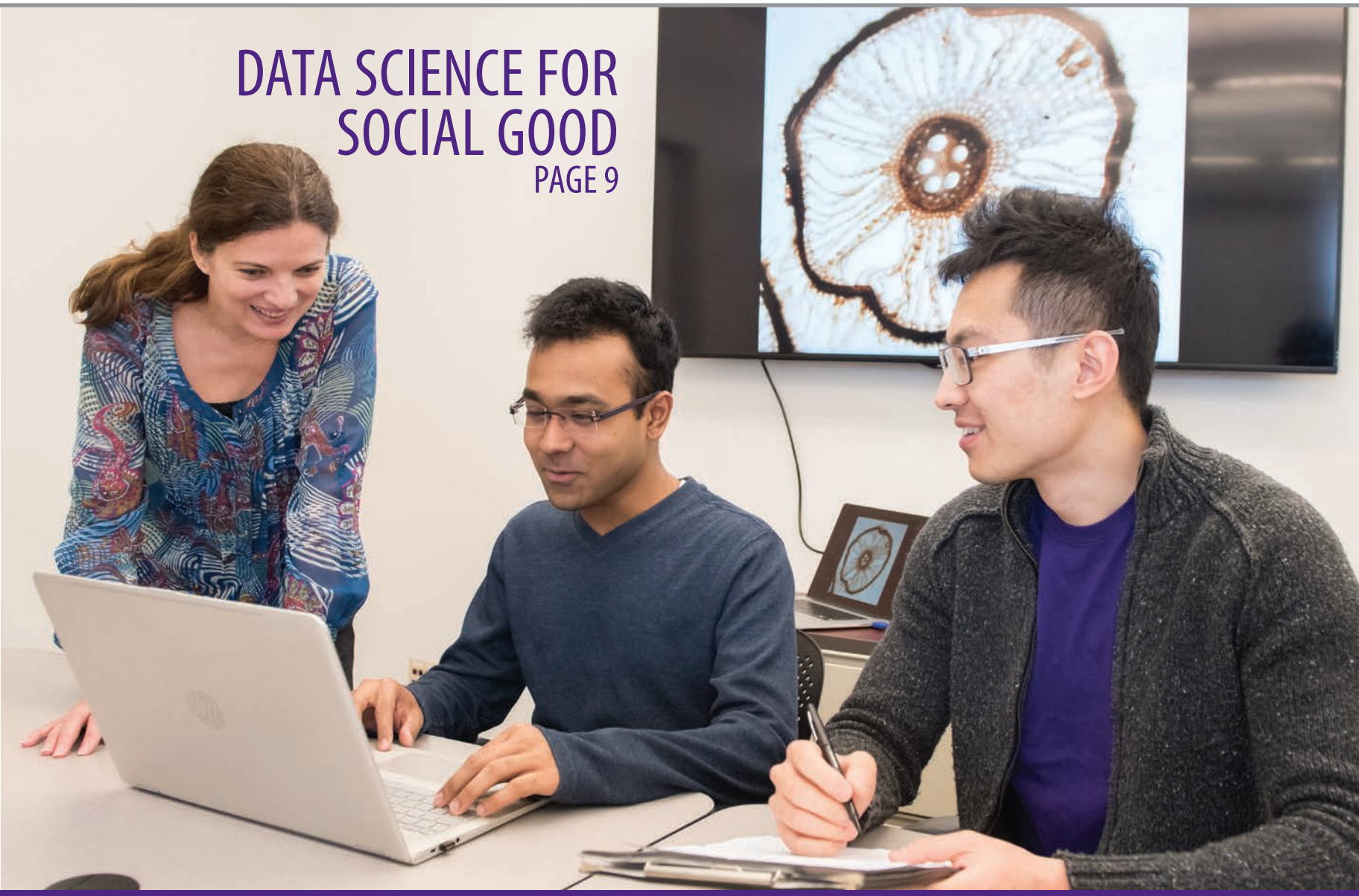
CS@K-STATE

COMPUTER SCIENCE SUMMER 2018 COLLEGE OF ENGINEERING

DATA SCIENCE FOR SOCIAL GOOD

PAGE 9



KANSAS STATE UNIVERSITY

FROM THE DEPARTMENT HEAD

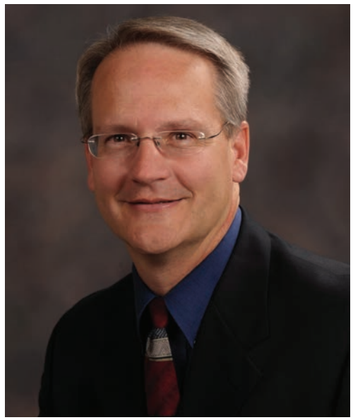
It's a great day to be a K-State computer scientist! That is how I start off almost every talk I give to students, alumni and industry partners these days. Why you ask? Because it is unequivocally true! We have made tremendous progress in our academic programs, student activities, research and faculty development. Add to that the tremendous job opportunities and salaries for our graduating students, and our outlook could not be any brighter.

While enrollment dipped slightly this year from 700 to 640 students, this was primarily caused by a record graduation in 2015-16 and an increase in academic admission standards, both positive directions for the department. But, while we graduated another record class this year (approximately 100), we also expect admissions to increase again.

We now have two cohorts of CS scholars on campus (with a third coming this fall) and they are doing very well. We added four new partner companies this year: Betsol, C2FO, Cerner and Netsmart. These, along with founding partner Boeing and the Don and Cleo Mounday Scholarship Fund, provided scholarships that totaled more than $22,000 this year.

Our students once again have done a tremendous job and several have been recognized for their efforts. Maria Fernanda De La Torre Romo, a senior from Kansas City, was recognized for her research excellence with the Kansas State University Award for Distinguished Undergraduate Student in Research. Maria has worked under William Hsu since fall 2015 and published several research papers along the way. Our Cyber Defense Club also continued to excel in national competitions, placing second at the 2018 National Cyber Defense Competition at Iowa State University.

