Dr. Maggie Cheng
- National Science Foundation: Factoring User Behavior in Network Security Analysis
- National Science Foundation: CPS: Synergy: Collaborative Research: Real-time Data Analytics for Energy Cyber-Physical Systems
- National Science Foundation: ECCS: Collaborative Research: Computationally Efficient Solvers for Power System Simulation

Dr. Dan Lin
- National Security Agency: GenCyber: Security Camp for K-12 Teachers
- National Science Foundation: MASTER: Missouri Advanced Security Training Education and Research

Dr. Sajal Das
- National Science Foundation: SHB: Collaborative Research: Crafting a Human-Centric Environment to Support Human Health Needs
- National Science Foundation: XPS: Collaborative Research: Scalable Parallel Algorithms for Network Dynamics Analysis (SPANDAN): A Sparsification-based Approach
- National Science Foundation: I-Corps: Health-Beacons: Flexible Wearable Health and Activity Tracker for Smart Living
- National Science Foundation: CPS: Breakthrough: Collaborative Research: Securing Smart Grid by Understanding Communications Infrastructure Dependencies
- National Science Foundation: CPS: Synergy: Collaborative Research: Threat Assessment Tools for Management-Coupled Cyber and Physical Infrastructures
- National Science Foundation: SC2: US-India Smart and Connected Communities Workshop
- National Science Foundation: I-Corps Sites: Journey to Innovation and Entrepreneurship at Missouri S&T
- National Science Foundation: CDS&E: ParCell: A Parallel Computation Framework for Scalable and Mechanistic Modeling and Simulation of Multicellular Systems

Dr. Sanjay Madria
- Department of Commerce: Secure Sensor Cloud Computing
- National Science Foundation: NSF I/UCRC: Net-Centric Software Systems Center Site at Missouri S&T
- National Science Foundation: REU Site: Research and Training Experience for Undergraduates in the area of Secure Cloud Computing
- National Science Foundation: ESCAP: Efficient and Scalable Collection, Analytics and Prediction: Handling Multidimensional Big Data for Disaster Applications
- U.S. Department of Education: A Doctoral Program in Security and Privacy in Mobile Social Network Space

Dr. Wei Jiang
- National Science Foundation: I-Corps: You&Me: An Outsourced and Completely Private Social Network

Dr. AbuSayeed Saifullah
- National Science Foundation: CRII: NeTS: Towards the Design of a Large-Scale Wireless Sensor Network

Dr. Simone Silvestri
- National Science Foundation: Autonomous Monitoring of Large Scale Agricultural Plants Through Unmanned Aerial Vehicles
- Penn State University: DTRA: Analysis and recovery of large-scale failures in interdependent networks
- Sapienza University of Rome: NATO: Hybrid Sensor Networks for Emergency Critical Scenarios

Dr. Daniel Tauritz
- Los Alamos National Lab: LANL/Missouri S&T Cyber Security Sciences Institute
- Sandia National Lab, Hyper-heuristics for solving real-world problems on diverse computational architectures

Dr. Zhaozheng Yin
- National Science Foundation: CAREER: Microscopy Image Analysis to Aid Biological Discovery: Optics, Algorithms and Community
- National Science Foundation: The Missouri Transect: Climate, Plants and Communities
- National Science Foundation: I-Corps: Automated attendance check by using smartphone cameras
- National Science Foundation: CPS: Synergy: Collaborative Research: Cyber-Physical Sensing, Modeling, and Control with Augmented Reality for Smart Manufacturing Workforce Training and Operations Management
MESSAGE FROM THE CHAIR

Greetings from the computer science department at Missouri University of Science and Technology, one of the top technological research universities in the nation. Founded in 1965, the department offers B.S., M.S. and Ph.D. degrees in computer science and currently has about 700 students: 604 undergraduates and over 100 graduate students. With 19 full-time faculty, including three on the teaching track, the CS department provides a high-quality, dynamic learning environment. Our professors are engaged in cutting-edge research clustered around five core areas: Algorithms and Theory, Computational Intelligence and Computer Vision, Wireless Mobile and Pervasive Computing, Networking and Systems, and Security and Privacy. Our interdisciplinary research spans Missouri S&T’s signature area on Smart Living (e.g., smart buildings, smart cities, smart energy, smart healthcare and smart transportation), big data analytics and data mining, critical infrastructure protection, cyber-physical systems, cybersecurity and social informatics.

The academic year 2015-2016 was a spectacular one for us as we celebrated our 50th Anniversary Golden Jubilee. In addition to the Jubilee kickoff celebration in October 2015, which was attended by more than 80 alumni, we hosted a Distinguished Colloquium Speaker Series with eminent visitors such as a member of the National Academy of Engineering, the NSF CISE assistant director and a division director and a college president. We organized the IEEE PerCom 2015 and IEEE SmartComp 2016 conferences in St. Louis and hired three new tenure-track faculty members. One faculty member was granted tenure and promoted to associate professor, another faculty member was selected as the school’s 2015 Woman of the Year. Our annual expenditures have steadily increased, with over $6.5M in active grants. Our undergraduate program account for the second highest number of majors at Missouri S&T and successfully passed the ABET reaccreditation in 2015. With our continued commitment to increased diversity student enrollment, we have been sending 15 to 25 female and underrepresented minority students, staff and faculty each year to the Grace Hopper Celebration of Women in Computing.

