

Computing Facility to Receive Extreme Makeover

1 ITTC's Bioinformatics Computing Facility (BCF) will receive a 20-fold boost in computing power thanks to a \$4.6 million grant from the National Institutes of Health (NIH). The new "green" renovation will utilize heat generated from the computing hardware to supplement the building's heating infrastructure.

"This is a superb example of a win-win," said KU Chancellor **Bernadette Gray-Little**. "Investigators on the cutting edge of biological research will have much more robust computing at their command and see that their research is energy efficient and sustainable—a priority for our campus."

ITTC researchers will renovate more than 3,500 square feet on the first and second floors of Nichols Hall. A sophisticated computer-rack cooling system will shuttle heat from computing equipment into the boiler room, resulting in an expected 15 percent reduction in natural gas use for Nichols Hall.

"We are confident that the renovated core facility will prove to be an exemplary centralized computational resource," said ITTC investigator **Jun "Luke" Huan**, assistant professor of electrical engineering and computer science, who spearheaded the project. "It will be well-positioned to meet the ambitious data analysis needs of KU biomedical research and to dynamically respond to future computational challenges."

Current research conducted at BCF includes predicting the misfolding of proteins that contributes to Alzheimer's, Parkinson's and other neurodegenerative diseases; sequencing genomes and data mining of emergent chemical genomics databases.



ITTC investigator Jun "Luke" Huan stands in front of ITTC's Bioinformatics Computing Facility (BCF). Huan spearheaded the NIH proposal to renovate and expand the facility, enabling a 20-fold increase in computing power.

"The existing BCF is running at capacity, supporting more than 50 research projects and 10 core service laboratories," said ITTC Director **Perry Alexander**. "Researchers from across KU participated in this proposal. It was a university-wide effort to increase high-performance computing capacity while focusing on sustainability and energy efficiency."

The renovations will enable additional KU researchers and Kansas businesses to access high-performance computing resources. ■

“As a Midwest native and small business owner, I understand the importance of creating and keeping high-tech jobs in the state. ITTC is working hand-in-hand with the Kansas Technology Enterprise Corporation (KTEC) network and others to make the commercialization process easier and more efficient. We want our technologies out of the laboratories and into the hands of Kansas entrepreneurs.”

—ITTC Director Perry Alexander

New ITTC Director Emphasizes Commercialization

An experienced professor and researcher who helped the University of Kansas gain federal recognition for its cybersecurity work has been named director of ITTC, effective immediately. **Perry Alexander**, professor of electrical engineering and computer science, has served as ITTC interim director since October, 2009.



Perry Alexander

“ITTC is an important research and commercialization program at KU,” said **Steve Warren**, vice provost for research and graduate studies.

“Perry is an excellent choice to direct this center. His work with the National Security Agency and the Department of Homeland Security to obtain designation for KU as a National Center for Academic Excellence in Information Assurance Education is just one example of his research skills and leadership abilities.”

Alexander is the principal architect of Rosetta, a system-level design language that allows different parts of electronic systems to communicate with each other. The technology was spun-off in 2001 as a Kansas start-up company—Cadstone, LLC—that is now a Lawrence-headquartered small business.

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Under Alexander, ITTC researchers will continue to focus on the center’s core mission: the integration of research, education and technology commercialization. The development of new faculty and an improved response time to novel research opportunities are among his top priorities.

Alexander served as director of ITTC’s Information Assurance and Computer Systems Design labs before accepting his interim appointment. He succeeded Joseph Evans, the Deane E. Ackers Distinguished Professor of EECS, who is taking a leave of absence from KU to continue his entrepreneurial work on the Tactical Ground Reporting System for the federal government. ■

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ITTC Student Researchers Garner NSF, Google Awards

Megan Peck, a doctoral student in computer science, received a \$30,000 National Science Foundation fellowship this spring through its Graduate STEM in K-12 Education (GK-12) program. The GK-12 program supports partnerships between future scientists and science, technology, engineering and mathematics (STEM) teachers. In collaboration with partner teachers at Landon Middle School in Topeka, Peck will develop interactive demonstrations and other STEM-based projects.

"Megan is an ideal candidate for helping us build this bridge between scientists and the public," said **Steven Case**, who is coordinator of KU GK-12. "A native Kansan, Megan is someone whom students will identify with. She is smart and articulate and understands that we must find new ways to capture and challenge students' natural curiosity about the world around them."

The GK-12 fellowship supports her research in ITTC's Computer Systems Design Lab. Peck is focusing on mathematical applications to better define Rosetta software. Rosetta enables faster and more accurate production of electronics.

Angela Oguna, a senior in electrical engineering, is the first KU student to win a prestigious Google Anita Borg Memorial Scholarship. In May, Oguna was one of 32 exceptional female students to receive a \$10,000 scholarship for 2010-2011.



ITTC students Angela Oguna, left, and Megan Peck received national awards this spring.

The Anita Borg Institute for Women and Technology and Google created the scholarship to encourage women to pursue careers in technology and to become leaders in their fields.

At ITTC, Oguna tests sensors that monitor cargo en route as part of a theft detection system. ITTC's Transportation Security SensorNet (TSSN) provides greater visibility and security of goods along the supply chain. ■

Pioneering Telemetry Research Leads to Elite Partnership

In recognition of KU's efforts to improve the science of telemetering—measuring at a distance—the International Foundation for Telemetering (IFT) has donated \$60,000 to KU and named it a partner university. A nonprofit organization, IFT promotes the interests of telemetering by sponsoring conferences, educational activities and publications.

The IFT donation will fund three fellowships for graduate students, purchase lab equipment and support students

traveling to conferences. As one of only six IFT partner universities, KU can present additional proposals at annual IFT board meetings. ITTC will host the next IFT board meeting.

"We are extremely honored to form this partnership with the IFT," said ITTC researcher **Erik Perrins**, who detailed KU's telemetry-related programs at the IFT board meeting in May. "We are excited to host the IFT board next spring and let the board members see our engineering programs up close." ■

Kulkarni Receives Prestigious NSF CAREER Award

I TTC investigator **Prasad Kulkarni** has won one of the most esteemed National Science Foundation honors given to junior faculty members. The multiyear Faculty Early Career Development (CAREER) award will support Kulkarni's ongoing efforts to build more secure and better performing software systems.



Prasad Kulkarni

"These highly selective grants are awarded to junior faculty members who are considered to be academic leaders of the future. Prasad is a dedicated researcher and highly deserving of this honor, and his work is critical to our national prominence in cybersecurity," said ITTC Director **Perry Alexander**. "Additionally, we are delighted to have three researchers in the last four years receive CAREER awards. [**Xue-wen Chen** and **Jun "Luke" Huan** received CAREER Awards in 2007 and 2009, respectively.]

Our younger faculty members are being recognized for their pioneering research and effective integration of scholarship and teaching."

At ITTC, Kulkarni is developing a more secure and efficient framework for virtual machines (VMs), which ensure compatibility between applications and the devices running them. Cell phones, PDAs and computers are among the billions of devices that have VM software running Internet programs and applications. To limit the cost and start-up time, current VMs apply basic security checks. Devices are then left vulnerable to viruses and other malicious software that can corrupt and steal private data—from passwords to address books.

Kulkarni's new VM framework will reduce the overhead of monitoring and security tasks and allow more secure and efficient execution of future programs. ■



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