CS@K-STATE

COMPUTER SCIENCE | SUMMER 2017 | COLLEGE OF ENGINEERING

KANSAS STATE UNIVERSITY

FROM THE DEPARTMENT HEAD

The 2016-17 academic year has been another great year for computer science at K-State. It marks the seventh consecutive year of growth in our undergraduate program, with an amazing 26 percent increase. In fall 2016, the department had 628 undergraduate, 33 master's and 46 doctoral students. However, we also graduated 83 students, which is almost double the largest CS class in recent memory.

The first year of our new CS Scholars Program is in the books. According to all reports, it was a resounding success. Twenty-two scholars completed their first year and we are expecting a full class of 30 new scholars this fall. Overall, the scholars program distributed more than $24,500 in scholarships and financial assistance, thanks to our corporate partners Tradebot and Boeing, and the generosity of Don and Cleo Mounday through the Don and Cleo Mounday Scholarship Fund. Outside of their normal classes, our students have stayed busy in several clubs and competition teams. This year our Cyber Defense Club went to two cybersecurity competitions, winning the CANSec Invitational Cyber Defense Competition for the second year in a row and placing second to the University of Illinois at Argonne National Laboratory's Cyber Defense Competition 2017.

As usual, the faculty continues to impress as well. John Hatcliff was awarded the Lucas-Rathbone Professorship in Engineering, established by Michelle Munson and Serban Simu. In addition, we also awarded four Keystone Research Scholars to two existing faculty, Pavithra Prabhakar and Eugene Vasserman, and two new faculty, George Amariucai and Arslan Munir. The goal of the Keystone Research Scholars Program is to recruit and retain top scholars into CS. Pavithra Prabhakar was also awarded a prestigious Young Investigator Program (YIP) award from the office of Naval Research. Her CAREER award last year, coupled with her YIP award this year, places Pavithra in an elite class of young faculty members nationwide. And finally, Julie Thornton was awarded the Clair A. Mauch Steel Ring Advisor of the Year Award for excellence in student advising. Julie is one of our own (B.S. 2003, M.S. 2005), and has been an instructor and academic adviser in the department since 2005. All these awards were well deserved.

Overall, 2016-17 was a great year for the CS department. If you are interested in getting more involved with or supporting the department, please let us know.

Scott DeLoach
Department head and professor

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is published by the department of computer science in the Kansas State University College of Engineering, 2184 Engineering Hall, 1701D Platt Street, Manhattan, KS 66506. It is available on the web at cs.k-state.edu.

Summer 2017
Editing and design . . . . . Engineering Communications
Contributing to content . . . . . K-State Communications and Marketing, Wes Agresta, Argonne National Laboratory

HOW IT ALL BEGAN

ROOTS OF THE K-STATE CYBER DEFENSE CLUB

During the summer of 2011, Xinming Ou, former computer science assistant professor, and Alex Bardas, a doctoral student in computer science at that time, started the Cyber Defense Club, or CDC, project at K-State. The initial goal was to teach students critical knowledge and skills needed to administer and defend computer networks and systems.

The project included developing the curriculum for a one-credit-hour Cyber Defense Basics class, teaching the class, building a cyber defense laboratory for teaching and research purposes, and starting a security club that would participate in and organize cyber defense competitions.

Over the years, the project was strongly supported by CIS/CS department heads, Gurdip Singh and Scott A. DeLoach. Many good ideas and much help were provided by the department's systems administrator, Seth Galitzer, and hardware analyst, Earl Harris.

Between 2011 and 2014, all CDC project-related activities were coordinated by Bardas under Ou's guidance and supervision. In 2014, the competition-side of the Cyber Defense Club project was turned into a self-standing academic club, currently funded by various on-campus entities such as the College of Engineering and Student Government Association, to participate on a regular basis in cyber defense and capture-the-flag type competitions. Starting in 2015, Eugene Vasserman, CS associate professor, became faculty adviser for the Cyber Defense Club.

The Cyber Defense Basics class is based on hands-on penetration testing and defensive activities performed in a controlled environment, giving students the basic background and understanding about well-known techniques and tools used in the current cybersecurity landscape. This helps students "speak the same language" before attempting to join the competition team.

Since 2011, Alex Bardas has taught or has been involved in teaching the Cyber Defense Basics class, but in fall 2017, Chandan Chowdhury, CS doctoral student, will take over those duties, as Bardas has accepted a position at KU as an assistant professor in its EECS department.

CYBER DEFENSE CLUB TAKES SECOND IN NATIONAL EVENT

Kansas State University's Cyber Defense Club has earned top-tier recognition from Argonne National Laboratory. Six members of the club tied for second place at the laboratory's second Cyber Defense Competition on April 1 in Lemont, Illinois. The competition included 15 teams from colleges and universities across the country. The K-State team shared the second-place honor with Dakota State University, while the University of Illinois took first place.

