The Department of Computer Science and Engineering is one of seven departments in the College of Engineering, the fourth-largest engineering college in Texas. Its mission is to serve the needs of the region, the state, and the nation by providing quality educational and innovative, relevant research programs in computer science and engineering.

The department strives to offer first-rate undergraduate, graduate, and continuing education opportunities; conduct research and development technologies in selected areas, and facilitate technology transfer for the betterment of the quality of life. Its internationally recognized faculty members are engaged in breakthrough research across the leading areas of computer science and engineering.

Greeting From the Chair

Hi from UT Arlington! It’s been an exciting year in the Department of Computer Science and Engineering, and we are pleased to be able to bring you up to date with the achievements of our faculty, students and staff. We continue to grow. Like many others, we are experiencing the resurgence of computer science enrollments as the computing disciplines become ever more pervasive in society. Our undergraduate students number over 800, up a whopping 34% over last fall. This is fortunate, since it comes at a time that the Texas Workforce Commission projects a need for 88,000 new engineers to support the state’s economy, with the bulk of them centered in the
computing professions. Our graduate numbers are strongly up also, to well over 600 master’s and PhD students. We are fortunate have the infrastructure to be able to support this growth. In 2011 we moved in to the brand new Engineering Research Building, which we share with the Department of Bioengineering and faculty from the College of Science who collaborate with these two departments. Our faculty and students benefit from the outstanding infrastructure and research facilities available here.

Together with a growing focus on health care, security, energy and the environment in the College of Engineering, our department contributes thru numerous research programs supported by funding from NSF, other governmental agencies, industry and foundations.

**DEGREES OFFERED**

- B.S. in Computer Engineering*
- B.S. in Computer Science*
- B.S. in Software Engineering*
- M.S. in Computer Engineering
- M.S. in Computer Science
- Master of Software Engineering
- Ph.D. in Computer Engineering
- Ph.D. in Computer Science

*B.S. degrees are ABET accredited
CSE STUDENT CLUBS/GROUPS

Association for Computing Machinery
Game Developers Club
Computer Security Club
Linux User Group
Upsilon Pi Epsilon
UTA RoboBoat Team

Colloquiums and Invited Talks Held in Spring 2015

The Synaisthisi Project: Using Multi-Agent Systems Technologies in Resource Allocation
Friday, April 10, 2015
Ioannis A. Vetsikas, PhD

AMINESS: Analysis of Marine Information for Environmentally Safe Shipping
Friday, April 10, 2015
Ioannis A. Vetsikas, PhD

Threat Analysis in Online Social Network Systems
Friday, April 10, 2015
Hassan Takabi, PhD
University of North Texas

Data Journalism Today: Applications and Problems
Friday, March 27, 2015
Jon McClure & Daniel Lathrop
The Dallas Morning News

Big Data Engineering at the National Center for Scientific Research (NCSR) - Demokritos
Friday, March 27, 2015
Vangelis Karkaletsis, PhD
NCSR "Demokritos"

Argument Mining from News and the Social Web
Friday, March 27, 2015
George Petasis, PhD
NCSR "Demokritos"
Enrollment Growth

Spring enrollment at The University of Texas at Arlington has surpassed 36,000 students residing in Texas for the first time as the institution’s global headcount of students in campus-based and in online degree programs reached 47,977, preliminary census reports show.

Enrollment growth was strong in the College of Engineering, which recorded an increase of 22.1 percent from spring 2014, and in the College of Nursing and Health Innovation, which saw a gain of 13.8 percent. College of Education enrollment was up 12.3 percent over spring 2014, while the School of Social Work saw a 9.4 percent enrollment gain.

GRADUATE RANKING MAKES DRAMATIC IMPROVEMENT

The University of Texas at Arlington is among the top 100 universities in the nation for earning a graduate degree in engineering, according to U.S. News & World Report’s Best Graduate Programs rankings for 2016. The University of Texas at Arlington’s College of Engineering graduate programs improved to No. 90 in the country this year, up from No. 102 last year. The progress is due, in part, to a continued rise in academic achievements of the faculty and students.