We added four top-quality teachers and researchers to our faculty this year: Josh Weese – teaching assistant professor (K-State, 2017), Cornelia Caragea – associate professor (Iowa State, 2009), George Amariucai – associate professor (Louisiana State, 2009) and Arslan Munir – assistant professor (University of Florida, 2012). Among them, they bring 16 years of faculty experience, 160 publications and more than $5 million in research grants.



Our faculty also received several prestigious awards this year. John Hatcliff was awarded the 2018 Engineering Distinguished Researcher Award, which is presented by the college for consistent research excellence over a career. John is only the third College of Engineering faculty member to receive this award. In addition, two faculty members received endowed chair positions as recognition of their excellence in research. Pavithra Prabhakar was awarded the Peggy and Gary Edwards Chair in Engineering, while Cornelia Caragea was awarded the Lloyd T. Smith Creativity in Engineering Chair. Finally, thanks to a generous gift from Michele Munson and Serban Simu, we named four Keystone Research Scholars — Cornelia Caragea, Doina Caragea, George Amariucai and Arslan Munir.

2017-18 was another banner year for computer science at K-State. If you are interested in getting more involved with or supporting the department, please let us know. And remember, it's a great day to be a K-State computer scientist!

Scott DeLoach
Department head and professor

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COMPUTER SCIENCE SUMMER 2018 COLLEGE OF ENGINEERING

ABOVE: Shanshan Zhang works to develop an Android-augmented reality application.

ON THE COVER: Professor Doina Caragea and students work in the Machine Learning and Data Science Lab.