Competing at the event were the following K-State students: Jordan Voss, sophomore in computer science, Hays; Lance Pettay, senior in computer science, Hutchinson; Richard Petrie, master's student in business administration, Lenexa; Nathan Hood, freshman in computer science, Olathe; Logan Prough, sophomore in computer science, Olathe; and Matt Webb, master's student in computer science, Colorado Springs, Colorado.

"I'm very proud of our team," said Petrie, president of the Cyber Defense Club. "I am especially proud that we maintained a positive attitude, even when things started to go wrong. Our team fixed any problems, patted each other on the back and kept working. Mistakes are a part of competition. You fix them, learn from them, and keep working to accomplish the task."

The competition included a staged real-life scenario. Collegiate teams — called blue teams — had three weeks to create and design a cyberdefense network for a green team, which represented a utility company and its employees and customers. The collegiate teams set up their systems at Argonne National Laboratory, where a red team of professional hackers tried to infiltrate and disrupt the cybersecurity networks designed by the collegiate teams. The students had to defend their networks from cyberattacks while still providing services to the green team.

The collegiate teams were scored based on the security of their network as well as the accessibility of their services to members of the green team.

PHOTO COURTESY WES AGRESTA, ARGONNE NATIONAL LABORATORY

The Cyber Defense Club has 26 members for the 2016-17 school year. All members regularly train for competitions and contribute to the success of the team members who attend, said Eugene Vasserman, associate professor of computer science and faculty adviser to the club.

"I am proud of the team's success at the latest national competition, which followed several weeks of preparation, training and hard work from all club members," Vasserman said. "We would not be able to maintain our strong competition track record without the involvement of everyone in the Cyber Defense Club. Through guest speakers, training sessions and education activities, our members challenge each other to improve their skills and knowledge of cybersecurity. Our success is truly a team effort."

For more information about Argonne National Laboratory's Cyber Defense Competition 2017, visit cyberdefense.anl.gov.

NEW FACULTY

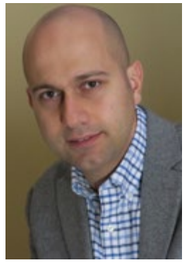
Arslan Munir joined the computer science, or CS, department as a tenure-track assistant professor in June 2017. Previously, he had been a tenure-track assistant professor in the department of computer science and engineering at the University of Nevada, Reno, as well as a postdoctoral research associate in the electrical and computer engineering department at Rice University in Houston.

He received his master's degree from the University of British Columbia in 2007 and his doctorate from the University of Florida in 2012, both in electrical and computer engineering. He also worked as a visiting graduate research student at the University of Toronto for one semester during his doctoral studies.

A recipient of many academic awards, Munir holds gold medals for best performance in electrical engineering, academic Roll of Honor and doctoral fellowship from the Natural Sciences and Engineering Research Council of Canada. He has published more than 35 scholarly articles related to his research interests, and recently published a book on modeling and optimization of parallel and distributed embedded systems in Wiley-IEEE.

Munir is a founding director of K-State's Parallel Reconfigurable Architecture and Distributed Embedded Systems Laboratory, and is involved in various research projects including efficient algorithms and hardware architectures for mobile radiation detection and isotope identification, fog-assisted sensing and analytics architecture for high-throughput phenotyping.

He received a $175,000 Computer and Information Science and Engineering Research Initiation Initiative award last year from the NSF for design of secure and dependable, next-generation, automotive cyber physical systems.



George Amariucai will join the department of computer science at K-State in fall 2017 after serving at Iowa State University since 2009, first as an adjunct assistant professor and then as an adjunct associate professor.

His research interests lie in the area of cyber security, and its intersections with probability and information theory, cryptography, machine learning, and wireless communications. He has been awarded four NSF grants and one NSA grant, totaling close to two million dollars, for cybersecurity projects focused on unconventional secure key establishment, community-enhanced authentication and procedural-learning-based user authentication.

He has sponsored and advised multiple graduate and undergraduate students, and published more than 25 articles in various prestigious journals and conferences. One of his more recent research interests is exploring interactions between the area of cyber security, and social and behavioral sciences.

Amariucai is also passionate about teaching and is an advocate of the hybrid classroom paradigm. In 2015, he received an undergraduate teaching award from Iowa State University's department of electrical and computer engineering. He has taught multiple graduate and undergraduate courses, on campus and online, with enrollments ranging from 10 to 350.

He received his doctorate from Louisiana State University in Baton Rouge, and his master's and bachelor's degrees from the Polytechnic University of Bucharest, Romania. He came to the United States in 2004, and is an enthusiast of the outdoors and the American Midwest.