ENGINEERING STUDENTS WIN 11 STUDENT ACHIEVEMENT AWARDS IN ACES COMPETITION

Engineering students took 11 of 32 prizes, including three President’s Awards, at UTA’s annual ACES competition March 26. In the undergraduate competition, Hussain Mucklai (CSE) earned the President’s Award -- the competition’s top honor -- in the morning oral presentation. Biology student Guarang Gupte, under the mentorship of J.-C. Chiao (EE), took honorable mention in the poster competition. In the graduate competition, Engineering students took the top two honors and an honorable mention in the morning oral presentation and the top honor, as well a third place and two honorable mentions in the poster competition. Xin Heng (ME) won the Sustainability Award for best poster and Reza Broun (CE) won the Sustainability Award for best oral presentation. Samir Iqbal, associate professor of electrical engineering, was honored as the best research mentor.
NSF Program Director Hired as CSE Chair

The University of Texas at Arlington has hired a National Science Foundation program director as the new chair of its Computer Science and Engineering Department. Hong Jiang will start Sept. 1, 2015. In addition to memory and storage architectures, Dr. Jiang also has had research projects in cloud computing, high performance computing, scalable and distributed file systems, memory management, and big data analytics. Dr. Jiang is a Fellow of the Institute of Electrical and Electronics Engineers, a prestigious distinction that is bestowed on less one-tenth of 1 percent of the total voting membership in any one year.

“I love challenges and leading a large department like the one The University of Texas at Arlington has built fits in with one of my goals,” Dr. Jiang said. “UT Arlington has a promising future. I believe their research interests fit in nicely with mine, as well.”

Professor Ramez Elmasri Publishing 7th Edition of Popular Database Textbook

Professor Ramez Elmasri, associate chair of CSE, is publishing the 7th edition of his popular database textbook, Fundamentals of Database System, which is co-authored with Professor Shamkant Navathe of Georgia Institute of Technology, and published by Pearson. The new edition includes two new chapters describing new technologies and paradigms related to big data storage and processing. One new chapter describes NOSQL systems, used by many social media companies such as Facebook and Twitter, as well as companies with large data needs such as Google and Amazon. The other new chapter discusses the map-reduce paradigm and the Hadoop system for distributed processing of big data. The book has been used in hundreds of universities around the world, and has been translated into more than twenty languages.
Grants Awarded to CSE Faculty

**Fillia Makedon**, Distinguished Professor of Computer Science and Engineering, has received a Computing Research Infrastructure (CRI) grant from the National Science Foundation to build such a computational infrastructure that can greatly advance human-machine interaction research. The research resulting from this $100,000 planning grant will develop a community repository of data that will be comprehensive and searchable to allow researchers to more accurately analyze their findings.

**Matthew Wright**, associate professor in the Department of Computer Science and Engineering, was awarded a $250,000 National Science Foundation grant to quantify the capabilities of powerful adversaries and develop defenses to overcome them. An autonomous system on the Internet is a collection of connected Internet Protocol routing addresses that define a clear route through the Internet. Wright said the research aims to route traffic around the eavesdroppers, preventing them from learning enough to break the anonymity.

**Gautam Das**, professor of Computer Science and Engineering in the College of Engineering, has won a $450,000 Army Research Office grant to develop efficient analytic techniques for combining and understanding the data stored in online social networks. Das said the grant is to find “implicit edges” in the uses of social networks. Implicit edges connect two seemingly unrelated occurrences on a social media platform. In contrast, explicit edges represent the more obvious relationships on the social media platform, such as friends, followers and contacts.

**Chengkai Li**, an associate professor in the Computer Science & Engineering Department, has been awarded a $241,778 National Science Foundation grant for his proposal about “perturbation analysis of database queries.” He is teaming with Duke University and Stanford University on the joint grant, which is worth more than $1.2 million. Li is helping design a system that will ask better questions when querying databases and lead to improved decision-making in our data-driven society.