IN THIS ISSUE

EDUCATION
EXCELLENCE
RESEARCH
LEADERSHIP

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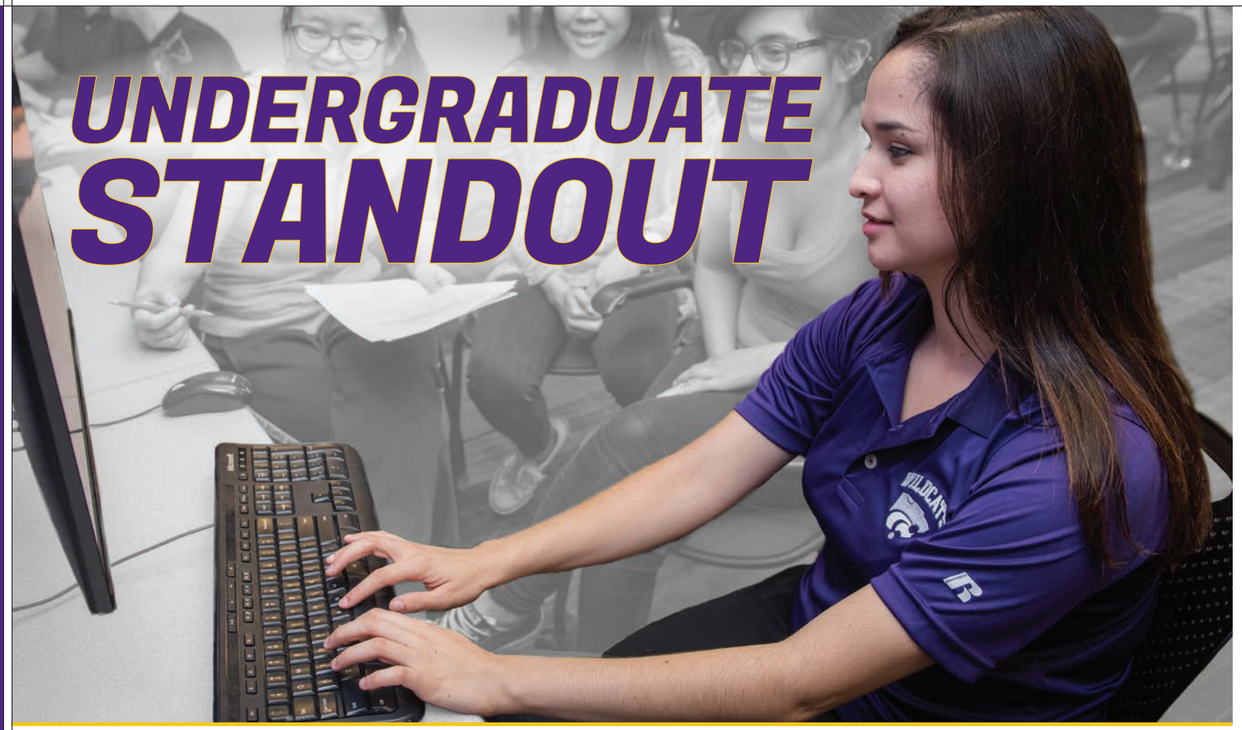


UNDERGRADUATE STANDOUT

COMPUTER SCIENCE, MATHEMATICS MAJOR EARNS UNIVERSITY'S TOP HONOR FOR UNDERGRADUATE RESEARCH

A Kansas State University undergraduate student involved in transdisciplinary research in computer science, mathematics and psychology was the 2017-18 recipient of the University Award for Distinguished Undergraduate Student in Research.

A senior in computer science and mathematics, Maria Fernanda De La Torre Romo was recognized for excellence in research. She has been an active undergraduate researcher since coming to K-State in fall 2015 and has several published papers and awards to her credit.

De La Torre Romo is currently working on projects with William Hsu, professor of computer science, and Mary Cain, professor of psychological sciences. As a member of Hsu's research team, her main interests are in data science, particularly network science and machine learning, and in computational neuroscience. With Cain, De La Torre Romo is developing an automated tool for behavioral neuroscience researchers to analyze video data of their animal models and a smart pet sitter using a long, short-term memory, recurrent neural network.