Although we have grown in quality and quantity and reached significant milestones, we do not wish to stop — we know there is still so much more to do. We are committed to take the department to the next level of excellence in terms of teaching, research, service, outreach and national and international visibility and ranking. We are working closely with our stakeholders to move the needle forward with passion, aggressive strategic vision and focused goals. We are committed to mentoring our students to build a stronger foundation, inspire creative thinking, problem solving and effective communication skills, hands-on experience in interdisciplinary education and research and teamwork to become industry and academic leaders. Innovation and entrepreneurship is an integral component of our experiential learning. More than ever undergraduate students are engaged in cutting-edge sponsored research.

Please visit our website for updates on our outstanding distance education and research opportunities. Prospective undergraduate and graduate students, particularly Ph.D. candidates, are invited to apply for admission to our programs as we offer competitive fellowships and assistantships. Finally, do not hesitate to offer valuable suggestions and ideas to help us realize our ambitious goal of becoming a world-renowned computer science department.

Sincerely,

Sajal K. Das
Department Chair and Daniel St. Clair
Endowed Chair, Computer Science

TABLE OF CONTENTS

2 Tan Le kicks off Golden Jubilee
Tech entrepreneur opens 50th anniversary celebration

3 Hackathon for humanity
Hacker teams vie to help society

4 GenCyber security camp for K-12 teachers
S&T hosts summer workshop for Missouri educators

5 Researchers study users to increase cybersecurity
Experiments will study the characteristics of user behavior

6 Op-ed: Moving beyond ‘medieval cybersecurity’
McMillin writes in St. Louis Post-Dispatch

7 Lin named S&T Woman of the Year
Computer science faculty member earns campus honor

10 Distinguished speaker series
Experts come to Rolla in spring, fall 2016

11 IEEE SmartComp conference
S&T co-sponsors St. Louis session on smart computing

12 Exploiting unmanned aerial vehicles to study the effects of climate change
A National Science Foundation-funded project is using drones to check a Columbia cornfield
To kick off its 50th anniversary Golden Jubilee, Missouri S&T’s computer science department brought in entrepreneur, CEO and computer science technology pacesetter Tan Le as the keynote speaker.

The Golden Jubilee marked the 50th anniversary of Missouri S&T’s computer science degree program. The Golden Jubilee was a time for the school, the first in Missouri to offer degrees in computer science, to reflect on and celebrate the past 50 years while looking to the future.

Le is the founder and chief executive officer of Emotiv, a bioinformatics company that pioneers portable EEG technology, a brain-computer interface and a platform for sharing crucial brain data globally. Her presentation, “The Future is Closer Than You Think,” was held on Friday, Oct. 23, 2015, in Leach Theatre in Castleman Hall.

A refugee from Vietnam, Le was named the 1998 Young Australian of the Year. She also co-founded and ran SASme, a pioneer in providing SMPP platforms to telecommunication carriers and content aggregators and one of the companies responsible for the creation of Australia’s SMS application market.

“Given the pervasiveness of computing today and how computer science makes so many things possible in so many different disciplines, our general criteria was to find someone who would be appealing to a broad segment of alumni and students,” says Pam Leitterman, who earned a bachelor of science in mathematics from Missouri S&T in 1975 and is president of the Academy of Computer Science. “We wanted someone who could speak to the future of computer technology and its impact on culture in a way that was exciting and inspiring.”

That could describe the “brain helmet” Emotiv developed. The helmet is a Wi-Fi enabled, many-fingered hand that sits on a person’s head and uses brain waves to execute computer commands, such as making a box disappear or reappear.

“The brain helmet technology her company has pioneered is a terrific example of applying computer science and computer engineering to create a product that contributes to the physical and social well-being of others,” Leitterman says.

Le’s focus on entrepreneurship also was a selling point.

In 2014, the computer science department offered an interdisciplinary course in experiential entrepreneurship, and in fall 2015 two more courses were offered. Having Le speak was “a great way to amplify the innovative spirit of Missouri S&T,” Leitterman says.
S&T COMPUTER TEAMS CAN HACK IT IN COMPETITION

Missouri S&T kicked off a Golden Jubilee celebration marking the 50th anniversary of its computer science department with a competition designed to help society through computing.

The Hackathon for Humanity (H4H) kickoff was held on Sept. 3, 2015 with live streaming for remote participation.

As part of the Golden Jubilee, teams had 19 days to create a mobile app for iOS or Android or a web app that is beneficial to society. Examples included a grant finder, which could be used to create a web page where grants can be easily accessed and where organizations can share their experience in trying to obtain funding. Another is a climate impact visualizer, an app that gives a visualization, infographic and animation of how the environment is changing.

