Chair’s message

The Department of Computer & Information Sciences (CIS) is continuing its upward trajectory in education and research and is establishing itself as a national hub of excellence in the field of computing. Our 23 internationally recognized tenure-track faculty; 22 full-time instructional faculty; devoted adjuncts and staff; and more than 1,300 undergraduate, master’s and doctoral students are fueling this rise.

With externally funded research grants exceeding $3 million annually, we are making great research strides. Nearly all CIS tenure-track faculty have active research funding. During the past year, several new rankings showed our department is among the country’s top 80 computer science departments based on research output.

We recently revamped our undergraduate programs to provide students a stronger computer science foundation and to offer more opportunities to specialize in one or more specific sub-areas. We also revised our MS in Information Science and Technology program to allow graduates from non-computing fields to gain expertise and pursue careers in information technology.

We also thank our alumni and friends who have generously donated their ideas, time and funding to support CIS and make it even better.

Please do not hesitate to contact us with questions, suggestions and ideas. We will be happy to respond.

Slobodan Vucetic
Professor and Chair

cis.temple.edu

New faculty member

Kai Zhang, Associate Professor

Kai Zhang, a former research staff member at NEC Labs America, scientist at Siemens Corporate Research and guest researcher with Lawrence Berkeley National Laboratories, has devoted his research to big-data mining, machine learning, bioinformatics and time series/complex network modeling.

Zhang earned his PhD in computer science in 2008 from the Hong Kong University of Science and Technology and his master’s degree in pattern recognition from the Institute of Automation, Chinese Academy of Sciences. Zhang is a winner of the NEC Labs America 2016 Business Contribution Award and 2016 Best Paper Runner-up awarded by the ACM Knowledge Discovery and Data Mining special interest group.

His research in brain functional networks was an editor’s choice cover story in Brain: A Journal of Neurology. Currently, Zhang is collaborating with the largest brain initiative in China to uncover the underlying mechanism of the human brain network in information processing and various mental disorders.

Support Computer & Information Sciences and CST

You can contribute to the continued success of CST and the Department of Computer & Information Sciences by supporting scholarships, undergraduate research, faculty endowment and innovative programs. Make your gift at giving.temple.edu/givetocst.
No sophomore jinx for Kevin Esslinger

He may have been only a sophomore, but in April Kevin Esslinger spoke briefly before more than 80 computer science professionals, professors and graduate students at the annual European Lisp Symposium in Marbella, Spain.

Funded through CST’s elite Science Scholars Program, Esslinger will continue to work in both professors’ labs this summer.

Predrag Radivojac helps lead major health initiative at Indiana University

Predrag Radivojac, PhD ’03, is leading a team of researchers at Indiana University’s School of Informatics, Computing, and Engineering (SICE) who are collaborating with other IU researchers on a major interdisciplinary health initiative.

Radivojac is a professor and associate chair in the department of computer science and an adjunct professor of statistics at IU. His team, along with researchers from the IU School of Medicine, Indiana University-Purdue University Indianapolis and other IU Bloomington campus entities, are part of the Precision Health Initiative—a $120 million project to transform biomedical research, health care innovations and the delivery of health solutions in Indiana.

The initiative is focused on curing multiple myeloma, a form of cancer and Fanconi anemia, a childhood disease, as well as preventing gestational diabetes and Alzheimer’s disease—all by 2020. From analyzing a patient’s lifestyle to attacking therapies to specific human cells.

“It was pretty nerve wracking, but a lot of people came up afterwards and said they liked what I was doing,” says Esslinger, who has a nearly perfect GPA. “It was awesome.”

Under Professor Slobodan Vucetic, the dual computer science and mathematics major is also helping to use machine-learning techniques and deep neural networks to predict National Basketball Association scoring probabilities.

Funded through CST’s elite Science Scholars Program, the Allentown, Pennsylvania native will continue to work in both professors’ labs this summer.

“All of my CIS professors are really incredible and supportive,” says Esslinger. “They really want you to learn and always take extra time out of their day to help you.”

Liang Du leads development of major Microsoft AI workplace safety product

Liang Du, PhD ’15, a principal applied scientist manager with Microsoft, is leading a team of researchers that have developed a new artificial intelligence (AI) product that utilizes surveillance cameras and computers to enhance workplace safety.

The product, AI for Workplace Safety, was the focus of Microsoft CEO Satya Nadella’s keynote address at the company’s annual Build developers conference in Seattle last May. Earlier, according to Du, it drew the praise of Microsoft founder Bill Gates.

“He said, ‘The work is amazing,’ recalls Du. “To work on something that you feel is important, and then to have the founder of this great company praise your work, was magical.”

While earning his doctorate in computer science under his advisor, Associate Professor Haibin Ling, the native of Wuhan, China, focused on computer vision. “Computer vision enables computers to see,” says Du. “Any artificial intelligence system needs computer vision to allow computers to make sense of the visual, physical world, to know what is happening there, who is there and what objects are there.”