Her current project in Hsu's lab uses deep hierarchical neural network approaches for information extraction. She is planning to submit this research to a peer-reviewed data mining conference or workshop. She is the co-author of a paper that was accepted to the IEEE International Conference on Machine Learning and Data Science, and published in December 2017. She also is working on papers for at least two other national conferences in the field.

"Maria is a very impressive student and researcher," said Scott DeLoach, professor and head of the computer science department. "Her breadth and depth of interests and knowledge, coupled with her passion, have helped her to excel in practically everything she has done here at K-State. Being a co-author of a paper accepted to an internationally prestigious research conference as an undergraduate is quite remarkable and speaks to her ability. Maria will definitely be in high demand when she graduates from here."

Hsu rates De La Torre Romo's accomplishments as a researcher, as well as her general abilities and capacity to learn, as among the top five of the more than 250 undergraduate and graduate students with whom he has worked with in his career.

"Dr. Hsu has always done an excellent job integrating undergraduate students into his cutting-edge research, and Maria is great example of how that exposure can really open up doors to a great career," DeLoach said.

A member of Kansas State University's Developing Scholars Program, De La Torre Romo's work in Hsu's lab helped her earn the program's 2017 Frank Cortez Memorial Award, which is presented to a student who passionately pursues excellence in many different interests, from the arts to the sciences. She also received the Developing Scholars Program's 2016 Promise Award for her work in Lester Loschky's visual cognition lab.

During summer 2016, De La Torre Romo took part in a Research Experience for Undergraduates program at the University of Missouri where she conducted a global analysis on autism spectrum disorders' gene candidates. She was invited to present her poster at the annual Biomedical Research Conference for Minority Students in November 2017.

De La Torre Romo has helped launch an artificial neural networks and computational brain theory journal group at the university, and a research group with the philosophy department for racial bias reduction in court-ruling algorithms. She has served as events chair and is the current philanthropy chair of the university's chapter of the Association for Computing Machinery Special Interest Group on Artificial Intelligence.

> **"HER BREADTH AND DEPTH OF INTERESTS AND KNOWLEDGE, COUPLED WITH HER PASSION, HAVE HELPED HER TO EXCEL IN PRACTICALLY EVERYTHING SHE HAS DONE HERE AT K-STATE."**

Accepted into the university's concurrent bachelor's/master's program in computer science, her ultimate goal is to earn a doctorate in a discipline related to computational neuroscience.

De La Torre Romo is a 2015 graduate of East High School in Kansas City, Missouri, and the daughter of Sehila Romo Gomez and Gabriel De La Torre.

DEPARTMENT ANNOUNCES KEYSTONE RESEARCH SCHOLARS

CORNELIA CARAGEA, GEORGE AMARIUCAI, DOINA CARAGEA AND ARSLAN MUNIR.

Four faculty members in the department of computer science — Cornelia Caragea, Doina Caragea. George Amariucai and Arslan Munir— have been named Keystone Research Scholars, funded by Michelle Munson, 1996 K-State graduate in electrical engineering, and her husband, Serban Simu.

Keystone Research Scholar awards were established to recruit and retain top scholars in the early stages of their careers who are in high demand for faculty positions throughout the U.S. The funds are to be used to recognize and reward outstanding performances in teaching, service and research in the College of Engineering.

Cornelia Caragea, associate professor of computer science and the Lloyd T. Smith Creativity in Engineering Chair, received a doctorate in computer science from Iowa State University in 2009, and came to K-State in 2017 from the University of North Texas where she had been an assistant professor in computer science and engineering. She directs the machine learning group in the department, and her research interests include artificial intelligence, machine learning, information retrieval and natural language processing.

Doina Caragea, professor of computer science, received a doctorate in computer science from Iowa State University in 2004, where she was the recipient of the prestigious IBM Fellowship in 2002 and 2003. She has graduated four doctorate students and more than 25 master's students during her 10 years at K-State. She has expertise in machine learning and data mining, with applications to data intensive problems in recommender systems, text analytics, security informatics and bioinformatics.