Any Missouri S&T students, alumni, faculty and staff were eligible to form teams. Teams could be based on campus, from remote locations, or, preferably, a mix of local students and remote alumni. To entice participation, $2,000 in prize money was awarded, with $1,000 for first place, $600 for second and $400 for third.

“Another team was modifying a version of Microsoft Excel to be used by mental health professionals in identifying patients with mental illness more accurately,” Tauritz says. “One team is working on a ‘brain training’ app for children who have learning disabilities that is not just a gaming app. They are incorporating psychological tools to help improve learning and development.”

The primary goal is to engage both our alumni and our students by having them collaborate on mixed teams creating apps for the common good,” says Dr. Daniel Tauritz, associate professor of computer science and H4H coordinator. Tauritz says not to worry — national secrets were not at risk during the hackathon.

“The word ‘hacking’ unfortunately is used to describe very different types of activities, from illegal, malicious type activities, to very beneficial types of activities,” Tauritz says. “These beneficial types are in hackathons, which are the clever creation of software (and sometimes also hardware) to address specific challenges, such as creating apps to benefit society.”

In the case of the Hackthon for Humanity, hacking involved the design and coding of computer apps along with promotional and explanatory YouTube videos.

The competition ended on Sept. 21, with judging taking place over the next few days. Winners were announced on Oct. 1 with videos of winning projects shown in Leach Theatre after Golden Jubilee keynote speaker Tan Le’s address.

To watch videos of the winners, go to h4h.mst.edu/projects/.

BRUNE, MARKER JOIN CS ACADEMY

William K. Brune, retired from Hewlett-Packard Company as lead project manager, global data services in 2015, was inducted into the Academy of Computer Science on Oct. 22, 2015. The Academy honors outstanding CS alums for their contributions to the profession and their involvement with Missouri S&T students and faculty. The academy also serves as a strategic advisory group for the computer science department.

Brune earned his bachelor of science degree in computer science from Missouri S&T in 1969. He then earned an M.B.A. from the University of Houston in 1977.

In addition to the Missouri S&T Academy of Computer Science, Brune serves as secretary of the Missouri S&T Alumni Board and is active with the S&T Admissions Ambassadors, the Student Design and Experiential Learning Center and the Houston Marathon.

Jeff Marker is senior vice president of customer services at Junction Solutions, a Gold Certified Microsoft Dynamics AX partner specializing in the implementation of solutions for the multi-channel retail, food and beverage and life sciences industries.

Marker holds a bachelor of science in electrical engineering from Missouri S&T, where he also serves on the advisory board for the department of Business and Information Technology.
For the second consecutive year, an interactive summer workshop to promote cybersecurity awareness and educate Missouri K-12 teachers took place in June 2016 at Missouri S&T. The “GenCyber” camp was sponsored by the National Science Foundation (NSF) and National Security Agency (NSA). Missouri S&T received $100,000 from the agencies to hold the camp. It’s part of an NSF/NSA program to educate K-12 teachers about the need for more cybersecurity experts, and Missouri S&T is the only university in the state to host the camp. There are 133 camps sponsored throughout the country this year after 43 in last year’s pilot program.

Missouri S&T’s camp was a huge success in its initial year. Through word of mouth, the 2016 camp was fully registered the first day of the camp enrollment notification. This year, the camp program was enhanced to promote fun learning and hands-on experience.

Twenty-five teachers from around the state learned basic programming concepts, fundamental cybersecurity concepts, introduction to network security, malware, social engineering, digital forensics and cryptography at the two-week camp in early June, says Dr. Dan Lin, associate professor of computer science at Missouri S&T, director of its cybersecurity laboratory and the camp program director.

With the GenCyber camp, the NSF and NSA are trying to fill the need for cybersecurity experts in government agencies and private industry, with plans to hold 200 camps around the nation by 2020. “Most of camp participants do not have programming or computer science background, so the camp showed that the field is not hard as long as you are willing to learn and have proper training,” Lin says. “If computer science and STEM (science, technology, engineering and mathematics) fields were introduced at an earlier age to students, they would be more willing to join the field. Once students are entering college, many are intimidated by cybersecurity or think the field is too hard to enter.

“Cars and even planes can be ‘hacked,’ and a major strike against U.S. digital infrastructure like power grids or large banks could be devastating to the country. This is why cybersecurity must be brought to the forefront of education.”

Teachers find the best way to learn to be a hacker is to try it themselves. They’re shown here playing d0x3d! as a fun way to learn about network security.

An interdisciplinary Missouri S&T research team with members from computer science and two other College of Engineering and Computing departments has won a sizable National Science Foundation grant to help enhance smart manufacturing workforce training.

The team consists of Dr. Zhaozheng Yin, an assistant computer science professor and Daniel St. Clair Faculty Fellow; Dr. Ming Leu, the Keith and Pat Bradley Distinguished Professor of Integrated Product Manufacturing and director of the Intelligent Systems Center; and Dr. Ruwen Qin, associate professor of engineering management and systems engineering.

