were no advanced graduate students.”

Dr. Thomason has seen firsthand, how the university, the College of Engineering and the field of computer science have changed over the years: “It’s dramatic, as far as computer science goes. We, of course, have added a bachelor’s degree, which was added in the mid-1970s, and the Ph.D. in the late 1980s. Electrical Engineering, along the way, changed to Electrical and Computer Engineering. And then of course we have the merger now, that we moved computer science into the College of Engineering. Electrical Engineering had a Ph.D. program, and I was able to participate with some graduate students by virtue of cooperative work with electrical engineering. With computing resources, the difference is like night and day. In the early days it was card reader systems and terminals around campus. No such thing as laptops or PCs. No such thing, in the early days, as terminals on individual desks. As things evolved, and as more equipment became available, and the concepts of what computing equipment should be available to faculty to support the research and instruction changed, there were great advances of terminals on faculty desks, eventually workstations and laptops for faculty. That change is as dramatic at UT as it has been in computing resources and computer science in general.”

“In computer science, we added the bachelor’s degree in the 1970s, and had an enormous peak in enrollment that fell off, and now is showing signs of coming back.” That peak was around the early 1980s. “As a matter of fact, it became so large that Computer Science was, to the best of my knowledge, the first department in Arts and Sciences that had to put enrollment limits on the number of majors, and make it a regular requirement that students had to actually apply, and present a good GPA in order to become a CS major, because we simply could not handle the numbers. These were national trends, not just UT trends. And then there were various factors, such as the dotcom bust and other things that led to a tapering off in enrollment interest for a while, and that shows signs of coming back.”

The computing business environment outside the university has also greatly changed, for Dr. Thomason’s students who graduate and enter the work force. “We have graduates of this department who are, throughout the country, working for really famous names in computing, like Google and Microsoft. We have a number of graduates working for FedEx. Lots of graduates work in the Atlanta area in high-tech industries.”

Dr. Thomason says that companies who hire EECS graduates “have pretty definite ideas. They want students who can communicate, orally and in writing; who can figure out how to work in groups; and also bring a basic set of skills, which can be expanded and tuned to the needs...
of an individual industry corporation. The department is trying to factor all of those things in, as it redesigns curriculum, as curriculum evolves. It’s impossible, with the proliferation of different tools in computer science, to teach everything. You cannot cover all commercially viable options for operating systems or hardware. So our job, as I see it, is to give a good, solid core of basic knowledge. I feel that we need to provide a foundation on which to grow, because those commercial products are going to change; as we all know, they change, month to month and year to year.

“It’s very competitive for the big-name players. It’s still competitive to find a position and be a success with the names that we think of as famous names, because those corporations can still pick and choose from among the very best people, the people with the best skills and the drive to be a success. We certainly want our best graduates to hold their own, with the kinds of people that corporations have been hiring. And so far we’ve done, I think, very well.”

“Not everyone is going to get a job with one of the most in-demand corporations, of course. It is certainly possible to have a very successful and rewarding career in computing, computer engineering, computer science and electrical engineering with other corporations than the biggest names. Not necessarily the headliners, but ones that still do stimulating work and make for a rewarding career. I’m sure we have large numbers of students who are in that category as well. Computer science and computer engineering are known among students as demanding majors and I hope they always will be.”

For Dr. Thomason, his proud-career accomplishments are his role in the creation of both the Bachelor’s degree and Ph.D. programs, and his Ph.D. students who have had great success after their time at UT.

“When I first came in 1973, as an assistant professor, I was immediately, within a couple of months, given the assignment of preparing the proposal to create the bachelor’s degree in computer science. It had to be an actual proposal, filled out in a certain format to go through the university committees, and to THEC (Tennessee Higher Education Commission) for ultimate approval. We were successful in getting that approved in short order. Later on I wrote the first proposal to create the Ph.D. program, which had to go through the same kind of process- college, university, committees, THEC. And at that time the resources were not available for us to launch the Ph.D. program, but a few years later that proposal was pulled out and revitalized… in 1986-87, and we were successful that time. Both of those were successes in adding two additional programs to the department’s offerings. I guess I would count those as having a large impact on students and on the department. Personally, I’ve had a fairly successful research career. I directed the first Ph.D. in computer science, and I have directed or co-directed others who now have positions at Microsoft, the Swiss Institute of Technology, the University of Hawaii, so I’m very proud of those students.”

“The first thing I would say is that a technical area like computer science, computer engineering or electrical engineering- it’s a fact that it’s not for everyone. First of all, you should be a serious student; you should be really serious about figuring out which courses are important, and which courses you’re going to devote your time and effort to mastering. And be prepared to work. Be prepared to work diligently, seriously, make good use of time throughout your studies. That may be trite, and that may sound like the advice you’d give any student, but it’s particularly true for technical areas, and particularly true, in my opinion, for computer science, computer engineering and such areas where technology evolves so fast.”

“And you will probably enjoy keeping up with the changes in technology, because most of us who have a fundamental interest in computing are fascinated every day by what comes along. Having at least to learn the potential of these things, if not actually being able to keep up with all the technical details, because it changes so fast in so many areas. It’s always something new, and anyone who is around computers in any sense knows this. We all know how fast the tools change, the applications change. I don’t see any sign of that stopping.”