George Amariucai, associate professor of computer science, joined the College of Engineering faculty in fall 2017, coming from Iowa State University where he was first an adjunct assistant professor and then an adjunct associate professor. He received his doctorate in electrical and computer engineering from Louisiana State University in 2009. Amariucai's research interests lie in the area of cybersecurity, and its intersections with probability and information theory; cryptography; theoretical and applied machine learning; and wireless communications.

Arslan Munir, assistant professor of computer science, completed a doctorate in electrical and computer engineering from the University of Florida in 2012. He was an assistant professor in the department of computer science and engineering at the University of Nevada, Reno, from 2014-17, before coming to K-State where he is a founding director of the Intelligent Systems, Computer Architecture, Analytics, and Security Laboratory. His current research interests include embedded and cyber-physical systems, secure and trustworthy systems, and hardware-based security.

2017-18 Computer Science Graduates

Doctor of Philosophy in Computer Science

Hong Liu
Heath Yates

Master of Science in Computer Science

Venkata Subrahmanya Siddharth Amaravadi
ChandraVyas Annakula
Poojitha Bikki
Urmi Chakravarty
Chaney L. Courtney
Pruthvidhar Reddy Dhodda
Sravani Donepudi
Joshua B. Donnoe
Russell A. Feldhausen
Naresh Kumar Giri
Andre Maurice Gregoire
Sneha Gullapalli
Narasimha Rao Jasti Madhu
Nithin Kumar Kakkireni
Aruna Sai Kannamareddy
Arjun Khanal
Bhavani Krithivasan
Reza Mazloom
Akash Rathore
Maitreyi Tata
Sharmila Vegesana
Matt Webb
Zhiqiang Xiong

Bachelor of Science in Computer Science

Nasser Hussain Alhamadah
Travis Atchison
Anthony Michael Atkinson
Olivia Madison Baalman
Cody Lee Baldwin
Ryan Edward Bates
Mary Grace Blair
Garrett Paul Blehm
Luis Enrique Bobadilla Dias
Clay Thomas Boley
Christopher Charles Boschert
Alexander Elliott Carpenter
Eujun Chin
Justin Hart Coen
Ashley Aaron Coleman
Carrington Michael Cooper
Joseph Townsend Davis
Zachary Robin Doll
Aaron Michael Doolittle
Uzoma T. Emuchay
Lane Wesley Evans
Caleb Robert Fleming
Matthew Roy French
Nicholas Anthony Goins
Wesley John Good
Dalton Alan Hahn
Joy Hauser
Chloe Elizabeth Henderson
Austen Grant Henry
Matthew Lee Hixon
Reis Douglas Hopkins
Jonathan David Howard
Shawn Corey Huggins
Brandon Jansen
Michael Cooper Johnson
Zakary Alexander Kedrovsky
Jacob Clark Kostner
Ryan Patrick Kruse
Richard Lee
Ryan Gerald Leroux
Jiaji Liu
Daniel Christian Longfellow
Lauren Kelly Lynch
Simran Jeet Malhi
Levi J Mann
Zach Marcolesco
Jacob Daniel Martin
Sarah Joy Martin
Connor Wayne McElroy
Diamond McNeill
Clifford James Meeks
Benjamin Miller
James Zachary Minton
Cre Ahmani Moore
Troy William Nagle
Tyler Nielson
Arunothayan Paramanathan
Lance Allen Pettay
Logan Michael Prough
Timothy David Ripper
Caullen Ray Sasnett
Patrick Scheurell
Eric Thomas Schmar
Tricia Schmitz
Brad Alan Schoonover
Lowell T. Scott
Matthew James Segraves
Elijah Solomon Seigel
Jordan David Spoor
Benjamin E. Stegeman
Hayden Scott Svancara
Tyler Jordan Tryon
Samuel Stephan Turner-Lill
Blair Edward Urish
Collin Andrew Vossman
George Walker
An Wei
Geordy Paul Williams
Ryan Paul Williams
Reagan Kenneth Wood
Bryant James Worcester
Benjamin John Young