**Junzhou Huang**, an assistant professor of Computer Science & Engineering with an expertise in big data and statistical learning, as won a $250,000 National Science Foundation grant to develop a scalable data-mining framework that will help manufacturers quickly discover desired materials for building their products. Huang will design scalable algorithms and a computational framework that can search unprecedented volumes of data detailing the complete set of genes present in numerous materials.
Student Achievements

Zedd Shmais, James Staud and Nhat Tran, three Computer Science and Engineering seniors, won a NTxApp Challenge contest and the $10,000 prize for building a program (GridLock) that eases traffic congestion. The system collects information about traffic, and then uses computerized data mining to enhance the timing of traffic lights in real time.

Computer science and engineering doctoral student Luan Viet Nguyen and electrical engineering master’s students Amol Vengurlekar and Ruoshi Zhang, will share a $1,000 prize for their Reconfigurable Continuous-Culture Bioreactor entry. The competition was created to encourage innovation and entrepreneurship. Twenty-nine teams submitted projects to the competition, and eight finalists were chosen to make a 10-minute presentation to the judges.

CSE doctoral students Naeemul Hassan, Afroza Sultana, and Gensheng Zhang, their dissertation advisor Associate Professor Chengkai Li, You Wu and Jun Yang from Duke University, and Cong Yu from Google Research won an Excellent Demonstration Award at the 40th International Conference on Very Large Databases in China for their paper, “Data In, Fact Out: Automated Monitoring of Facts by FactWatcher.”

Shabnam Aboughadareh, a doctoral student in the Computer Science and Engineering Department, won first prize among all graduate, technical Symantec interns worldwide in the company’s 7th Annual Intern Showcase Competition. Aboughadareh, whose research interest is computer security, interned at the Symantec Research Labs with her manager, Dr. Matthew Elder. The project was a government-funded project to detect malware in a cloud environment by using a sophisticated type of malware called a rootkit.

Ashis Biswas, a doctoral student in the Computer Science and Engineering Department, was awarded Best Paper honors at the recent IEEE International Conference on Bioinformatics and Bioengineering. With co-author Bao Zhang, Xiao Wu and faculty advisor Jean Gao, Biswas wrote a paper entitled, “NMF-based LncRNA-Disease Associate Inference and Bi-clustering.” According to Biswas, accumulated evidence over the past decade shows that long non-coding ribonucleic acids (IncRNAs), the non-protein coding transcripts longer than 200 nucleotides, are associated with many dysregulations in various biological processes implicating quite a large number of human diseases.
UTA-led iPerform Center Seeking Industry Partners

The University of Texas at Arlington (UTA) has created a new National Science Foundation center under the auspices of the Industry/University Cooperative (I/UCRC) program. The center is led by Distinguished Professor of Computer Science and Engineering Fillia Makedon.

The UTA-led center is called “iPerform”, as it focuses on assistive technologies to enhance human performance. It is a consortium with The University of Texas at Dallas (UTD), where it is led by computer science professor Ovidiu Daescu. Several other universities are expected to join the center in the future.

iPerform is actively seeking industry partners who are interested in participating in exciting innovations that improve commercial productivity at the company level, as well as human performance in the workplace, and in daily life activities. iPerform, researchers are working on computer-based methods to help people overcome physical, cognitive, and operational obstacles that prevent them from reaching their full potential or achieving best performance.

The center’s faculty leaders and student researchers are interested in collaborations with industry in areas that include device safety and innovation, cybersecurity, data analytics, training interfacers, diagnostic and rehabilitation systems, behavior monitoring, vocational safety and health, assistive robotics, and many other areas.

Industry representatives who are interested in becoming a partner in the iPerform center should contact Fillia Makedon at makedon@uta.edu or the UTA Computer Science and Engineering Department Office at 817-272-3785.
Research Areas

BIG DATA AND LARGE-SCALE COMPUTING
• Big data analytics and mining; computational journalism; data exploration; data science; distributed computing; scientific computing

BIOCOMPUTING AND HEALTH INFORMATICS
• Assistive technologies; bioinformatics; computational neuroscience; computer aided rehabilitation; health informatics; human computer interaction; medical informatics

COMPUTER NETWORKS
• Anonymity and privacy online; content-centric networking; Internet distributed traffic control; Internet router interface programming; next-generation networks; opportunistic networks