Dr. Thomason has no plans of stopping, either. He has a four-year post-retirement teaching contract with the department, and will be teaching one course a semester. He says he will also keep in contact with fellow faculty members for joint research, and with students who come to him with questions.

“I cannot imagine retiring and abandoning all of my interests, although I understand that plenty of people do want to walk away. But I can’t imagine that for me. As long as I enjoy teaching, and as long as the department and I come to an arrangement, I intend to keep at it.”
Entering its third year of operation, CURENT, the National Science Foundation’s Engineering Research Center housed in the Department of Electrical Engineering and Computer Science, has made much progress in reaching a complex array of research and educational goals.

And while the CURENT acronym may seem lengthy (Center for Ultra-wide-area Resilient Electric Energy Transmission Networks), the center can really be summed up into just a few words: research, industrial collaboration, and education. Take a look below to see what steps CURENT has taken to establish itself as one of UT’s premier research hubs.

**Research**

CURENT has now identified a research roadmap to achieve its system level goals. In other words, the center has long identified a major engineering problem, and it has now addressed the best method to getting that problem solved. What’s the problem? The nation’s power grid is in dire need of updates that range from better monitoring systems, improved reliability, strengthened infrastructure, and a more efficient way to integrate renewable energy. With so many problems to solve, coming up with a plan that streamlined CURENT’s research goals was the first major step. Pulling academic experts from the Department of EECS and CURENT’s three partner institutions (Northeastern University, Rensselaer Polytechnic Institute, Tuskegee University), as well as hiring new faculty has helped put that plan into motion.

The center has established four major research areas to address in order to achieve the system-level goal. Monitoring, or the study of energy transfer across the grid, is being overseen by Governor’s Chair Professor Yilu Liu. Modeling, or exploring the capabilities and nature of information transfer across the grid, is led by Dr. Ali Abur, a renowned power systems engineering professor at Northeastern University. Wide-area Actuation research will look into improving the transfer of power over further distances, and is being led by Condra Chair of Excellence Professor Dr. Fred Wang here at UT. Dr. Wang’s actuation group will also study methods of efficiently integrating renewable energy into the grid. Finally, real-time control of power demands is headed by Professor Joe

CURENT research on display during the annual NSF Site Visit
Chow from Rensselaer Polytechnic Institute (RPI).

In addition, CURENT Director Dr. Kevin Tomsovic is leading the testbed component of CURENT’s research. Dr. Tomsovic is overseeing the Large Scale Testbed, which is a model representing the North American power grid, while EECS Department Head Dr. Leon Tolbert is overseeing the Hardware Testbed, which provides a testing platform for new technologies developed by the center.

Industry

The center has recruited a variety of companies to join CURENT as Industry Partners. These companies have a vested interest in the research that the center is performing, and will work closely with faculty from all CURENT campuses to communicate on industry needs and collaborate on new technologies. In all, the center currently has 18 companies that are official partners. CURENT is working with ABB, Alstom, Certes Networks, Dominion Power, The Electric Power Research Institute (EPRI), GE, Global Power Electronics, ISO New England, Mehta Tech, National Rural Electric Cooperative Association (NRECA), New York ISO, Oak Ridge National Laboratory, PJM, Scout Industries, Senetas, Tektronix, TVA, and Vacon.

Education

While the research activity has been high in the center, the education faculty and staff have also initiated a variety of programs to engage both students within CURENT and pre-college students and teachers in the local communities. Graduates and undergraduates at UT are encouraged to join the center’s Student Leadership Council (SLC), which provides professional and academic seminars, industry connectivity opportunities, and social activities. The SLC, along with a limited number of undergraduate CURENT Ambassadors, are also tasked with assisting in educational outreach activities and programs in the center. Speaking of which, CURENT is busy year-round with Family Engineering Nights, classroom visits, educational field trips, and summer programs. The Adventures in STEM Camp, a collaboration with the National Institute of Mathematical and Biological Synthesis (NIMBioS) here at UT, is also entering its third year of operation. The camp is a signature program within CURENT, and offers middle school girls a week full of STEM-related projects and activities during the summer.

Year Two in CURENT finalized the foundation of the center and the development of new programs and goals. As CURENT enters Year Three, there is much anticipation of the progress that will be made from research, industry relations, and educational opportunities.

(Adam Hardebeck contributed to this article.)
On Tuesday, August 20, 2013, the student group Systers in EECS hosted Bazinga!, an “EECS building party.” The event welcomed engineering students back to campus and to the Min H. Kao building for the fall semester.

Computer science, engineering, and math students and anyone interested in learning more about the EECS department were encouraged to attend. Bazinga! featured free food, robot demos, games and more. The day’s highlight was a raffle with prizes like an iPad mini, an XBox 360, Amazon.com gift cards and more. Nearly 400 students attended and the event was covered by local print and TV news.

College of Engineering alumnus Dr. H.M. “Hash” Hashemian donated the seed funding to kick off the group through a $10,000 contribution from his company AMS, the leading supplier of equipment, training, and services for in-situation response time testing and online calibration of temperature and pressure instrumentation in nuclear plants.

The mission of Systers in EECS is to recruit, mentor, and retain women in Electrical Engineering and Computer Science at the University of Tennessee. And based on the attendance at Bazinga!, the event was a success, as 25% of the partygoers were female.