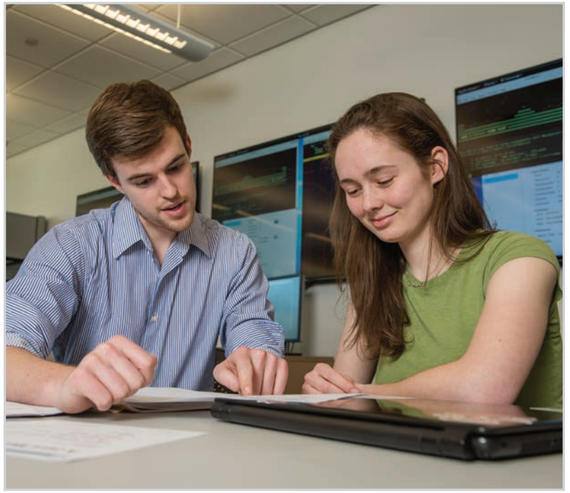
Bachelor of Science in Information Systems

Susan Elizabeth Burke
Jacob Scott Dokos
Joshua Eric Durbin
Ethan D. Haley
Steven P. Mercier
Jacob Thomas Moldrup
Daniel Eduardo Moreno-Rodriguez
Shannon Shourbaji Nelson
Sean William Pittman
Devlin Rein Smiley
Zachary Noble Smith
Riley James Toombs
John David Wildman

Minor in Computer Science

Branden S. Brown
Brandt Larson Hill
Daniel Jackson Lovell
Andrew E. McKittrick
Patrick Mason Sutherland
Daniel Warren Wagner

NSF SCHOLARSHIP FOR SERVICE PROGRAM PRODUCES CYBERSECURITY PROFESSIONALS



The computer science department is entering its fifth year of the CyberCorps®: Scholarship for Service (SFS) program at K-State. SFS is uniquely designed to increase and strengthen the number and quality of federal information assurance professionals that protect the government's critical information infrastructure. The program provides scholarships that fully fund the costs incurred by students attending K-State, including tuition, books and related fees. In addition, each SFS student receives stipends in excess of $20,000 for undergraduate students and $30,000 for graduate students. The scholarships are funded through a grant from the National Science Foundation.

Since its inception, the SFS program has graduated 13 computer science students, and currently another 11 are in the program and making good progress. The average GPA of an SFS student is 3.7. Our SFS students have received several excellent and interesting internships, including positions at the Federal Reserve, Software Engineering Institute, Argonne and Sandia National laboratories, Department of Defense and the FBI. Our placement rate after graduation is 100 percent, with all our graduates choosing careers at federal or state levels. Our graduates are in high demand, and have gone on to highly competitive and challenging work environments including many of the same places where they had interned. In addition, several students used their SFS scholarships to pursue graduate studies as well.

SFS provides an independent source of funding to computer science students, allowing them more free time to help build the local cybersecurity community. Nowhere is this better exemplified than our Cyber Defense Club, which has many SFS students in its leadership. These students are self-driven to teach, learn, and disseminate new skills and findings via meetings, competitions and local outreach. The Cyber Defense Club has also placed well at recent regional and national competitions:

- Second place, National Cyber Defense Competition, Iowa State University, 2018
- Second place, Annual Argonne National Laboratory Cyber Defense Competition, 2017
- First place, Central Area Networking and Security Workshop Cyber Defense Competition, 2016
- First place, Central Area Networking and Security Workshop Cyber Defense Competition, 2015
- Third place, National Cyber Defense Competition, Iowa State University, 2015
- Second place, National Cyber Defense Competition, Iowa State University, 2014

SFS works in tandem with the National Security Agency's designation of our department as a National Center of Academic Excellence in Cyber Defense. This combination has helped us to retain females in a male-dominated field and has attracted many talented undergraduates as well. Having the NSA designation helps students to gauge the quality of the K-State cybersecurity program when deciding among prospective SFS schools.