The three-year, $505,287 grant highlights Missouri S&T’s research role in Advanced Manufacturing, one of four Signature Areas for the university. The project also involves a research team from the University of Missouri-Columbia, which received a $196,000 NSF grant.

The project will attempt to develop a cyber-physical sensing, modeling and control infrastructure coupled with augmented reality to significantly improve the efficiency of future workforce training, performance of operations management and worker safety and comfort in smart manufacturing.

The research team will rely upon a suite of sensors to gather real-time data about individual workers, worker-machine interactions and the working environment. They’ll also develop advanced methods and tools to track and understand workers’ actions and physiological status while detecting their knowledge and skill deficiencies in real time.

The project will also establish mathematical models that encode the manufacturing process in the research sensing and analysis framework, characterize the efficiency of worker-machine-task coordination, model the learning curves of individual workers and investigate various multimodal augmented reality-based visualization, guidance, control and intervention schemes to improve task efficiency and worker safety.

Results from this research are expected to transform the practice of worker-machine-task coordination and provide a powerful tool for operations management. This research involves several disciplines including sensing, data analytics, modeling, control, augmented reality and workforce training, representing a synergetic research effort.
RESEARCHERS STUDY USERS TO INCREASE CYBERSECURITY

Missouri S&T researchers are working to build a framework to study the online behavior of internet users and how that behavior affects the safety of systems and networks.

Dr. Maggie Cheng, associate professor of computer science, and Dr. Fiona Nah, professor of business and information technology, are working with a two-year grant from the National Science Foundation. The researchers are looking to design experiments to study the characteristics of user behavior, Cheng says, creating a theoretical framework to study human cyber behavior.

Computer systems can be vulnerable because of unexpected human behavior, Cheng says, including situational behavior. “We're trying to consider in what ways user behavior can change the network state,” she says.

Network users are not always conscious of risks and aware of security issues. A user can unintentionally compromise a network's security, such as by opening a seemingly innocuous email that turns out to be a virus that infects a whole system. A user’s psychological state and cognition capacity affect cyber behavior, and a user’s situational cyber behavior also depends on the user’s own assessment of the risk. For instance, a user may not want to click on a link received from an email when fully risk-conscious, but when the user is under time pressure or believes the link is what it appears to be, the user may still do it.

A user’s cyber behavior may also vary with the network and device the user is on. Cheng says that a user most likely will be more conscious of risk on the networks and devices that have higher security requirements. Malware targeted at mobile devices, such as those found on fake game sites, can easily be downloaded and installed because of users’ low security awareness.

“The psychology of a hacker is different from an IT person and an ordinary network user,” Cheng says. “IT looks at how it can secure the network by improving security policies, but a hacker views the user-caused vulnerability as an opportunity to take what is gleaned and go from there.”

SENSOR NETWORK RESEARCH EARN NAVATIONAL SCIENCE FOUNDATION SUPPORT

A Missouri S&T research project examining wireless sensor networks will tap into the white space of unused TV channels in an effort to develop sensing and control applications over wide areas.

Wireless sensor networks face significant scalability challenges due to the proliferation of emerging wide-area wireless monitoring and control systems (e.g., urban sensing, large civil infrastructure monitoring and oil field management) that require thousands of sensors be connected over long distances.

Due to their short communication range, existing wireless sensor network technologies face critical challenges in terms of energy, cost and complexity to achieve scalability in wide-area deployments.

A research team led by Dr. Abusayeed Saifullah, assistant computer science professor, has received $175,000 from the National Science Foundation to develop a scalable sensor network architecture — called Sensor Network over White Spaces — by designing sensor networks to operate over television white spaces.

This two-year project will lead to a new generation of sensor networks that will operate over white spaces, enabling an “internet of things” and a broad range of applications that involve wide-area monitoring and control.

GRACE HOPPER

A dozen female and underrepresented minority students and one staff from the computer science department attended the Grace Hopper Celebration of Women in Computing in Houston on Oct. 14-16, 2015. This was the second year that students from Missouri S&T have been sponsored to attend Grace Hopper. For some, this was a first experience and they enjoyed the numerous networking activities, workshops and overall inspiration from so many women in the tech industry. For others, this was a repeat experience. (In 2014 the department sponsored 28 female students, along with two faculty and two staff members to attend the conference in Phoenix.) These students were able to visit the career fair, obtain internships and develop career-long relationships with other women.

This year again, 13 students, two faculty and one staff member will be attending Grace Hopper on Oct. 19-20 in Houston. Students are excited to do peer mentoring in research and study. Our department is one of only 15 institutions in the nation to be part of the BRAID initiative (Building Recruiting And Inclusion for Diversity) announced by former Secretary of State Hillary Clinton and managed by the Anita Borg Institute and Harvey Mudd College under the leadership of President Maria Klawe, a theoretical computer scientist.