Systers holds meetings every two weeks to discuss professional development, networking, and communication practices within each member’s respective field.

Dr. Lynne Parker is the faculty advisor for Systers. Denise Koessler is the president and chairperson. Founding members are Katie Schuman, Nicole Pennington, Meg Drouhard, Casey Miller, Sadika Amreen, and Zahra Mahoor.
One of the top ten startup companies in Tennessee began right here at the University of Tennessee. Five members of the UT faculty have created Survature, a company that provides fresh, engaging and interactive surveys that result in more insightful reports into respondents' behavior.

Survature's CEO, Dr. Jian Huang, is a Professor in the Electrical Engineering and Computer Science department. Steven Chin from the College of Law, Lynn Youngs from the College of Business Administration, Sarah Lowe from the School of Art and Garry Shteynberg in Psychology round out the Survature team.

Surveys from Survature are intended to address the problem of user fatigue, wherein respondents either get tired of completing a long questionnaire that seems more like a test, or avoid surveys altogether for this reason. A Survature survey doesn’t look or feel like an exam; it’s more like a conversation. Faster than a regular survey, it results in better data for the companies that use it.

Now Survature has been selected as one of the top ten startups in Tennessee and has been awarded the opportunity to participate in The TENN, the state’s first master accelerator program organized by Launch Tennessee. Launch Tennessee is a public-private partnership focused on supporting the development of high-growth companies in the State of Tennessee with the ultimate goal of fostering job creation and economic growth.

At LaunchTN’s “The TENN” Demo Day event, on August 27th in Nashville, Survature was one of twenty companies given the opportunity to pitch its services to a judging team of entrepreneurs and investors. At the end of the event, Tennessee Governor Bill Haslam announced the ten winning companies, which included Survature.

Survature, along with the other nine startups, traveled the state in The TENN tour bus, from September 9th through 13th, as part of The TENN Roadshow. They met with corporate executives and marketing directors for mentoring and feedback, and raised awareness of Survature with the general public. The TENN tour bus stopped in Memphis, Nashville, Chattanooga, Knoxville, and Kingsport. Among other companies, Survature met with Eastman Chemical, Scripps Networks Interactive, BlueCross BlueShield of Tennessee, the Hospital Corporation of America, First Tennessee, and FedEx.

Later, during the master accelerator program, the members of The TENN will fly to California and the East Coast to network with entrepreneurs, investors, and the media. In the meantime, Survature has already begun to field inquiries into its services as a result of the TENN Roadshow. A great beginning for a homegrown startup!
The Distributed Intelligence Laboratory was founded in 2002 by EECS Professor Lynne E. Parker and is engaged in research in cooperative robotics and distributed artificial intelligence. Its research is focused on the computational issues of distributed intelligent systems - particularly embodied intelligent systems that have a physical presence in the world, such as multi-robot teams, sensor networks, or software agents. It characterizes distributed intelligent systems as multiple entities that integrate perception, reasoning, and action to perform cooperative tasks under circumstances that are insufficiently known in advance, and dynamically changing during task execution.

According to Dr. Parker, the future is one of robots and humans working together as peers. “Most of the [research] funding in the U.S. and worldwide these days is really aiming at the robot working together with the human. That’s where the future is headed.”

“If you look at what currently goes on in the world, in terms of humans working with robots, they’re usually teleoperated, which means the human has a joystick or a user interface, tells the robot what to do, and the robot just does it.”

Parker and her colleagues are working on going beyond that, where robots and humans can work together as a team, without requiring a lot of interaction. “For different tasks, you might say, well, how should you cooperate? If you’re a robot and I’m a person and we’re working together, how should the robot pick a task? But more broadly, how would a human like to cooperate with a robot?”

To help answer this, one of Dr. Parker’s students is working on modeling how people cooperate with one another when completing a task. “What if you watched people cooperating, doing a task, and you somehow model how humans cooperate? Then you give that model to the robot. The robot, then, can perform the task in a way that mimics how the human would do it.”

However, getting robots to be able to properly recognize what a human is doing is a challenge that the laboratory is still working on. “We want to write software that can look at what the human is doing and tell what the human is doing, and that’s
what’s called activity recognition. I have a student who is doing some amazing work on different ways of understanding what humans are doing in different contexts.”

The laboratory has recently received a new tool to further this quest: a yet-to-be named robot that is more human-sized than the smaller robots with which they have previously worked. “It’s got human-scaled arms and it’s got nice sensing capabilities. This robot, then, will allow us to do more interesting tasks that are of human scale, so that now we can demonstrate some of these ideas that we’ve been developing.”

The new robot is called a compliant robot, which “is one that gives, so that if you get in the way of it, it’s not going to be so stiff and knock you down—that then gives you safety. Since we just got the robot, we really need to see what kinds of tasks are easier for it to do than others, and then we’ll work our way up. It’s challenging because there’s uncertainty in everything.”

“Most computer science students are used to running a piece of code on a computer, and the second time you run it, the results are identical to the first time you run it. That’s not at all what happens on a robot. You run it twice, and something’s different. That’s the challenge of this kind of work, compared to just ‘on a computer’ computer science. You have so much more uncertainty. That’s kind of the fundamental challenge of robotics: how to deal with that uncertainty.”
Department profile

Our Mission:

• To prepare students for entry into the profession;

• To instill in students the capabilities required by the discipline, the recognition of the need to enhance the discipline, and the desire for lifelong learning; and

• To equip students with a general knowledge and/or research capabilities in technical and non-technical disciplines so that they are prepared for further study and contribution in other fields, including professional and graduate education.

