COMPUTER SCIENCE IS FOR EVERYONE

Katie Courage

Chris Wilcox left a comfortable career in the tech industry to go back to school. Why? To get a Ph.D. – “purely because I wanted to get involved in teaching,” he explained.

Wilcox is now a special assistant professor in the CSU Department of Computer Science. But year after year, he noticed something peculiar when he looked out over his classroom: He would see about 10 women. Out of a class of 100.

So, along with Assistant Director for Advising and Mentoring Debbie Bartlett, Professor Adele Howe, Professor Indrakshi Ray, and others, Wilcox has been on a mission to change that ratio – and make computer science at CSU welcoming to all.

One powerful way to do that is to change the way fundamental courses are taught. Traditionally, these classes were lecture-, test-, and math-heavy, where students were expected to make it or break it on individual effort alone. Such a model fostered competition and isolation, further discouraging students who might already feel like they don’t belong, Wilcox said.

He has flipped some of his classes around. So instead of just listening to him lecture, students are expected to study the day’s lesson beforehand then come to class ready to engage with Wilcox and with each other. Programming projects are no longer done alone but in pairs, creating dialogue and helping all students contribute.

But Wilcox is not soft on rigor. In fact, his in-class clicker quizzes are built to be so challenging that students have to work together to solve them: “They’re loud and boisterous, and they scream and yell – and they teach each other.”

And in that dynamic environment, confidence gaps begin to evaporate, he said. All of the students “start to realize, ‘hey, maybe not everybody knows everything.’” And that can be the key to retaining students who might not otherwise see that others are grappling with the same challenges.

The pedagogic refresh is one way to diversify the department’s student population. Wilcox and others have also helped launch new scholarships, clubs, teaching programs, and outreach, such as Girls Who Code and Summer Programming Camp.

In a short time, Wilcox has seen tremendous success. From the eternal 10 percent, the proportion of female students in his course grew to 19 percent for the Spring 2016 semester.

“That’s a big deal,” he said. He knows there is still a way to go. But, as he can see each day in his classes, “something’s happening.”
MESSAGE FROM THE CHAIR

Greetings from Fort Collins! The spring semester is well underway, and the computer science department continues to grow and transform. We are bursting at the seams with high-quality undergraduates, welcoming extremely talented new faculty, instructors, and staff members, making strides in diversity, and growing our K-12 outreach activities.

When I first became department chair in 2003, we had 16 tenure-track faculty and approximately 400 majors. We have grown to approximately 800 majors – the largest number in the history of the department, and it increases every year. We now have 22 faculty and hope to add two more for Fall 2017. It is not just that there are more computer science majors – students from a wide array of majors now find it valuable to have a class in computing.

We are also working to provide more scholarships to incoming students. We created a new Inclusion and Excellence Scholarship specifically to attract talented first year students who are deciding where to go to college and if CSU is the right fit for them. We are always excited about attracting exceptional talent to CSU. And to help our students succeed in the job market, we held our well-attended annual networking dinner last fall that connected dozens of companies and 100-200 computer science students.

We are pleased to welcome three new faculty to the department. Laura Moreno works in software engineering. Louis-Noël Pouchet works in high performance computing. And Lorenzo De Carli works in networks and security. We also added a new advisor (with the title of Academic Success Coordinator); that position was filled by Albert Lionelle, an alumnus of the CS department.

Our diversity and outreach efforts are gaining momentum. The number of women enrolled in the CS major has increased, and 2016 was the first year we sent several women (faculty and students) to the Grace Hopper conference. Our female students and alumni also won awards for their research at Grace Hopper and the Rocky Mountain Celebration of Women in Computing. The student chapter of the Association of Computing Machinery Council on Women in Computing (ACM-W) has quickly become popular, and our Girls Who Code club is already full. This summer we will again host several computing camps for middle and high school students from underrepresented groups.

Thank you all for supporting our department community. Enjoy this newsletter, read more news on our webpage, and feel free to contact us or stop by – you are always welcome!