“Through BRAID we have been able to secure funding from Facebook, Google, Microsoft and Intel to conduct outreach activities to middle- and high-school students, in addition to participating at Grace Hopper,” said department chair Dr. Sajal Das. “Such initiatives have helped increase undergraduate female/diversity student enrollment by about 50 percent in the last two years.”
The following op-ed was published in the St. Louis Post-Dispatch on Friday, Oct. 30, 2015. The author is Dr. Bruce McMillin, professor of computer science, associate dean for research and external relations in the College of Engineering and Computing and co-director of Missouri S&T’s Smart Living signature area.

The U.S. Office of Personnel Management’s recent announcement that 5.6 million fingerprint records were stolen is the latest in a rash of break-ins that raise concerns about how to make our online lives more secure. From the U.S. government to the adult online dating site Ashley Madison, it seems no system is safe from a potential cyberattack.

As we finish National Cyber Security Awareness Month (observed every October), our nation continues to face threats to our cyber infrastructure that could cripple national security. Despite tremendous advances in technology, our approach to protecting information stored online still has more in common with medieval defense tactics than with the integrated and smart approach we need.

A firewall is much like a castle moat or wall designed to keep the “bad guys” out. But history shows that this approach does not work. The Great Wall of China, for instance, was a defense fortification that was breached simply by going around it. In modern times, attackers use breaks in the (fire)wall and phishing attacks to steal passwords to launch their assaults.

The problems will get worse. Our modern systems are both physical and computational. In such a “smart” environment, attacks can come from multiple sources, some even inside what we consider protected. The Stuxnet worm, for example, caused a factory floor process to produce substandard product and destroy the very equipment that was being operated — all while reporting to the factory operator false information that everything was going fine. What’s particularly insidious is that the worm, the factory floor and the factory operator were all inside the security firewall.

Imagine a similar scenario in your smart home, where the cyber system now controls your physical house — seemingly for you, but also for an attacker monitoring your electrical usage. That attacker could steal your appliance usage for commercial reasons, enter your house when you are not away or to do physical damage, such as shutting off the heat in the winter.

To secure cyber-physical systems today is simultaneously easier and harder. On one hand, attackers are limited by what false information they can use to trick a system owner. On the other hand, the physical part of our systems inherently leak confidential information through physical observations; the pattern of your home lights and the route you take on your commute give an attacker an idea of when you’re away.

What can be done? In a purely cyber system we can “opt out” — not use the system — or reduce the amount of information stored, so that when an attack does occur less information can be lost. But these are stopgap measures. Some approaches are to store your information encrypted in the cloud, and then never decrypt it, only operating on the encrypted information. This would mitigate cyber theft. But in a smart community, it isn’t possible to opt out, or you would never get electricity or water.

In the end, we must focus on the information that both flows into and out of every portion of our smart living environment, both hiding what we consider private and disrupting the ability of our adversaries to launch information attacks.

“A firewall is much like a castle moat or a wall designed to keep the ‘bad guys’ out. But history shows that this approach does not work.”

— Bruce McMillin, professor
Lin named S&T’s 2015 Woman of the Year

Dr. Dan Lin, associate professor of computer science at Missouri S&T, was named the university’s 2015 Woman of the Year.

The Woman of the Year award is given annually in recognition of efforts to improve the campus environment for women and minorities. As part of the award, Lin received a $2,000 stipend funded by Missouri S&T graduate Cynthia Tang, founder and former chair of Insight Industries Inc. and also a member of the Computer Science Academy.

"Dr. Lin’s commitment to the promotion of diversity and student success in engineering and computer science is exemplified by her accomplishments over a relatively young career in academia," wrote one of her nominators. "Since her appointment with S&T, she has worked diligently in advocating for, mentoring and educating students."

Lin joined the Missouri S&T faculty in 2008. She teaches courses on cloud computing, pervasive computing, database systems, and file structure and introduction to database systems. Her research focuses on the fields of database systems and information security.

"Computer science has for many years suffered nationwide from a lack of female role models such as Dr. Lin, to help stem the tide of the decreasing percentage of computer scientists who are female," wrote another nominator. "Dr. Lin is a shining example for all S&T’s female computer science students, both through her research accomplishments, her student organization service and her outreach to young women."

At Missouri S&T, Lin has chaired the diversity committee in the computer science department since 2011. She also serves on the Honorary Degree Committee, the Student Scholastic Appeals Committee, the Peer Teaching Evaluation Committee and the computer science department’s Faculty Hiring Committee. Since 2009 she has organized workshops for Missouri S&T’s Expanding Your Horizons program for girls in seventh- and eighth-grade girls who are interested in mathematics and science.

Lin has garnered over $4 million in external research grants from agencies such as the National Science Foundation and the National Security Agency. Her research has been published in numerous book chapters, conference proceedings and refereed journals.

A member of the Institute of Electrical and Electronics Engineers (IEEE) and the Association of Computing Machinery (ACM), Lin’s many accolades include the St. Louis Section of IEEE Certificate of Appreciation, two IEEE St. Louis Section Outstanding Branch Counselor awards, a Grace Hopper Scholarship and the Ted Nelson Newcomer Award for best paper at the 22nd ACM Conference on Hypertext and Hypermedia in 2011.