Our Vision:

We are resolved to become one of the country’s top public EECS departments. To bring this vision to reality, the department is committed to these six charges:

• Attaining national and international recognition among peer institutions for excellence in both research and teaching.

• Assembling a dynamic body of faculty who exemplify excellence and innovation in the pursuit and delivery of knowledge, and will perpetuate the highest standards of education in EE, CE, and CS.

• Graduating students who are well-educated in technical knowledge, who have solid communication and teamwork skills, and who can compete successfully in the global business and research world.

• Maintaining technical relevance in response to scientific and engineering advances, and the evolving student body.

• Investing strategically in the college’s most important resources — students, faculty, and programs — through the vigorous acquisition of grant and contract funding from agencies, corporations, and foundations.

• Partnering with academic, industrial, and government entities that share and enhance the mission of the department so that our educational, research, and collaborative efforts result in the maximum positive economic impact locally, regionally, nationally, and globally.
DEPARTMENT LEADERSHIP

Leon Tolbert
Department Head

Lynne Parker
Associate Department Head
External Relations & Strategic Planning

Syed K. Islam
Associate Department Head
Academic Affairs

DEGREES OFFERED

Bachelor of Science
Electrical Engineering
Computer Engineering
Computer Science

Master of Science
Electrical Engineering
Computer Engineering
Computer Science

Doctor of Science
Electrical Engineering
Computer Engineering
Computer Science

ENROLLMENT FIGURES

Enrollment (Full-Time)
Academic Year 2012-2013
Undergraduate  523
Graduate  231
Total  754

Degrees Granted
Academic Year 2012-2013
Undergraduate  99
Graduate  58
Total  157

Faculty
Academic Year 2012-2013
Professors  21
Associate Professors  10
Assistant Professors  8
Total  39

2012 ASEE SURVEY DATA

• 29th nationally among public EECS programs in research expenditures per tenure-line faculty member. Research expenditures grew 38% from FY 2009 - FY 2012.

• 28th nationally among public EECS programs in PhD enrollment per tenure-line faculty member. PhD enrollment grew 47% from Fall 2009 - Fall 2012.

ACCREDITATION

All undergraduate degree programs under the Department of Electrical Engineering and Computer Science are accredited by ABET.

RECENT FACULTY-PUBLISHED BOOKS


Departmental Scholarships

Carol & Malcolm Bayless
Benjamin A. Brock
Molly E. Hood

Dr. Michael E. & Mrs. Jane N. Casey
David F. Platillero

Grace O. Davis
Jacob L. Davis

Department of Electrical Engineering & Computer Science
Spencer P. Cochran
James A. Haynes

Eta Kappa Nu (HKN)
Philip G. Vaccaro

Christopher J. and Michelle R. Gentry
Jonathan W. Lamont

S.T. Harris
Gabriel J. Hanas
Benjamin E. Mills
George G. Perry
Adam M. Seal
Ryan J. Weiss

Urban & Susan Hilger
Philip G. Vaccaro

Dr. E. Johnson & Mrs. L.H. Kennedy
Michael S. Fields

Robert & Alliene Lay
David F. Platillero

W.O. Leffell
Christopher A. McDonald

Harlan D. Mills
Benjamin A. Arnold
William A. Brummette
Benjamin D. Parrott

Billy J. & Sylvia F. Moore
Jeffery M. Dix
Westley L. Harris
Brent M. McFerrin

Erby Roy & Jean Bush Nankivel
Joe L. Allen
Wilson P. Parker
Trevor A. Watson
Zachary A. Wieger
Nicholas R. Zamudio

Leonard & Betty Shealy
Shawn M. Cox
Simon A. Finney
Matthew A. Lambert
David G. Laughon
Chauncey A. Meade
Andrew K. Messing
Michael D. Snowden
Mathew J. Stinnett
Cody B. Waugh
Joshua C. Willis

Charles & Martha Sprankle
Charles F. Armstrong
Daniel J. Bauer
Jared W. Bolin
Jeffrey C. Brandon
Brennen A. Cox
Patrick C. Davis
Adam P. Howard
Jonathan T. Jackson
Jeremy J. Langford
David Lu
Garrett R. Massman
Anthony P. Meyer
Alex C. Roschli
Matthew B. Seals

David W. Straight
Jacob L. Davis

Arthur F. Woods
Michael J. Breuhl
Brett H. Brownlee
Jason Yen Shen Chan

Kenton W. Culbertson
Christopher P. Daffron
Sharvari Sanjiv Desai
John P. Dorris
Richard H. Fagan
Kyle J. Goodrick
John S. Gutman
Saajid Al Haque
Harry N. Hughes
Andrew T. Letsinger
Alexander L. McHale
Connor C. Minton
Jaymin Jayantibhai Patel
Christopher B. Tester
Taylor A. Thomas
Haley E. Whitaker
Caleb J. Williamson
Nicholas R. Winston