Darrell Whitley, Ph.D.
Professor and Chair

DEPARTMENT HIGHLIGHTS

Massive Data No Match for NSF CAREER Award Winner Sangmi Pallickara

Big data can be immensely powerful, but only if it can be efficiently used. Otherwise its sheer volume – whether from satellites, genomes or Twitter – becomes a bottleneck in the scientific process. So when scientists are faced with the sorts of massive datasets now available, knowing how to start analyzing them can be daunting, if not downright impossible. That’s where Assistant Professor Sangmi Pallickara and her research come in. Recent winner of a National Science Foundation CAREER Award, the NSF’s most prestigious that support early-career faculty, Pallickara is working on numerous programs to help make big data usable.

Industrial Advisory Board – Over 25 Years and Still Going Strong

The Department of Computer Science is grateful for the active participation, involvement, and support from a wide range of industrial partners. Our Industrial Advisory Board members contribute expertise and perspective about our educational and research mission. They provide practical suggestions, objective assessment, and give their time and resources to scholarships, student organizations, research and technology transfer, teaching and guest lecturing, and many other initiatives and activities. The department community benefits enormously from this valuable communication and collaboration. If your organization is interested in joining our Board, you are welcome to visit our website for more information. We look forward to working with you!

Visit the IAB website

New Inclusion and Excellence Scholarship

The department offers a variety of scholarships for juniors and seniors, but the new Computer Science Inclusion and Excellence Scholarship has been created to attract highly qualified underrepresented first year students. The department is very proud of its outstanding undergraduates, and we are always excited about recruiting exceptional talent to CSU.

Donate to the Inclusion and Excellence Scholarship
Read about our available scholarships

COLLEGE OF NATURAL SCIENCES – COMPUTER SCIENCE
BILLION-DOLLAR HACK – OR NOT? A NEW APPROACH TO CALCULATING TRUE COST OF SECURITY BREACHES

During the holiday shopping season a few years ago, Target’s systems were hacked, compromising credit and debit card data of some 40 million customers, and exposing the names and contact information of 70 million people.

Target estimated the total cost of the breach at $252 million. An outside firm, however, added another $38 million for an estimate closer to $290 million. Why the millions in difference?

It turns out that estimating the cost of a security breach is still more art than science, according to research by Colorado State University computer science faculty.

And the issue of assessing hacks is important – to companies as well as to consumers. Security failures might not always be as highly publicized as those at major retailers, such as Target or Home Depot (which suffered a similar incident in 2014). But data breaches occur at more than four in 10 companies in the U.S. each year.

CSU study on security risks

Despite this prevalence – and the increasing amount of sensitive information transmitted digitally every day – “we found out that there has been very little attention paid to the impact,” said Yashwant Malaiya, professor of computer science in the College of Natural Sciences at CSU.

He and colleague Abdullah Algarni, a doctoral researcher in the same department, are among the first researchers to tackle this thorny issue. In studying overall security risk (an organization’s risk being defined as the probability of a breach multiplied by the impact of the breach), they noticed that models to predict the actual financial impact of these data breaches can be radically different.

“Existing approaches can yield widely different values,” Malaiya said – some by two full orders of magnitude. For instance, some companies peg breach costs largely to the cost of personnel time to rectify the situation. Others include additional ramifications, such as lawsuits, increased insurance premiums, lower stock prices, systems security fixes and improvements, and even passing intangibles, such as loss of brand value and market share.

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CSU STUDENTS JOIN THOUSANDS FOR CELEBRATION OF WOMEN IN COMPUTING

This past fall, 10 undergraduate computer science students from Colorado State University had the opportunity to rub elbows with some of the biggest names in computing – all of whom were women.

The occasion was the Anita Borg Institute’s Grace Hopper Celebration of Women in Computing, an annual conference that draws more than 15,000 attendees, held last year in Houston, Texas. The CSU students in attendance all received special awards to attend the meeting, where they were able to meet women at all stages of their careers – and hear from high-level speakers, including Ginni Rometty, the current president and CEO of IBM, Latanya Sweeney, the founder and director of Harvard’s Data Privacy Lab, and Megan Smith, the United States Chief Technology Officer. They also met up with CS department alumna Anne Spencer Ross (’14) who won second place in the conference’s research competition, as well as CSU alumna Bonnie Ross (’89) who is a vice president at Microsoft.