COMPUTER VISION AND MULTIMEDIA
• Endoscopic vision; gesture recognition; human motion analysis; image processing; neural networks; pattern recognition

DATABASE AND INFORMATION SYSTEMS
• Converting data to knowledge; crowdsourcing and human computation; data modeling and summarization; data exploration; data warehousing; database testing

EMBEDDED SYSTEMS AND MOBILE COMPUTING
• Applications in robotics/power/aerospace; cyber-physical systems; formal methods; hybrid systems; mobile applications; virtual reality; wireless localization; wireless sensor networks

MACHINE LEARNING AND DATA MINING
• Deep web and social media mining; environmental and tracking data analysis; matrix-based machine learning; neural networks; pattern recognition; similarity-based indexing

ROBOTICS AND AI
• Assistive robotics; autonomous robot systems; development of intelligent behavior; endoscopic vision; healthcare robotics; robotic vision

SECURITY AND PRIVACY
• Anonymity and privacy; malware analysis; mobile device security; secure peer-to-peer systems; usable security and privacy

SOFTWARE ENGINEERING
• Agile methods; automated testing; cloud computing; mobile software engineering; program analysis; program repair; reverse engineering; software design patterns; software process; software security; verification and validation
ABET Accredited Programs

The programs of Computer Science (CS), Computer Engineering (CpE), and Software Engineering (SE) in the Department of Computer Science & Engineering at the University of Texas at Arlington are accredited by the Accreditation Board for Engineering and Technology (ABET).

ABET is recognized as the worldwide leader in assuring quality and stimulating innovation in applied science, computing, engineering, and engineering technology education.

Earning a degree from an ABET-accredited program:

- Verifies that the quality of the educational experience you have received meets the standards of the profession.
- Increases and enhances employment opportunities.
- Permits and eases entry to a technical profession through licensure, registration, and certification.
- Establishes eligibility for many federal student loans, grants, and/or scholarships.
**Faculty Highlight**

**Junzhou Huang,** PhD is an Assistant Professor at the CSE Department. His major research interests include machine learning, computer vision and biomedical imaging informatics. The general goal of his research is to investigate scalable models and algorithms for data-intensive applications. Dr. Huang is currently leading the Scalable Modeling & Imaging & Learning Lab (SMILE) at University of Texas at Arlington. His lab is working actively on developing scalable algorithms and applying high performance computing technologies, such as multicore processors, GPU, and Grid/Cloud computing environment to process and analysis big data together with many other collaborators. The research projects in his lab are broad and interdisciplinary, such as Robust Materials Genome Data Mining for Nanoparticle Synthesis, Adaptive Interdisciplinary Pain Management for Personalized Medicine, Large Scale Non-intrusive Energy Monitoring, Compressed Sensing Magnetic Resonance Imaging (MRI), 3D Modeling and Simulation, Visual Tracking and Event Detection. Dr. Huang is currently leading the Scalable Modeling & Imaging & Learning Lab (SMILE) at University of Texas at Arlington. His lab is working actively on developing scalable algorithms and applying high performance computing technologies, such as multicore processors, GPU, and Grid/Cloud computing environment to process and analysis big data together with many other collaborators. The research projects in his lab are broad and interdisciplinary, such as Robust Materials Genome Data Mining for Nanoparticle Synthesis, Adaptive Interdisciplinary Pain Management for Personalized Medicine, Large Scale Non-intrusive Energy Monitoring, Compressed Sensing Magnetic Resonance Imaging (MRI), 3D Modeling and Simulation, Visual Tracking and Event Detection and so on.

The Materials Genome Initiative research has been launched by U.S. government to discover, manufacture, and deploy advanced materials fast and low-cost, which holds great opportunities to address the challenges in clean energy, national security, and human welfare. However, the major computational challenges are the bottlenecks for comprehensive materials genome data analysis. There is a critical need for new data mining and machine learning strategies to bridge the gap and facilitate the new materials discovery. The overall goal of this project is to address the computational challenges for comprehensive materials genome data analysis due to unprecedented scale and complexity, and develop new data mining and machine learning strategies for facilitating the new materials discovery. This project will develop new computational tools to automate the material genome data processing, investigate the new learning model to integrate heterogeneous material characterizations for predicting the catalytic capabilities and associations to theoretical modeling measurements, design novel robust learning techniques to predict the catalytic capabilities of the new synthesized nanoparticles. This project is funded by NSF IIS core program from 08/2014 to 08/2017 with a total amount of an award as $250,000.
Faculty Highlight