Min H. Kao Scholars
Pranshu Bansal
Natalie R. Beitel
Jessica D. Boles
Joshua M. Clark
Joseph R. Dorris
John W. Duggan
Austin C. Fulbright
Randall N. Glover
Lily M. Hoang
Jose F. March-Rico
Aaron M. Pinto
Kimberly F. Shook
Karsten M. Solies
Madeline N. Threatt
Ryan D. Wagner
Alexander Wetherington
Aaron R. Young
Departmental Fellowships

**Bodenheimer Fellowship**
Richard “Kyle” Harris  
Taylor L. Morris  
Aaron M. Pinto  
David G. Prenshaw

**Ron Nutt Fellowship**
Sang Hyeb “Sam” Lee  
Joshua C. “Josh” Dunn

**Chancellor’s Honors Award**
Jeffery M. Dix  
Edward A. Jones  
Nicole M. Pennington  
Farhan Quaiyum  
Alexander J. Saites

**SCALE-IT Fellowship**
Benjamin F. Goodrich  
Aaron J. Mishtal

**Distinguished Graduate Fellowship (CIRE)**
Jerel A. Culliss

**Department Excellence Awards**
Sadika Amreen  
Linquan Bai  
Steven A. Clukey  
Adam W. Disney  
Nan Duan  
Yawen Fan  
Md. Habib Ullah Habib  
Reazul Hoque  
Weihong Huang  
Mohsen Judy  
Liang Li  
Yong Li  
Haoyang Lu  
Yuping Lu  
Zheng Lu  
Ifana Mahbub  
Casey A. Miller  
Xiangyu Niu  
Alireza Rahimpour  
Mohammad Ehsan Raoufat  
Yang Song  
Siqi Wang  
Sisi Xiong  
Yingyuan Yang  
Yichen Zhang  
Zhiyang Zhang  
Dao Zhou

**ESPN Fellowship**
Hantao Cui  
Xiahuo Zhang

**Fulbright Scholarship/Fellowship**
Hira Amna Saleem

**Honeywell Fellowship**
Terence C. Randall

**Min H. Kao Fellowship**
Jin Dong  
Yao Xu  
Zhibo Wang  
Shuang “Susan” Gao  
Thomas B. “Ben” Ollis

**National Science Foundation Fellowship**
Catherine D. “Katy” Schuman

**PEER**
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Chief Technology Officer
Jewelry Television
Knoxville, TN

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Software Engineer
Google
New York, NY

Dr. John Garrison
Engineer
Huntsville, AL

Mr. Joe Gipson
Operations Manager
Cisco Systems
Knoxville, TN

Dr. Brad Grinstead
Senior Vice President
IAVO Research and Scientific
Durham, NC

Dr. H. M. ("Hash") Hashemian
President
AMS Corporation
Knoxville, TN

Mr. Jeffrey D. Lamoree
President and CEO
EnerNex Corporation
Knoxville, TN

Mr. Ken Lowery
Senior Partner
Cadre5, LLC
Knoxville, TN

Dr. Mohammad M. Mojarradi
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Jet Propulsion Laboratory
Pasadena, CA

Mr. John B. O’Dell, Jr.
Supervisor of IT Financial Reporting &
Analysis and Contract Relationship Manager
Eastman Chemical Company
Kingsport, TN

Dr. Jelena Pjesivac-Grbovic
Senior Software Engineer
Google Inc.
Mountain View, CA

Mr. Dan Roberts
President & CEO
InterFET Corporation
Richardson, TX

Mr. Ron Thompson
Director, Business Development
Emerging Technologies & Markets
Electrical Sector- Global Marketing
Eaton Corporation
Louisville, TN

Dr. Ken Tobin
Director and Corporate Research Fellow
Measurement Science and Systems
Engineering Division
Oak Ridge National Laboratory
Oak Ridge, TN

Dr. Richard (Dick) Todd
President
RIS Corp.
Knoxville, TN

Dr. Grazia Todeschini
Senior Consultant, Power Systems Group
EnerNex Corporation
Knoxville, TN

Mr. Dave Tolman
Electrical/I&C Engineering Manager
Enercon Services
Kennesaw, GA

Mr. Terry Tyler
EVp, CTO and CIO
ENMAX Corporation
Calgary, AB

Mr. J. D. Wilson
Distribution Engineer
Georgia Power Company
Woodstock, GA

Dr. Brian Worley
President and Chief Executive Officer
PYA Analytics, LLC
Knoxville, TN

Ms. Angela Yochem
Global Chief Information Officer
BDP International
Philadelphia, PA
**Financial Information**

*Numbers reflect the department's financial information for FY13.*

Total Resources
$21,876,099

- Externally Funded Gifts, Grants & Contracts: $8,473,116
- Recurring & Nonrecurring State Funds: $13,402,983

Expenditure Breakdown of State Funds
$8,473,116

- Salaries & Benefits: $7,059,419
- Equipment: $132,907
- Miscellaneous Operating Expenses: $1,280,790
By the numbers
How EECS at UT compares to peer and aspirational institutions

We’ve collected data from universities we consider peers and aspirational peers over the past year to see how our EECS program compares. The data from our peers and aspirational universities has been averaged and displayed in the following charts.


Research expenditures per T/TT faculty
Faculty Profile

EECS has 39 full-time faculty members who are all leaders in their fields. Each year they successfully compete for and receive prestigious awards and accolades. Their research and scholarship are not only helping keep the department on the cutting edge of its disciplines, but also teaching and training the engineers of tomorrow.