The conference provides an important touchpoint for women in a field that is still staggeringly lacking in diversity. Nationally, fewer than one in five bachelor’s in computer science goes to a woman. But that’s a trend that the College of Natural Sciences and its computer science department have been working to address. Rallying support to send a group of female computer science students to this meeting for the first time is one of the ways the department is helping to bolster and encourage this growth. To support students attending the Grace Hopper Conference, please donate here.

Seeing a path

Among the students who attended the conference was Laura South, a computer science major, who is also the chair of the Association of Computing Machinery Council on Women in Computing (ACM-W) chapter on campus. She found the whole environment of the conference transformative. “The biggest take-away for me was just the experience of being surrounded by accomplished, brilliant women in my chosen field of study,” she said. After attending sessions led by young female entrepreneurs, for example, she said, “they were all incredibly inspirational because I could see my own goals reflected in their path.”

While there, the students were also able to attend the career fair, which offered relevant jobs and internships with companies from across the globe. “The conference exposed me to the variety of career paths that are available to someone with a computer science background,” said Audrey Newlon, a computer science major and lead for public relations for CSU’s ACM-W group. She said just catching the bus to the conference one morning, she sat next to a manager at the open-source software company Red Hat and was able to discuss career insights with her. “It was such a simple way to connect with a successful woman in the field,” she said. “It’s rare to make those connections on a morning commute, but at Grace Hopper it’s very common.”

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COLLEGE OF NATURAL SCIENCES – COMPUTER SCIENCE
NEW FACULTY AND STAFF

LAURA MORENO
Laura Moreno is an assistant professor with research interests in software maintenance and evolution, program comprehension, software analysis, and mining software repositories. The core of her work is empirical in nature and focuses on the development of tools, methodologies, and practices that help software developers better understand and change large-scale software. Prior to joining CSU, Moreno completed her Ph.D. at the University of Texas at Dallas.

LOUIS-NOÉL POUCHET
Louis-Noël Pouchet is an assistant professor working on optimizing compilers for scientific computing and has designed numerous compilation approaches to effectively map applications to CPUs, FPGAs, and SoCs. His work spans a variety of domains, including compiler optimization, hardware synthesis, machine learning, programming languages, and distributed computing. His research is currently funded by the U.S. National Science Foundation, the U.S. Department of Energy, and Intel. He is the author of the PolyOpt and PoCC compilers and of the PolyBench benchmarking suite.

LORENZO DE CARLI
Lorenzo De Carli is an assistant professor with research interests in network security, high-performance packet processing, malware analysis, and usable security. His contributions include hardware accelerators for packet inspection and forwarding, parallelization strategies for intrusion detection, and analysis of malware communications. He has also worked on optimized signature matching and instruction scheduling for novel processor architectures. De Carli received an M.Sc. (2010) and Ph.D. (2016) in computer science from the University of Wisconsin-Madison.

ALBERT LIONELLE
Albert Lionelle joins us as academic success coordinator. He is an alumnus of the CS department, graduating with a B.S. in 2002 and an M.S. in computer vision in 2005.

DAVE MATTHEWS
Dave Matthews is a special instructor with research interests in local search and machine learning. Prior to joining CSU, Dave worked in industry for over 37 years, mostly at HP.

IN MEMORY: PROFESSOR ADELE E. HOWE (1961 — 2017)
Professor Adele E. Howe passed away on January 20 after a long battle with cancer. Professor Howe was a faculty member in our department for 25 years and was internationally recognized for her research in artificial intelligence. She was an AAAI Fellow, the inaugural recipient of the ICAPS Distinguished Service Award, Professor Laureate in the College of Natural Sciences, and served the United States as a member of the U.S. Defense Science Study Group. She was also a champion for diversity in computer science and dedicated to providing high quality undergraduate education.

If you wish to honor Professor Howe’s life and work, her family asks you to consider donating to the CSU Department of Computer Science Inclusion and Excellence Scholarship. This fund promotes inclusion and excellence in the department by recruiting and retaining stellar underrepresented students in computer science.

You may donate by clicking here.

SUPPORT THE DEPARTMENT

Your support of the department is incredibly valuable. Please consider making a difference to today’s students, faculty, facilities, and programs — at whatever level is right for you. Thank you!

For more information on giving, contact
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