Taylor Johnson, PhD is an Assistant Professor at the CSE Department. His research interests include cyber-physical systems: real-time, embedded control systems and software; hybrid and distributed systems; software engineering, formal methods, and verification; reliability and fault-tolerance; application areas including robotics, power and energy, aerospace. At UT-Arlington, Dr. Johnson has begun collaborations with systems biologists at UT-Southwestern to ensure validity of experimental data acquired in microorganism growth experiments. Through this, Dr. Johnson and his students have designed a novel continuous-culture device using the Beaglebone Black ARM development board and custom-designed printed circuit board (PCB) daughterboards, known as capes in the maker community. The software architecture uses the Xenomai real-time Linux extensions as a real-time operating system (RTOS) and Dropbox for online data storage so that remote monitoring of the weeks-to-months long experiments is feasible. A preliminary analysis of the design appeared at the 2014 Cyber-Physical Systems Week (CPSWeek) in Berlin.

Dr. Johnson leads the Verification and Validation for Intelligent and Trustworthy Autonomy Laboratory (VeriVITAL) at UT-Arlington. Other ongoing collaborative projects in VeriVITAL include:

- Design and analysis of distributed multilevel inverters for use in connecting renewables like photovoltaics with the smart grid (in conjunction with Prof. Ali Davoudi of Electrical Engineering)
- Indoor quadrotor localization using the Kinect sensor for use in control of guaranteed correct distributed robotic swarms (in conjunction with Prof. Amy LaViers of the University of Virginia's Systems and Information Engineering Department and Prof. Leonardo Bobadilla of Florida International University's School of Computing and Information Sciences)
- Development of software engineering and hybrid systems formal verification tools and applications to CPS (in conjunction with Dr. Stanley Bak of AFRL)
Masters Defenses Held in Spring 2015

PERFORMANCE COMPARISON OF SPATIAL INDEXING STRUCTURES FOR DIFFERENT QUERY TYPES
Monday, April 20, 2015
Neelabh Pant

BIOMEDICAL PARAMETER MONITORING USING VIDEO PROCESSING
Monday, April 20, 2015
Negar Ziaee Nasrabadi

THE IMPACT OF DIFFERENT CUES ON THE MEMORABILITY OF SYSTEM-ASSIGNED RECOGNITION-BASED TEXTUAL PASSWORDS
Monday, April 20, 2015
Kanis Fatema

GAIT ANALYSIS ON A SMART FLOOR FOR HEALTH MONITORING
Monday, April 20, 2015
Oluwatosin E. Oluwadare

TRANSMISSION OF URL USING BLUETOOTH LOW ENERGY TECHNOLOGY
Tuesday, April 14, 2015
Arjun Kumar Bhaskar Shetty

PhD Defenses Held in Spring 2015

ENERGY EFFICIENT FRAMEWORKS FOR PARTICIPATORY URBAN SENSING
Monday, April 20, 2015
Adnan Rahath Khan

DESIGN AND ANALYSIS OF PLACE BASED OPPORTUNISTIC NETWORKS
Friday, April 17, 2015
Yanliang Liu

AUTOMATIC TEST CASE GENERATION WITH DYNAMIC SYMBOLIC EXECUTION FOR PROGRAMS THAT ARE CODED AGAINST INTERFACES AND ANNOTATIONS OR USE NATIVE CODE
Thursday, April 16, 2015
Mainul Islam

A PERSONALIZED PROFILE BASED LEARNING SYSTEM FOR POWER MANAGEMENT IN ANDROID
Wednesday, April 15, 2015
Ashwin Arikere

METHODS FOR HUMAN MOTION ANALYSIS FOR AMERICAN SIGN LANGUAGE RECOGNITION AND ASSISTIVE ENVIRONMENTS
Thursday, April 02, 2015
Zhong Zhang
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