<table>
<thead>
<tr>
<th>Strength Area</th>
<th>Tenured/Tenure-Track Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological applications</td>
<td>Berry, Birdwell, Day, Holleman, Islam, Langston, McFarlane, Peterson, Vose, Wu</td>
</tr>
<tr>
<td>Computer systems and architecture</td>
<td>Beck, Dean, Peterson, Plank, Vander Zanden</td>
</tr>
<tr>
<td>High performance and scientific computing</td>
<td>Banks, Berry, Dean, Dongarra, Gregor, Huang, Langston, Vose</td>
</tr>
<tr>
<td>Intelligent systems, data mining, and machine learning</td>
<td>Arel, Berry, Birdwell, Gregor, MacLennan, Parker, Qi, Vose</td>
</tr>
<tr>
<td>Microelectronics, microwave, and MEMS</td>
<td>Blalock, Fathy, Gu, Holleman, Islam, McFarlane, Wu</td>
</tr>
<tr>
<td>Networked and embedded systems</td>
<td>Beck, Cao, Djouadi, H. Li, Parker, Qi, J. Sun, W. Gao</td>
</tr>
<tr>
<td>Power systems, power electronics, and renewable energy</td>
<td>Costinett, F. Li, Liu, Tolbert, Tomsovic, F. Wang, K. Sun</td>
</tr>
<tr>
<td>Signal processing, systems, and controls</td>
<td>Birdwell, Djouadi, H. Li, Roberts</td>
</tr>
<tr>
<td>Visual computing and image processing</td>
<td>Abidi, Arel, Banks, Gregor, Huang, Qi, Vander Zanden, Vose</td>
</tr>
</tbody>
</table>
# EECS Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Awards/Positions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mongi Abidi</td>
<td>Ph.D. The University of Tennessee</td>
<td>Cook-Eversole Professor</td>
</tr>
<tr>
<td>Itamar Arel</td>
<td>Ph.D. Ben Gurion University (Israel)</td>
<td>DOE Young Investigator Award</td>
</tr>
<tr>
<td>David Banks</td>
<td>Ph.D. University of North Carolina</td>
<td></td>
</tr>
<tr>
<td>Micah Beck</td>
<td>Ph.D. Cornell University</td>
<td></td>
</tr>
<tr>
<td>Michael W. Berry</td>
<td>Ph.D. University of Illinois</td>
<td></td>
</tr>
<tr>
<td>J. Douglas Birdwell</td>
<td>Ph.D. Massachusetts Institute of Technology</td>
<td>IEEE Fellow</td>
</tr>
<tr>
<td>Benjamin J. Blalock</td>
<td>Ph.D. Georgia Institute of Technology</td>
<td>Kennedy-Blalock-Pierce Professor</td>
</tr>
<tr>
<td>Qing (Charles) Cao</td>
<td>Ph.D. University of Illinois</td>
<td>NSF Career Award</td>
</tr>
<tr>
<td>Daniel J. Costinett</td>
<td>Ph.D. University of Colorado</td>
<td></td>
</tr>
<tr>
<td>Judy Day</td>
<td>Ph.D. University of Pittsburgh</td>
<td></td>
</tr>
<tr>
<td>Mark Edward Dean</td>
<td>Ph.D. Stanford University</td>
<td>Fisher Distinguished Professor, IEEE Fellow, National Academy of Engineering Member</td>
</tr>
<tr>
<td>Seddik M. Djourdi</td>
<td>Ph.D. McGill University (Canada)</td>
<td></td>
</tr>
<tr>
<td>Jack Dongarra</td>
<td>Ph.D. University of New Mexico</td>
<td>University Distinguished Professor, IEEE Fellow, National Academy of Engineering Member</td>
</tr>
<tr>
<td>Aly E. Fathy</td>
<td>Ph.D. Polytechnic Institute of New York</td>
<td>James W. McConnell Professor, IEEE Fellow</td>
</tr>
<tr>
<td>Wei Gao</td>
<td>Ph.D. Pennsylvania State University</td>
<td></td>
</tr>
<tr>
<td>Jens Gregor</td>
<td>Ph.D. University of Aalborg (Denmark)</td>
<td></td>
</tr>
<tr>
<td>Gong Gu</td>
<td>Ph.D. Princeton University</td>
<td></td>
</tr>
<tr>
<td>Jeremy H. Holleman</td>
<td>Ph.D. University of Washington</td>
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<tr>
<td>Jian Huang</td>
<td>Ph.D. The Ohio State University</td>
<td></td>
</tr>
<tr>
<td>Syed Kamrul Islam</td>
<td>Ph.D. University of Connecticut</td>
<td>James W. McConnell Professor and Associate Department Head</td>
</tr>
<tr>
<td>Michael A. Langston</td>
<td>Ph.D. Texas A&amp;M University</td>
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<tr>
<td>Fangxing (Fran) Li, P.E.</td>
<td>Ph.D. Virginia Tech</td>
<td></td>
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<tr>
<td>Husheng Li</td>
<td>Ph.D. Princeton University</td>
<td></td>
</tr>
<tr>
<td>Yilu Liu</td>
<td>Ph.D. The Ohio State University</td>
<td>Governor’s Chair Professor, IEEE Fellow</td>
</tr>
<tr>
<td>Bruce J. MacIennan</td>
<td>Ph.D. Purdue University</td>
<td></td>
</tr>
<tr>
<td>Nicole McFarlane</td>
<td>Ph.D. Maryland University</td>
<td></td>
</tr>
<tr>
<td>Lynne E. Parker</td>
<td>Ph.D. Massachusetts Institute of Technology</td>
<td>Professor and Associate Department Head, IEEE Fellow, NSF Presidential Young Investigator Award</td>
</tr>
<tr>
<td>Gregory D. Peterson</td>
<td>Ph.D. University of Washington (St. Louis)</td>
<td></td>
</tr>
<tr>
<td>James S. Plank</td>
<td>Ph.D. Princeton University</td>
<td>NSF Career Award</td>
</tr>
<tr>
<td>Hairong Qi</td>
<td>Ph.D. North Carolina State University</td>
<td>NSF Career Award</td>
</tr>
<tr>
<td>Michael J. Roberts</td>
<td>Ph.D. The University of Tennessee</td>
<td></td>
</tr>
<tr>
<td>Jinyuan (Stella) Sun</td>
<td>Ph.D. University of Florida</td>
<td></td>
</tr>
<tr>
<td>Kai Sun</td>
<td>Ph.D. Tsinghua University (China)</td>
<td></td>
</tr>
<tr>
<td>Leon M. Tolbert, P.E.</td>
<td>Ph.D. Georgia Institute of Technology</td>
<td>Min H. Kao Professor and Department Head, IEEE Fellow, NSF Career Award</td>
</tr>
<tr>
<td>Kevin Tomsovic</td>
<td>Ph.D. Washington University</td>
<td>CTI Professor, IEEE Fellow</td>
</tr>
<tr>
<td>Bradley T. Vander Zanden</td>
<td>Ph.D. Cornell University</td>
<td></td>
</tr>
<tr>
<td>Michael D. Vose</td>
<td>Ph.D. University of Texas</td>
<td></td>
</tr>
<tr>
<td>Fei (Fred) Wang</td>
<td>Ph.D. University of Southern California</td>
<td>Professor and Condra Chair of Excellence in Power Electronics, IEEE Fellow</td>
</tr>
<tr>
<td>Jie (Jayne) Wu</td>
<td>Ph.D. Notre Dame</td>
<td>NSF Career Award</td>
</tr>
</tbody>
</table>
After a 34-year career with IBM, Dr. Mark Dean has returned to his home state and to the University of Tennessee. The Jefferson City native has joined the faculty as the John Fisher Distinguished Professor in the Department of Electrical Engineering and Computer Science.