Du credits his work with Ling for elevating his Temple experience. “The research we were doing was state of the art. We published our research on the best facial recognition system in the world at that time,” says Du. “That experience helped me get my Microsoft job and gave me the foundation to succeed with the workplace safety project I’m still working on.”

The program utilizes a new concept that combines the analytical power of both Microsoft’s Cloud and local computers to interpret, in real time, what the surveillance cameras are seeing.

For example, if the cameras detect a top-heavy jackhammer precariously leaning against a workbench, the system can use facial recognition to immediately notify, via smartphone, a worker in the room. The technology also can issue alerts if someone is where they shouldn’t be or is using equipment they are not qualified to use.

Similarly, if a recovering heart surgery patient is detected walking too far in a hospital hallway, a nurse would be alerted—and informed where the nearest wheelchair for the patient is located.

“We’re working on something that may change the way people work,” says Du. “Many disasters or accidents will be prevented, or at least mitigated, with this kind of system, which can be installed anywhere.”
John Nosek’s GAINS software advances autism therapy

A 10-year quest by John Nosek, professor of computer and information sciences, has resulted in new software that advances early-intervention autism therapy. For it to be most effective, labor-intensive Applied Behavior Analysis (ABA) treatment must be delivered early in life, and that process must be consistent and must build on previous successes. This has been difficult to achieve, because ABA for autism has been paper-based and solely human dependent, and ABA therapists have high turnover rates.

Nosek’s solution: GAINS, the Guidance Assessment and Information System. GAINS incorporates knowledge of the ABA process, instructor and student to provide real-time process and decision support for instructors. Slobodan Vucetic, CIS chair and professor, and his team are data mining the high-quality data captured by GAINS to customize therapy and improve success rates.

GAINS acts as a virtual assistant for ABA therapists. Instead of having to look back through voluminous binders to determine a child’s progress or try to pick up on where another therapist left off, GAINS tells the therapist what skill to work on next and makes decisions in real time about the best therapy session sequence. “The real problem [with ABA] was a lack of well-qualified instructors to consistently provide therapy,” Nosek said. “We needed to build an agent-based system that guides instructors, including parents and family members, step-by-step to provide quality ABA therapy.”

Years of testing included user-experience research at a local autism treatment center that showed a 50 percent increase in performance with GAINS. Finally, GAINS was launched last year by Guiding Technologies (GT), a Temple spinoff company that is commercializing the technology. Recently, the National Science Foundation (NSF) awarded an additional $150,000 to integrate GAINS into Individual Education Plan (IEP) software. This brings NSF funding for GAINS to $1.4 million. Ben Franklin Partners, Independence Blue Cross and Safeguard Sciences have together invested an additional $500,000.

Bo Ji’s NSF CAREER award tackles next-generation wireless technology

Bo Ji, assistant professor, has been awarded a five-year NSF CAREER grant worth nearly $500,000 to develop theories and algorithms for the efficient control of wireless networks.

With the advent of smart devices and the internet, wireless technology has spawned a plethora of services that span business, science and engineering, entertainment, safety and security, health monitoring, and cover a large portion of our social interactions. Due to the prevalence of these new services, today’s wireless networks are witnessing not only an unprecedented growth in the volume of traffic, but also a significant change in the types of traffic—such as much higher percentage of voice/video traffic with more stringent delay requirements.

“These new trends require next-generation wireless networks to simultaneously provide not only very high data rates but also ultra-low, sub-millisecond delays. In addition, the control algorithms of such networks need to be of low complexity in order to be implemented,” says Ji. “How to do this remains largely open.”

Meanwhile, Ji is also working on a two-year NSF grant worth more than $170,000 to develop theories and algorithms to optimize the timeliness of information-update systems. “The research on timeliness optimization is still at its nascent stage,” he says. “New theoretical results and practical solutions coming out of this project are expected to have a significant impact not only on information theory and networking community, but also on databases and machine learning community.”
LOCAL HACK DAY attracts even more college students

The second annual Local Hack Day hosted by CIS students drew 50 percent more college students from the region than the inaugural event in 2016. About 150 students from Temple, the Community College of Philadelphia, the University of Pennsylvania and Drexel and West Chester universities participated in the 12-hour technology hackathon. Working together in groups of four students, they created projects and as web and mobile apps or hardware hacks.

The event’s title sponsor was SEI Investments. Additional sponsors included Captech, Elsevier, Guru, Unisys and Vanguard. Some of the sponsors employees who are alumni of the participating academic institutions helped with the event, as did faculty and staff of the College of Science and Technology and the CIS Department.

TECHGIRLZ: CIS students host two events

The Temple student chapter of the Association for Computing Machinery (ACM) hosted two Techgirlz events at Temple last year. Techgirlz is a nonprofit group dedicated to reducing the gender gap in technology occupations by staging workshops that demonstrate available opportunities.

A total of 20 middle school girls attended the two workshops. Under the guidance of Temple ACM chapter members and its faculty advisor, Instructor Claudia Pine-Simon, in April students worked in teams to develop a mobile app. In December, the students were introduced to Microsoft’s free Touch Development platform, which enabled them to learn programming skills and create a game that could be played on mobile devices.