Lin earned a Ph.D. in computer science from National University of Singapore in 2007. She also holds a bachelor of science degree in computer science from Fundan University in Shanghai, China.
Armaja LaRue-Hill says that if it weren’t for a crown and sash, she would still be the shy, introverted student she was in fall 2014 when she started classes at Missouri S&T. Back then, her introversion kept her from joining campus activities. Now a junior in computer science, LaRue-Hill can’t cross campus without stopping to chat with someone.

In her first semester, LaRue-Hill stepped out of her comfort zone and decided to participate in the Miss Black and Gold Scholarship Pageant hosted by Alpha Phi Alpha fraternity.

“I was just hoping to win the $1,000 scholarship,” she says. “But I ended up having to work on my soft skills like meeting and talking to people. I learned how social I could be.”

To her surprise, she won the pageant and was crowned Miss Black and Gold that October.

LaRue-Hill credits her success at Missouri S&T since then to her decision to dive into activities.

“I turned the skills I learned on the road to the crown and sash into real progress,” LaRue-Hill says. “After that, I had the courage to start study groups, talk to new people in my classes and pursue many other things I wouldn’t have considered before.”

The simple, yet sometimes hard-to-employ code LaRue-Hill now lives by is to “dive in.” When she begins a project or homework for a class, she immerses herself in it to produce the best results she can. She also jumps into volunteer activities that allow her to advocate for causes she believes in.

“I learned through the pageant that I like to promote events and things I believe in,” she says. “I like to spend time getting the word out for charitable events.”

When LaRue-Hill isn’t in class, she works in the leadership and cultural programs office. She is a member of the National Society of Black Engineers and Voices of Inspiration choir. She is also vice president of the Association of Computing Machinery-Women (ACM-W) and a 2015 Sue Shear Fellow.

After graduation, LaRue-Hill wants to improve human-computer interaction.

“Computers are a work of art because of all the things they can do seamlessly and quickly,” she says. “I want to dive into bridging the gap between the art and the science of computers.”
On April 7, 2016, S&T’s 15th annual Computer Science Student Banquet took place. As part of our Golden Jubilee celebration, the department took the banquet back to the 1960s and as part of the department’s vision of establishing a pervasive research culture, the banquet was opened by a student research poster competition during the reception. The competition, in its third year, was organized by Dr. Sanjay Madria, supported by staff members Christina Barton and Dawn Davis and judged by a distinguished panel of CS faculty and alumni, along with the banquet’s keynote speaker Dr. Mani Chandy, Simon Ramo professor emeritus at the California Institute of Technology. Five undergraduate students and 23 graduate students participated in this research competition and presented their work with the help of professionally produced, conference-size posters. The winner of the undergraduate category was Ryan Wood, advised by Dr. Daniel Tauritz. First place in the graduate category went to Yunxiang Mao, advised by Dr. Zhaozheng Yin. Second place went to Edward Norris, advised by Tauritz and third place went to Mingzhong Li, advised by Dr. Zhaozheng Yin.

In Spring 2016, our local chapter of the Association of Computing Machinery-Women (ACM-W) was awarded $5,000 from NCWIT and Google. The purpose of these funds is to boost outreach programs to junior high and high school women and minorities and encourage them to try computing-related fields. Over the summer, ACM-W as well as students from other universities, have worked with the campus outreach and diversity department and hosted six workshops for young women of various ages. The topics of these workshops included the basics of programming with Python, social engineering, cryptography and programming robots for sustainability goals. These workshops have been a positive influence on the young students, many of whom have asked to learn more.
COMPUTER SCIENCE DEPARTMENT HOSTS DISTINGUISHED SPEAKER SERIES

As part of its yearlong Golden Jubilee, Missouri S&T’s computer science department highlighted world-renowned faculty and government and national campus leaders through its Distinguished Colloquium Speaker series. The spring series, which ran from March to May this year, featured six speakers from around the country.

Kicking off the series on Monday, March 7 was “An expanding and expansive view of computing” presented by Dr. James Kurose, assistant director of the National Science Foundation for Computer and Information Science and Engineering directorate. Kurose is on leave from the University of Massachusetts-Amherst, where he is a distinguished professor in the College of Information and Computer Sciences.

“Advances in computer and information science and engineering are providing unprecedented opportunities for research and education,” Kurose said. “My talk includes an overview of CISE activities and programs at the National Science Foundation and a discussion of current trends that are shaping the future of our discipline. I also discuss the opportunities as well as the challenges that lay ahead for our community and for CISE.”

On Monday, April 25, Dr. Maria Klawe, president of Harvey Mudd College, presented a speech titled “Getting more women into tech careers.”

“Analysis of data, as it is being generated, enables timely response,” Chandy said. “Sensors, social media, phones and other devices generate streams of data. ‘Right-time’ analytics extracts the information from data streams that enables effective, timely response. This talk describes StreamPy, a tool for analyzing data in motion to obtain right-time analytics.”