While at IBM, he was one of the co-inventors of the PC, and was most recently the Chief Technology Officer for IBM Middle East and Africa in Dubai, United Arab Emirates. His focus was on developing Africa’s IT skills and computer science workforce.

Dean, a 1979 engineering alumnus, is responsible for developing technology that allows us to plug anything into computers—keyboards, mice, monitors, modems, printers, speakers, scanners—and have the devices and PCs communicate seamlessly. He holds three of the nine original patents on the computer that all PCs are based upon, and more than forty patents overall.

Dean’s other contributions include managing teams that developed the world’s first one-gigahertz processor chip and the world’s most powerful supercomputer, Blue Gene.

He holds a bachelor’s degree in electrical engineering from the University of Tennessee, a master’s degree in electrical engineering from Florida Atlantic University and a Ph.D. in electrical engineering from Stanford University.

Dean is the first African-American to become an IBM Fellow, the highest level of technical excellence at the company. In 1997, he was inducted into the National Inventors Hall of Fame. He was also honored with the 2012 Distinguished Alumnus Award, UT’s highest honor, and the 2005 College of Engineering’s Nathan W. Dougherty Award, the college’s highest honor. He has been a longtime member of the college’s Board of Advisors.

“Mark is an outstanding addition to a college that is growing in size and achievement,” said Chancellor Jimmy G. Cheek. “His work has revolutionized the way we live and his computer science expertise will continue to be a game-changer in his research and mentoring here at UT.”

(Whitney Heins contributed to this profile.)

Dr. Daniel Costinett is an Assistant Professor in the Department of Electrical Engineering and Computer Science at the University of Tennessee. He received his Ph.D. degree in Electrical Engineering at the University of Colorado at Boulder in 2013. In 2012, he assisted with research and course development as an instructor at Utah State University. His research interests include resonant and soft switching power converter design, high efficiency converters for data centers, energy harvesting, implantable devices, and electric vehicles.

Dr. Costinett is a member of the NSF Engineering Research Center - CURENT.

