TO PROSPECTIVE STUDENTS

The University of Texas at El Paso is an emerging national research university in the heart of the American Southwest, only a few hundred meters from the U.S-Mexico border. Situated in the high desert and surrounded by mountains on three sides, El Paso enjoys mild days, cool nights and constant sunshine, making it possible to enjoy outdoor activities nearly all year long. El Paso adjoins both the state of New Mexico and the country of Mexico, creating one of the most culturally diverse areas in the nation.

The graduate programs in Computer Science offer courses in a variety of core and applied areas of CS that provide students with a strong foundation to build their individual research and professional programs. In addition to research focused directly on CS, the department engages in research in interdisciplinary areas, such as health, biological, geological, and environmental sciences, education, and engineering. Recognizing that solving many of our complex problems today requires multidisciplinary perspectives, we encourage our students to collaborate with researchers outside the department.

We look forward to answering any questions that you may have about our exciting CS program, our qualified faculty, and all the opportunities that UTEP has to offer.

GRADUATE PROGRAMS

Master of Science in Computer Science (MSCS)- The MSCS program provides a broad coverage of both theoretical and applied topics in computer science at the graduate level. In addition to a set of core requirements, students have the flexibility to pursue specific specialties by selecting from a variety of elective courses. Students may optionally choose to complete a thesis as part of their degree, working in close collaboration with a faculty mentor on cutting-edge research. Contact: **mscsadvisor@utep.edu**

Master of Science in Information Technology (MSIT)- The MSIT program focuses on the application of information and network technology for the enterprise. Students take a combination of technical coursework in computer science and management courses from the business school. The degree is appropriate for students seeking to pursue a career in information technology or management. Contact: **msitadvisor@utep.edu**

Master of Science in Software Engineering (MSSwE)- The MSSwE program is designed for graduates of Computer Science, Software Engineering, or other related undergraduate programs, as well as for software engineering professionals who want to advance their knowledge of the discipline and enhance their career prospects. Courses are designed to strengthen students' ability to learn and apply state-of-the-art practices, tools, and techniques. The MSSwE program also offers a ***Secure Cyber Systems (SCS) Track*** designed to produce graduates capable of building robust and secure software systems that are part of a complex cyber-physical system. The curriculum in the SCS-Track is based on the needs of entities such as the Department of the Homeland Security (DHS) and the National Cyber Security Division (NSCD), a division of the Office of Cyber Security & Communications. Contact: **mssweadvisor@utep.edu**

Doctor of Philosophy in Computer Science- The PhD program emphasizes deep technical mastery of computer science through rigorous advanced coursework, as well as training in research methods in computer science. Students work in close collaboration with a faculty mentor in their area of interest to conduct novel research, culminating in a dissertation. Contact: **csphdadvisor@utep.edu**

Graduate Certificate in Cyber Security- Students obtain this certificate by completing a concentration of security courses in combination with an MS or PhD degree. It is also open to professionals with a BS or graduate degree who are seeking advanced training specifically in cybersecurity. Contact: **cscert advisor@utep.edu**

RELATED PROGRAMS

Master of Science in Bioinformatics
http://www.bioinformatics.utep.edu/

Master of Science & Doctor of Philosophy in Computational Science
http://science.utep.edu/computationalscience/

The University of Texas at El Paso

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GRADUATE STUDIES

COMPUTER SCIENCE

www.cs.utep.edu/graduate

FACULTY

Omar Badreddin - software engineering, model-driven software design, cyber-physical systems design, and healthcare analytics

Martine Ceberio - constrained global optimization, constraint solving, applications of interval analysis, reasoning under uncertainty

Yoonsik Cheon - object-oriented specification, verification, development tools and languages

Eric Freudenthal - robust, high performance, self-organizing systems, and engineering and math education

Olac Fuentes - machine learning, computer vision, robotics, and natural language processing

Ann Q. Gates - software engineering, runtime software monitoring, formal specification, data integrity, collaborative research teams

M. Shahriar Hossain - data mining, big data analytics, machine learning

Luc Longpré - information theory applications, and computer security

Christopher Kiekintveld - artificial intelligence, multi-agent systems, game theory, security, trading agents

Vladik Kreinovich - interval computations, intelligent control, and reasoning under uncertainty

Salamah Salamah - formal methods for software assurance and software engineering process

Pat Teller - high-performance, parallel, distributed, power- and energy-aware computing; workload characterization; performance measurement, modeling, and analysis; performance-enhancing adaptations; I/O scheduling, including that associated with fault tolerance

Natalia Villanueva-Rosales - semantic web for data integration and exchange of scientific research, ontologies, question answering of scientific data

Nigel Ward - real-time responsiveness in spoken dialog systems, human-computer interaction

CENTERS

ARMY HIGH PERFORMANCE COMPUTING RESEARCH CENTER (AHPCRC)- The research conducted in this lab addresses some of the Army's most difficult scientific and engineering challenges using high performance and power-and energy -efficient computing, emerging technologies, algorithm development, simulation and analytical modeling. Current research aims to: (1) reduce the energy footprint of important battlefield applications, while producing timely output that facilitates decision making; (2) guide the design and operation of private computing Cloudlets that will serve mission critical operations; and (3) develop the services (application solutions) that will be provided by these Cloudlets via migration of applications to emerging technologies embedded in portable devices carried by Warfighters and fielded mobile computing platforms.

CYBER-SHARE CENTER OF EXCELLENCE - The mission of Cyber-ShARE Center of Research Excellence in Science and Technology is to advance education and research through cyber infrastructures that support information exchange and integration, as well as collaborative interdisciplinary research. The Center's cyber infrastructure (CI) efforts are focused on the following: 1) CI, computational science, and technology-enabled science research that link methods across multiple fields to support scientific data acquisition, integration, and analysis; and 2) CI, dissemination and training that focus on making CI products and tools accessible and usable.