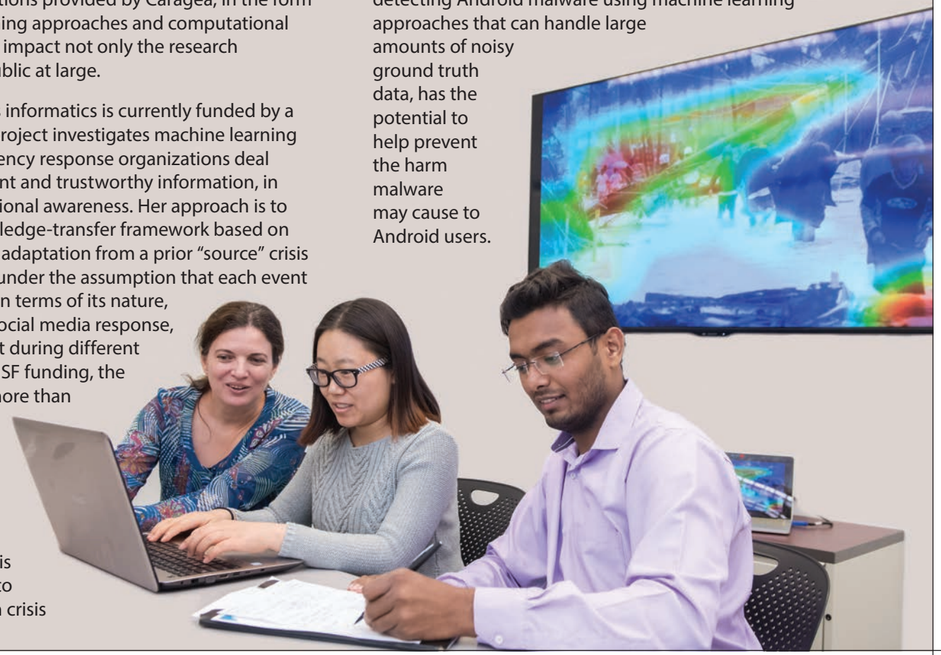
DATA SCIENCE FOR SOCIAL GOOD

Doina Caragea, professor in computer science at Kansas State University and a Michelle Munson-Serban Simu Keystone Research Scholar, is focusing her research in the area of machine learning and data science, with applications to big data problems including crisis and security informatics.

In addition to the scale of the data, two common challenges are presented by these applications to traditional machine learning — scarcity and quality of ground-truth-labeled data that are generally required to learn accurate classifiers. To address these challenges, Caragea has focused on the design of semi-supervised learning and domain adaptation approaches that leverage unlabeled data for a target problem and labeled data available for related problems. The solutions provided by Caragea, in the form of advanced machine learning approaches and computational tools, have the potential to impact not only the research community but also the public at large.

Caragea's research on crisis informatics is currently funded by a $900,000 NSF award. The project investigates machine learning approaches to help emergency response organizations deal with the overload of relevant and trustworthy information, in real time, to improve situational awareness. Her approach is to design an integrated knowledge-transfer framework based on deep learning and domain adaptation from a prior "source" crisis to a current "target" crisis, under the assumption that each event has unique characteristics in terms of its nature, location, actors and even social media response, while some patterns persist during different events. In addition to the NSF funding, the project has also received more than $700,000 in credits from Amazon Web Services to be used for training deep learning classifiers to identify useful situational awareness information. Thanks to NSF and AWS, this research has the potential to transform the way in which crisis response organizations operate, and in turn provide better support to victims of disasters in a timely fashion.