Position: Assistant Professor

Hometown: Boulder, CO

PhD: Electrical Engineering, University of Colorado Boulder, 2013

Research areas: Power Electronics, Soft Switching Converters, Electric Vehicles

Hobbies: Rock climbing, cooking, travel.
Master’s Graduates 2012-13

Yu Du – Non-thesis MS
Advisor: G. Peterson

Matthew Ryan Johnson – Non-thesis MS
Advisor: J. Dongarra

Maximilian Abel Mueller – Non-thesis MS
Advisor: J. Gregor

Eric Anthony Tobias Allen – Non-thesis MS
Advisor: J. Huang

Dennis Michael Franklin – Non-thesis MS
Advisor: L. Parker

Jesse James Lindsey – Non-thesis MS
Advisor: D. Banks

Robert Earl Lowe – Non-thesis MS
Advisor: L. Parker

Advisor: M. Berry

Long Jung Yu – Non-thesis MS
Advisor: D. Banks

Yanwei Zhang – Power Management for Cloud-Scale Data Centers.
Advisor: X. Wang

Christopher Patrick Boyd – Non-thesis MS
Advisor: I. Arel

Scott Frederick Hansen – Exploration of Neural Structures for Dynamic System Control.
Advisor: D. Birdwell

Shelby J. Moorman – Non-thesis MS
Advisor: L. Smith

Michael Robert Juran – Non-thesis MS
Advisor: G. Peterson

Jonathan Lawrence Peyton – Programming Dense Linear Algebra Kernels on Vectorized Architectures.
Advisor: G. Peterson

Everett Truman Stiles – Non-thesis MS
Advisor: D. Birdwell

Clayton Edward Taylor – Non-thesis MS
Advisor: Q. Cao

Jordan Hunter Deyton – Tor Bridge Distribution Powered by Threshold RSA.
Advisor: J. Sun

Vijay Gopal Joshi – A Study of Possible Optimizations for the Task Scheduler ‘QUARK’ on the Shared Memory Architecture.
Advisor: J. Dongarra

Kefa Lu – Sequence Mining Based Debugging of Wireless Sensor Networks.
Advisor: Q. Cao

Xuejuan Zhang – Non-thesis MS
Advisor: L. Parker

Stephen Andrew Holland – Conductive Textiles and their Use in Combat Wound Detection, Sensing, and Localization Applications.
Advisor: A. Fathy

Yang Xue – Non-thesis MS
Advisor: L. Tolbert

Mojtaba Amirikamalabad – Non-thesis MS
Advisor: J. Day

David Aaron Heise – Automated Generation of Simulink Models for Enumeration Hybrid Automata.
Advisor: M. Thomason

John Lars Nelson – Non-thesis MS
Advisor: J. Dongarra

Aaron David Vose – Non-thesis MS
Advisor: B Vander Zanden

Advisor: G. Peterson

Yeting Feng – Non-thesis MS
Advisor: G. Peterson

Bradley Kerwin Greene – Novel Applications for Phasor Measurement Units and Synchronphasor Data.
Advisor: Y. Liu

William Rawlins Martin – Pose Estimation of 4 to N-Point Implementation and Applications.
Advisor: M. Abidi

Eric Lynn Taylor – Short-term Electrical Load Forecasting for an Institutional/Industrial Power System Using an Artificial Neural Network.
Advisor: L. Tolbert

Advisor: B. Blalock
Doctoral Graduates 2012-13

Sarina Adhikari - Control of Solar Photovoltaic (PhV) Power Generation in Grid-connected and Islanded Microgrids. Advisor: F. Li

Lloyd F. Arrowood - An Investigation of Markov Random Fields for Bayesian Reconstruction of Single Photon Emission Computed Tomography. Advisor: J. Gregor

Wesley B. Bland - Toward Message Passing Failure Management. Advisor: J. Dongarra

Robert A. Coop - Mitigation of Catastrophic Interference in Neural Networks and Ensembles using a Fixed Expansion Layer. Advisor: I. Arel


Robert L. Greenwell - Highly Integrated Gate Driver with 100% Duty-Cycle Capability and High Output Current Drive for Wide-Bandgap Power Switches in Extreme Environments. Advisor: B. Blalock

Chuan-Jun He - An Expert System for Guitar Sheet Music to Guitar Tablature. Advisor: M. Vose

David D. Jenkins - Exploring Computational Chemistry on Emerging Architectures. Advisor: G. Peterson

Zhiqiang Jin - Control Studies of DFIG based Wind Power Systems. Advisor: F. Li


Phani Teja Kuruganti - Techniques for Wireless Channel Modeling in Harsh Environments. Advisor: S. Djouadi

Teng Ma - Kernel-assisted and Topology-aware MPI Collective Communication among Multi-core or Many-core Clusters. Advisor: J. Dongarra

Xiao Ma - Control Design and Filtering for Wireless Networked Systems. Advisor: S. Djouadi

Rukun Mao - Design of Wireless Communication Networks for Cyber-Physical Systems with Application to Smart Grid. Advisor: H. Li

Penn N. Markham - Data Mining and Machine Learning Applications of Wide-Area Measurement Data in Electric Power Systems. Advisor: Y. Liu

Muhtarrem Mercimek - Motion Segmentation Aided Super Resolution Image Reconstruction. Advisor: M. Abidi

Benyamin Moradzadeh - Optimal Distribution Reconfiguration and Demand Management within Practical Operational Constraints. Advisor: K. Tomsovic


Derek C. Rose - Online Multi-Stage Deep Architectures for Feature Extraction and Object Recognition. Advisor: I. Arel

Christopher T. Symons - Extending Structural Learning Paradigms for High-Dimensional Machine Learning and Analysis. Advisor: I. Arel


Frederick E. Weber - Parallel For Loops on Heterogeneous Resources. Advisor: G. Peterson

Yanli Wei - Advanced Studies on Locational Marginal Pricing. Advisor: F. Li

Asim Yar Khan - Dynamic Task Execution on Shared and Distributed Memory Architectures. Advisor: J. Dongarra

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