OPTIMIZING AUTONOMOUS AUTOS

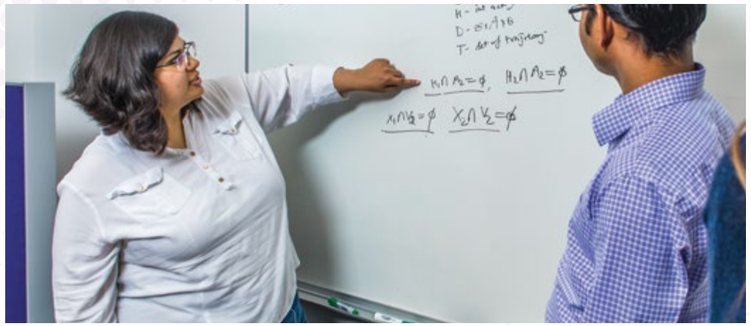
COMPUTER SCIENTIST RECEIVES YOUNG INVESTIGATOR AWARD

Self-driving cars, robotic vacuum cleaners and thermostats exemplify the kind of autonomous systems research that played a role in a Kansas State University faculty member receiving a Young Investigator Award from the Office of Naval Research's Science of Autonomy Program.

The approximately $500,000 award will allow Pavithra Prabhakar, associate professor of computer science, to design software for small vehicles — under 3 feet tall — that have varying levels of autonomy. Some will rely completely on their own sensors and programming to make decisions, while others will incorporate human intervention for direction, speed and responses to environmental factors.

Prabhakar's project will focus on two challenges: robustness, which is measured by the vehicle's ability to adjust to changes in the environment, and optimality, measured by the vehicle's ability to conduct its tasks with as little fuel and time as possible.

"Robustness is important when vehicles are being sent into potentially changing landscapes and seascapes, especially



if there is a current in the water where aquatic vehicles are operating," Prabhakar said. "Optimality is necessary not only for efficiency but also for safety because speed in dangerous areas can make the difference of whether the vehicle is able to complete its mission."

Prabhakar said her research may be important to the U.S. Navy because autonomous underwater vehicles can explore and photograph areas of the ocean floor where the Navy may not want to send humans. Other branches of the military may use autonomously driven unmanned aerial vehicles to fly over dangerous disaster areas and send information back to human decision-makers.

"In military applications, autonomy is especially crucial when human intervention could put people at risk," Prabhakar said. "On the consumer side, there will certainly be more and more autonomous systems, and the challenge is how can these systems be made more affordable so they are more widely available."

Prabhakar was one of six College of Engineering faculty members to be named as a Michelle Munson-Serban Simu Keystone Research Faculty Scholar in January. She also has received the National Science Foundation CAREER Award, a Summer Faculty Fellowship from the Air Force Research Lab and the Marie Curie Career Integration Grant from the European Union.

COMPUTER SCIENCE STUDENT NAMED

2017 Cargill™ Global Scholar

Nathan McClain, a rising sophomore majoring in computer science and physics, has been selected as a 2017 Cargill Global Scholar.

The Cargill Global Scholars Program, a distinctive international scholarship program that began in 2013, offers a scholarship award of $2,500 per year for up to two years.

In addition to scholarship funding, McClain will join the nine other scholars selected for the program's fifth cohort in the U.S. for a three-day leadership development seminar in late June at Cargill Headquarters in Minneapolis. During the seminar, scholars will receive training in a variety of business and leadership skills, tour Cargill's Food Innovation Center and get to meet Cargill business leaders who will serve as their mentors for the next year. In the summer of 2018, McClain and his fellow U.S. cohort members will participate in a five-day global leadership seminar with scholars selected for the program from Brazil, China, India, Indonesia and Russia.

Students selected as Global Scholars are those who demonstrate exemplary academic achievement and leadership potential, and study in a field relevant to Cargill's world of food, agriculture and risk management.

McClain is the seventh Cargill Global Scholar finalist to come from K-State since the program began.

For more information about the Cargill Global Scholars Program, visit www.cargillglobalscholars.com.

CS SCHOLARS PROGRAM

Tradebot made its first presentation to CS Scholars of 2017, and mentors from the company met with mentees to help guide and develop their industrial skills.

In the first year of the program, the department of computer science has distributed $24,500 in scholarships and financial assistance. This breaks down to $4,500 in direct scholarships and $20,000 in Freshman Fellowships. Annual contributions of $10,000 from Tradebot and Boeing, and funds from the Mounday Scholarship Fund, supported this investment in students.

Congrats, graduates!