CENTER FOR INFORMATION ASSURANCE- The Center has a portfolio of research projects in such areas as privacy-preserving databases and authentication and trust in distributed systems.

RESEARCH GROUPS

ADVANCE CYBER-PHYSICAL DESIGN AND ANALYTICS LAB (ACPDA)- The mission of the ACPDA is to innovate new design paradigms, notations, tools and techniques to address the emerging requirements of cyber-physical systems. The lab focuses on complexity management of hybrid systems, i.e., those that exhibit strong interdependencies between its software and hardware elements. Research topics include behavioral and structural modeling, testing under uncertainty, model-driven engineering, and model-based system engineering. Applications domain include mission-critical software systems, and healthcare informatics.

DISCOVERY ANALYTICS LABORATORY- The Discovery Analytics Laboratory (DAL) is engaged in research on knowledge discovery from big data. Specific research foci of this lab lie in the following areas: data mining and machine learning, text analytics, artificial intelligence, transfer learning, computational biology, and visual analytics. Along with the development of theoretical algorithmic frameworks, the lab builds prototypes to solve data mining problems in different disciplines. The research efforts include, but are not limited to, applications in biomedical science, biology, intelligence analysis, social network analysis, mechanical engineering, sustainability, and software engineering.

HIGH PERFOMANCE SYSTEMS LAB (HIPERSYS)- The research conducted in the HiPerSys lab, focuses on performance-enhancing adaptations, both static and dynamic, of high performance computer applications, operating systems, runtime systems, I/O subsystems, and computer architectures. In this case, the term performance encompasses execution time, resource utilization, power and energy efficiency, output accuracy, throughput, and latency guarantees. This research involves workload charac- terization, algorithm analysis and development, and performance measurement, modeling, and analysis.

INTERACTIVE SYSTEMS GROUP (ISG)- The research conducted in ISG focuses on models of interaction and the engineering of interactive systems, combining expertise in spoken language processing and in human-computer interaction. Current research projects are applying prosodic information for better information retrieval, for improved turn-taking in dialog systems, and in models of cross-cultural communication differences. A particular focus is the use of paralinguistic behaviors to improve the realism of embodied conversational agents.

INTELLIGENT AGENTS AND STRATEGIC REASONING LABORATORY (IASRL)- The goal of the IASRL is to develop intelligent autonomous agents that can reason strategically about complex decisions involving other agents and humans. The IASRL conducts basic research is in many areas of AI including optimization, game theory, learning, and reasoning under uncertainty. Other focus areas are on applications of intelligent agent technologies in areas such as homeland security, cybersecurity, and trading agents.

LINKING KNOWLEDGE ACROSS DISCIPLINES, DATA AND MODELS (iLink)- iLink interdisciplinary research aims to improve the efficiency and effectiveness of the discovery, integration, processing and interpretation of scientific data. iLink's current approaches link human and machine knowledge to address societally -relevant problems in the areas of biomedical informatics, environmental sciences, geosciences and climate change.

MEDIA-PROPELLED COMPUTATIONAL-THINKING (IMPACT)- The iMPaCT educational research group creates and evaluates educational learning modules that use the programming of low-level graphics to engage students in the exploration of mathematics and various dynamics phenomena. iMPaCT modules have been embedded into into a variety of introductory programming, mathematics, physics, and electrical engineering courses and collaborators include faculty from UTEP's college of Science, education, and business, El Paso public schools, NYU, and the US Military Academy at West Point.

ROBUST AUTONOMIC SYSTEMS GROUP- The students and faculty in the Robust Autonomic Systems group examine automatic techniques that provide performance scalability, and stability in dynamic contexts including partial system failure. Prior efforts have developed techniques for or related to distributing and updating authorization credentials, providing secure and timely communications with biomedical devices, adaptively modulating surveillance camera resolution, monitoring communications within military aircraft, and using virtualization to reduce the overhead of workstation maintenance.

REAL-TIME EMBEDDED AFFINITY LABORATORY (REAL)- The REAL research group focuses on enhancing research and practices that ensure the development of secure and reliable software systems that control complex cyber-physical systems. Particularly, the research focuses on identifying new techiniques, models, and processes that ease the use of formal validation and verification techniques for sorftware systems at earlier stages of development such as architecture and design.

SOFTWARE SPECIFICATION AND VERIFICATION LABORATORY (SSVL)- The SSVL research group aims to advance the practices that support development of correct and reliable computer programs. The focus is on formal methods–mathematically-based techniques for the specification, development and verification of computer programs–in the development of computer programs. The research aims to develop theories and techniques that are usable by practicing programmers with minimal mathematical background.

THEORETICAL RESEARCH AND APPLICATIONS IN COMPUTER SCIENCE (TRACS)- The focus of TRACS is on development of theory for useful applications. Areas of interest include data (and image) processing and decision making under uncertainty, constraints, and possible adversity, in particular in relation to online systems and cyber infrastructure. Current applications include the following: environmental research, geosciences, biomedical applications, security, and privacy, among others. Special areas of expertise include computer security, constraints, decision making, and interval uncertainty.

VISION AND LEARNING LAB (VLL)- The VLL group works on research aimed at developing solutions based on Machine Learning to challenging practical problems. Areas of particular interest include transfer learning from unbalanced datasets and intelligent optimization, as well as applications is computer vision, human-computer interaction, natural language processing and scientific data analysis.