On Monday, April 11, Dr. S. Rao Kosaraju, Edward J. Schaefer Professor at Johns Hopkins University and division director of the computer and communications foundation at NSF/CISE, spoke on Monday, April 11, on “Basic research can pay off big — a network design example.”

On Monday, April 18, Dr. Klara Nahrstedt, Ralph and Catherine Fisher Professor at the University of Illinois Urbana-Champaign, presented a speech titled “Trustworthy cyber-physical infrastructure for electrical vehicles.”

And on Monday, May 2, Dr. Rajesh Gupta, Qualcomm Professor in Computer Science and Engineering at the University of California-San Diego, presented “Building computing machines that sense, adapt and approximate.”

A similar slate of speakers has been lined up for fall 2016. Distinguished speakers include Dr. David Culler (UC Berkeley) and Dr. Daniel Reed (University of Iowa) among others.

“Klawe initiated the BRAID initiative — Building, Recruiting And Inclusion for Diversity — of which S&T is a part,” said Dr. Sajal Das, chair of computer science and Daniel St. Clair Endowed Chair of computer science at S&T. “Missouri S&T has received a three-year grant from BRAID that is helping us build a community of women and minority students in computer science and sending a large number of them to the annual Grace Hopper Conference on Women in Computing. Such efforts have resulted in a more than 20 percent increase in female student enrollment in computer science in the last two years.”

Other speakers in the series were Dr. S. Rao Kosaraju, Edward J. Schaefer Professor at Johns Hopkins University and division director of the computer and communications foundation at NSF/CISE. He spoke on Monday, April 11, on “Basic research can pay off big — a network design example.”

On Monday, April 18, Dr. Klara Nahrstedt, Ralph and Catherine Fisher Professor at the University of Illinois Urbana-Champaign, presented a speech titled “Trustworthy cyber-physical infrastructure for electrical vehicles.”

And on Monday, May 2, Dr. Rajesh Gupta, Qualcomm Professor in Computer Science and Engineering at the University of California-San Diego, presented “Building computing machines that sense, adapt and approximate.”

A similar slate of speakers has been lined up for fall 2016. Distinguished speakers include Dr. David Culler (UC Berkeley) and Dr. Daniel Reed (University of Iowa) among others.
Smart computing has weaved its way into people’s everyday lives, from healthcare to transportation, from security to social media, and Missouri S&T is a leader in this growing field.

Missouri S&T was a co-sponsor of the Institute of Electrical and Electronics Engineers (IEEE) International Conference on Smart Computing (SMARTCOMP 2016) held on May 18-20 in St. Louis. Dr. Sajal K. Das, the Daniel St. Clair Endowed Chair and department chair of computer science, was on the steering committee and was the conference’s co-chair.

“We wanted to bring IEEE SMARTCOMP 2016 to St. Louis because Smart Living is one of our signature areas, and this will give Missouri S&T a lot of visibility,” says Das, who attended the first IEEE SMARTCOMP conference in 2014 in Hong Kong. “This conference will continue to grow over time.”

Multidisciplinary smart computing has two major topics: designing and building smart systems and using computing to improve the human experience.

Topics at the conference included all aspects of smart computing such as smart healthcare, smart energy, smart cities and connected communities, mobile and sensor networks, the internet of things, big-data analytics, pervasive and cloud computing, security and privacy, social informatics and cyber-physical systems.

The first day included workshops, with one keynote talk and four sessions on each of the next two days. Featured topics included smart mobility, smart healthcare, smart sensing and smart cities. The conference program also included a cutting-edge panel on the challenges and opportunities of connected communities, a Ph.D. forum and a National Science Foundation-sponsored session on smart service systems.

As a co-sponsor along with the NSF, the IEEE Computer Society and the IEEE St. Louis Section, Missouri S&T sent a strong contingent to the conference. The registration and finance chair was Dr. Maciej Zawodniok, associate professor of electrical and computer engineering. Technical program committee members included Dr. Sanjay Madria, associate chair for undergraduate studies and professor of computer science; Dr. Abusayeed Saifullah, assistant professor of computer science; Dr. Simone Silvestri, assistant professor of computer science; and Dr. Debraj De, a post-doctoral fellow in computer science. Dawn Davis, a computer science department office support assistant, was the conference’s web chair.

In addition, Yoelit Hiebert, EE’81, MS EE’89, and Dr. Prasenjit Shil, MS EMgt’04, Ph.D. EMgt’08, served as local arrangement co-chairs. An NSF grant paid for 29 students from around the U.S. to attend the conference, including six from Missouri S&T.

Keynote speakers were Dr. Raj Rajkumar, George Westinghouse Professor of Electrical and Computer Engineering and Robotics Institute at Carnegie Mellon University, and Dr. David Corman, Cyber-Physical Systems Program Director at the National Science Foundation.
Dr. Bruce M. McMillin, professor of computer science and associate dean of the College of Engineering and Computing at Missouri S&T, was elected to a three-year term on the Institute of Electrical and Electronics Engineers (IEEE) Computer Society Board of Governors in August 2015. The IEEE is the world’s leading membership organization for professionals in all aspects of advancing technology. The computer society is the largest of the 39 IEEE technical societies.