Caragea has also received a $200,000 NSF award to design and develop approaches for mobile app vetting. While many revolutionary apps with impact in areas — such as health, finance and communications — have become available in recent years, the number of malicious apps has also increased significantly. The inclusion of malicious apps into an app store allows them to be downloaded on mobile devices across the globe. These malicious apps can then infect their targets, having undesirable consequences ranging from personal data leakage to financial losses. Caragea's security informatics research, focused on detecting Android malware using machine learning approaches that can handle large amounts of noisy ground truth data, has the potential to help prevent the harm malware may cause to Android users.



C2FO®

DEPARTMENT WELCOMES NEW CORPORATE PARTNER

In an era of constricted education budgets, corporate partnerships are essential to help Kansas State University provide exceptional and affordable higher education opportunities to all students. Corporate partners such as C2FO, Leawood, Kansas, support student learning and realize their investment as graduates enter careers well-prepared for the rigors of professional life. C2FO, a global financial technology and cash-flow optimization company, recently established its K-State partnership by giving to the Computer Science Scholars Program in the College of Engineering.

C2FO is partnering directly with the Computer Science Scholars Program to develop computer science scholarship through academic mentorships, professional collaboration, networking opportunities, and recruitment of K-Staters for potential paid internships and full-time employment.

"We believe in K-State's Computer Science Scholars Program because of the success we've seen first-hand in hiring high-quality student interns and graduates from the university," said John Young, C2FO chief data and scientific officer.

The C2FO partnership will further connect K-State's award-winning computer science department and students to cutting-edge innovations at the intersections of computer technologies, data science, global finance and business.

"We are excited to grow this partnership with C2FO," said Scott DeLoach, professor and computer science department head.

"We look forward to how this innovative company will challenge student and departmental capacity to meet the fintech industry's exponential demand for machine-learning and data research skills."

The C2FO and K-State computer science department partnership is one of several of the company's investments in education in Kansas and the Kansas City metro area. C2FO started YEP KC or Young Entrepreneurs Program, Kansas City, a hands-on internship program for high school students that focuses on entrepreneurial thinking and development through practical experience.

As Kansas State University's strategic partner for philanthropy, the KSU Foundation inspires and guides philanthropy toward university priorities to boldly advance K-State family. The foundation is leading Innovation and Inspiration: The Campaign for Kansas State University, to raise $1.4 billion for student success, faculty development, facility enhancement and programmatic success. Visit www.ksufoundation.org for more information.

INNOVATION & INSPIRATION
THE $1.4 BILLION CAMPAIGN FOR K-STATE

PPA RECIPIENT GIVES BACK TO KANSAS STATE UNIVERSITY

The Kansas State University College of Engineering honored 10 alumni for professional career accomplishment during the first 20 years following their graduation at ceremonies April 21.

Recipients of the college's Professional Progress Award were nominated by their respective department heads and confirmed by Darren Dawson, dean of engineering. Ashok Reddy, Broomfield, Colorado, a 2001 graduate, is the honoree from the department of computer science.

Reddy is founder and CEO of BETSOL, a Denver-based company specializing in product engineering and managed information technology services with customers and offices in the U.S. and India.

A strong supporter of Kansas State University over the years, BETSOL has donated $40,000 to the university's scholars program, is engaged with mentoring and offering internships to Kansas State University students, and hires its graduates.

K-State's CS Scholars Program was created to equip students with academic and professional advantages to prepare them to lead in the computer science and information technology industries. The program offers students smaller class sizes, academic enrichment, professional development opportunities, industry networking, mentoring with faculty and industry representatives, and an advanced application of computer science theory through research and internships.

"K-State gave me the skills, confidence and self-belief to succeed, which is all a student can ask for," Reddy said. "We want to support K-State so that it can continue to do the same for a new generation of students. The faculty at K-State bring out the best in the students and students of K-State showcase the potential of the next generation."

KANSAS STATE UNIVERSITY

COMPUTER SCIENCE ENHANCEMENT FUND

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