Doctor of Philosophy in Computer Science

Spring 2017
Pavel Janovsky
Joshua Weese

Master of Science in Computer Science

Fall 2016
Nicholas A. Boen
Abhishek Challa
Ying Chen
Pramod Kumar Gudipati
Keerthi Korivi
Sowmya Mathukumalli
Tyler Edward Robinson

Spring 2017
ChandraVyas Annakula
Shubh Chopra
Anamika Nupur Choudhary
Chaney L. Courtney
Shravan Dammannagari Gangadhara
Aruna Sai Kannamareddy
Swapnil Kumar
Uma Maheshwar Reddy
Mandadi Venkata
Dhananjay Mehta
Muhammad Sajidur Rahman
Oleksandra Sopova
Varun Varshney
Nikitha Vootla

Summer 2017
Michael John Mccall

Master of Software Engineering

Fall 2016
David Buryl McWaters

Spring 2017
Blake Michael Knedler
Quan Kong
Tracy Dalane Marshall
Keith Moyer

Bachelor of Science in Computer Science

Fall 2016
Austin Alan Boerger
Michael John Bradshaw
Alex Donnelly
Jacob Hull Ehrlich
Zhiang Fan
Christopher David Gieringer
Seth Wayne Gruver
Dominik Vincent Haeflinger
Daniel Arlon Jones
Joung Kim
Pavel Kuropatkin
Phong Trieu Le
Donovan Alan Mitchell
Yashkumar Nareshbhai Patel
Joshua Reed
Brandon Thomas Runyan
Gui Xian Say
Adam James Seiwert
Jonathon Edward Kyle Terry
James Blades Tyson
Wyatt David Watson
Matthew Bryan Wilderson
Jia Wen Wong
Shanshan Wu
Yue Xie
Kai Zhang

Spring 2017
Landon Sidney Breckenridge
Robert Stewart
Daniel Josh Bamba
Joshua G. Benard
Connor Berg
Logan Ty Brecheisen
Allan Jay Morales Cabanatuan
Kevin Carr
Zachary Alan Cleary
Shawn Contant
Jordan Timothy DeLoach
Clyde James Dopheide
Austin Christopher Elliott
Xin Fang
Austin Paul Fangman
Dylan Andrew George
Hunter Brandon Goddard
Jonathan Michael Gooden
Alexander Cameron Devereux Henley
McKenzie Renee Hine
Joshua Andrew Hock
Christian Jason Hughes
Brent Andrew Johnson
Nicholas James Johnson
Kathryn Kristiansen
Robert Casey Lafferty
Andrew Jacob Leigh
Tyler Christian Gauge Lentz
Mark Alan Loevenstein
Andrew James Massey
Sagar Mehta
Joseph Mills
Joseph Richard Perkins
Corey Porubsky
Joshua Edward Richtarik
Aaron Willis Schif
Zachary Dale Sliefert
Benjamin E. Stegeman
Jeremy Ryan Taylor
Zachary Charles Terwort
Blake Edward Winchester
Hayden Robert Woods

Summer 2017
Eric Carl Johnson

Bachelor of Information Systems

Fall 2016
Alexandre Adams
Patrick Neil Hutfless
Jerry Robert Losey
Robert McDevitt
Ifeanyichukwu Rex Otuonye
Richard Allen Petrie
Matthew Thomas Traudt

Spring 2017
Steven Blits
Miriam A. Cox
Andrew James Darrow
Jake Macek
Jacob Michael Thomas Moulin
Ryan Allen Rutledge

Summer 2017
Zachary Noble Smith

COMPUTER SCIENCE OPEN HOUSE 2017

The 95th annual Engineering Open House was March 31-April 1, 2017. Departmental highlights included a Wonka-themed skit; many displays and demonstrations; a CS St. Patricia nominee, Miriam Feldhausen; and CS faculty member, Julie Thornton, being named Clair A. Mauch Steel Ring Advisor of the Year.

COLLEGE AWARDS KEYSTONE RESEARCH SCHOLARS

The impact of faculty research plays a major role in establishing the reputation of a college and university.

This belief propelled the College of Engineering to establish the Keystone Research Scholars Program to recruit and retain top scholars, who though in the early stages of their academic careers, are in high demand for faculty positions throughout the country.

Based on previous records of outstanding research accomplishment, two computer science faculty were nominated by Scott DeLoach, department head, for these positions.

Pavithra Prabhakar, assistant professor, and Eugene Vasserman, associate professor, will receive a three-year appointment with a salary increase and discretionary funds to support travel, specialized equipment and additional graduate students to join their research teams.

Funded by a gift from Michelle Munson, 1996 electrical engineering graduate, and her husband, Serban Simu, the first six recipients have been named as Michelle Munson-Serban Simu Keystone Research Faculty Scholars. Four additional Keystone Research Scholars will be announced at a later date.

KANSAS STATE UNIVERSITY

COMPUTER SCIENCE ENHANCEMENT FUND

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❑I/We have provided for K-State in my/our will.

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