A Columbia cornfield is the site of a Missouri S&T computer science research project that uses drones to look at how climate change affects agricultural fields.

The National Science Foundation-funded research into unmanned aerial vehicles is part of the Missouri Transect project. “As the Earth warms, changes in crop production can have profound effects on food scarcity and distribution,” says Dr. Simone Silvestri, an associate computer science professor. “We are using a swarm of UAVs to monitor how crops respond to climate change and drought while designing a novel framework to optimize the trade-off between the monitoring accuracy and cost.”

Prospective users such as farmers can remotely submit monitoring mission details through a web application. The proposed framework provides efficient algorithms to distribute the monitoring missions and autonomously schedule flying operations for the remotely operated vehicles.

The drones are equipped with RGB, hyperspectral and thermal cameras that can gather a variety of information on several crop features such as plant growth, health and water stress.

Before it’s time to fly, Silvestri’s student researchers first make use of a local, autonomous weather-monitoring station to determine if it’s safe to fly. The Columbia corns are then tracked from first planting until harvest.
IEEE PERCOM 2015

As part of our Golden Jubilee celebration, the computer science department at Missouri S&T organized and co-sponsored the 13th IEEE International Conference on Pervasive Computing and Communications held in St. Louis in March 2015.

The general co-chairs of this flagship conference were Dr. Ali Hurson and Dr. Sajal Das of the computer science department. IEEE PerCom offered a high-quality technical program and featured three excellent keynotees by Dr. Maja Matarić (University of Southern California), Dr. Guruduth Banavar (IBM Watson Research Center), and Dr. James Kurose (assistant director of NSF CISE directorate). Several cutting-edge workshops ran in parallel with the single-track main conference. PerCom 2015 also featured an exciting panel discussion on the topic “Cyber-Physical Systems and Pervasive Computing: Overlap or Divergent?” Dr. David Corman, an NSF program director, argued that there is an overlap between cyber-physical systems and pervasive computing, as cyber-physical systems will enable the ubiquitous technologies of tomorrow.

In numbers, IEEE PerCom 2015 was a tremendous success. The conference received a total of 243 submissions, of which only 15 full-length papers and 14 concise papers were accepted for presentation, representing an acceptance rate of 12 percent. The program included four candidate papers for the Mark Weiser Best Paper Award, which eventually was awarded to “Energy Modeling of System Settings: A Crowdsourced Approach,” by E. Peltonen, E. Lagerspetz, P. Nurmi, and S. Tarkoma from the University of Helsinki in Finland. The runner-up award was presented to “WiBreathe: Estimating Respiration Rate Using Wireless Signals in Natural Settings in the Home,” by Ruth Ravichandran, Elliot Saba, Ke-Yu Chen, Mayank Goel, Sidhant Gupta and Shwetak N. Patel from the University of Washington.

NEW FACULTY HIRE S

Dr. Haoyi Xiong, assistant professor, received his Ph.D. in computer science from Institut Mines-Telecom/Telecom SudParis in France and Universite Pierre et Marie Curie in 2015. He was a postdoc at the University of Virginia in 2015-2016. His research interests include ubiquitous computing, mobile computing, crowd sourcing, optimal sequential decision-making and submodular optimization.

Dr. Zhishan Guo, assistant professor, received his Ph.D. in computer science from the University of North Carolina at Chapel Hill in 2016. His research interests include real-time systems, cyber-physical systems, neural dynamic systems, and machine intelligence.

Dr. Yanjie Fu, assistant professor, received his Ph.D. in management information systems from Rutgers University in 2016. His research interests include data mining and business analytics, with an emphasis on urban computing, mobile analytics and personalized techniques, particularly from the perspective of combining urban computing and business analytics for urban business intelligence.

ROTHSCHILD HONORED FOR SERVICE TO S&T

Alumna Susan H. Rothschild, CSci’74, a former president of the Miner Alumni Association, is one of five Missourians honored in 2015 for outstanding service to the University of Missouri System. Each year, the University of Missouri System Alliance of Alumni Associations and Extension awards the Presidential Citation Award for outstanding and continuing service to the University of Missouri and its four campuses. The honorees were recognized during the 2015 University of Missouri System Legislative Day Rally at the State Capitol in Jefferson City. The Alumni Alliance selects one individual from each of the four campuses and Extension. The UM System president may also select recipients on behalf of the system.

Rothschild began her career with Southwestern Bell and remained with the corporation for 14 years before joining Sandy Rothschild and Associates as vice president. She later earned a master of accounting degree from the University of Missouri-St. Louis and joined the firm of John T. Straub, CPA. She retired in 2013.
GRADUATION DOESN’T MEAN GOODBYE.

Tell us how you’re doing. We’d love to hear about new appointments, degrees earned, job promotions and other family or professional news.

Get in touch with us by emailing csdept@mst.edu. Tell us what you’re doing with a degree in computer science so we can feature your accomplishments among our alumni achievement stories.