CS@Mines News

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Letter from CS Division Director

The CS faculty at Colorado School of Mines has some exciting news to share. On July 1st, 2016, the Division of Computer Science was established!

CS@Mines has 13 faculty and is the fastest growing program at Colorado School of Mines (with approximately 320 undergraduate and 60 graduate students as I type). Our students continue to be of the highest quality, and we constantly work to enhance our courses for them. Our research program is also growing with areas of focus in algorithms, high-performance computing, robotics, machine learning, networking, security, and computer vision. We emphasize diverse opportunities for our students, industry collaboration, and we are committed to improving diversity and computer science education for Colorado and the nation.

CS@Mines looks much different than it did a few years ago. We are grateful for the recent progress we have made to create our new Division, as well as the on-going expansion of "computing across Mines" (e.g., we are collaborating this semester with both the Physics and Petroleum Engineering Departments to help expand computing education for their students).
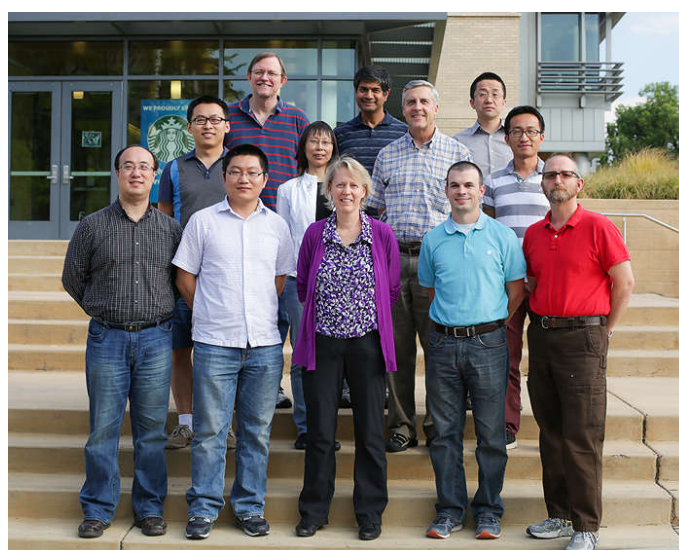
Our first CS@Mines newsletter is in your hands, and includes a few examples of recent activities. I invite you to visit our website (http://cs.mines.edu) for all the details!

Tracy Camp

Tracy Camp, Ph.D.
Professor and Division Director
Division of Computer Science
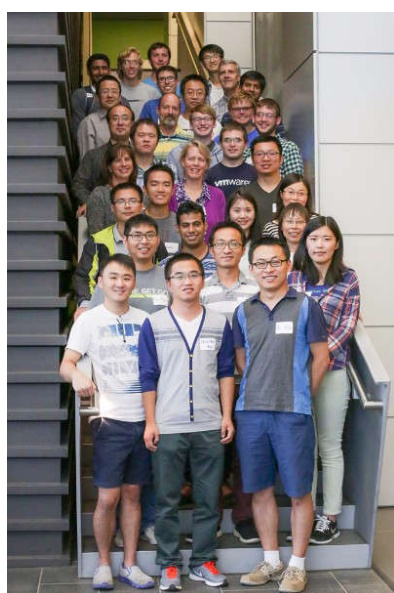
CS@Mines faculty and graduate students at our welcome event in September 2016.

Mines CS Faculty
Front: Hua Wang, Hao Zhang, Tracy Camp, Jeffrey Paone, Keith Hellman
Middle: Bo Wu, Qi Han, William Hoff, Dejun Yang
Rear: Christopher Painter-Wakefield, Dinesh Mehta, Chuan Yue
Missing: Cyndi Rader

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Faculty News & Honors

Ben L. Fryrear Assistant Professor Dejun Yang (third from the left) received a Best Paper Award at GLOBECOM 2015 with his four collaborators, for "Enabling Green Mobile Crowd Sensing via Optimized Task Scheduling on Smartphone" in San Diego, California in December 2015.

Professor Dinesh Mehta was recently selected as Faculty Senate President. The Faculty Senate promotes cooperation and understanding among the various constituencies that comprise the school by providing a forum for the faculty to express their concerns to the Administration and the Board of Trustees and fostering and maintaining a stimulating atmosphere for teaching, scholarship and service. Professor Mehta is honored to serve as the voice of the faculty.
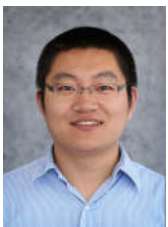
Cyndi Rader, Teaching Professor of Computer Science, received the Mines Teaching Award for being an outstanding member of the Teaching Faculty in April 2016. The purpose of the award is to recognize superior teaching at the undergraduate level over a period of several years and to provide encouragement and incentive for teaching achievement. Dr. Rader's teaching abilities are well attested to by excellent student reviews and multi-faceted pedagogical innovations.

Congratulations to CS professors Jeff Paone, Cyndi Rader and Chuan Yue, who were selected as three of the seven inaurgural Daniel's Fund Fellows. Paone and Rader's proposal includes an ethics instruction overhaul, revolving around timely issues such as the use of drones and data mining. Yue's proposal discusses responsibilities that arise in addressing cyber terrorism and information warfare.

CS Assistant Professor Bo Wu and his collaborator, Xu Liu from the College of William and Mary, won the Best Paper Award for "ScaAnalyzer: A Tool to Identify Memory Scalability Bottlenecks in Parallel Programs" at the International Conference for High Performance Computing, Networking, Storage and Analysis, on November 20, 2015, in Austin, Texas.

Supercomputing 2015 had over 12,000 attendees. Each year, the SC Technical Papers Committee identifies one paper as the best paper from the Conference's Technical Program. Many of the submitted papers are from researchers from top universities, industry research labs, national labs and research institutes from around the world. The full text of Wu and Liu's winning paper is available online.

CS Assistant Professors Hao Zhang and Hua Wang won Best Paper Finalist at the 2016 Robotics: Science and Systems (RSS) along with collaborator Fei Han for "Robust multimodal sequence-based loop closure detection via structured sparsity". RSS is one of the top conferences in robotics, with its 2017 edition being held at MIT.

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Faculty News & Honors

Teaching Associate Professor Jeff Paone was one of 30 Mines faculty selected for the Engineering Learning Showcase, hosted by the Trefny Innovative Instruction Center. Faculty met throughout the summer to revise courses with an intentional design process that positions students to cognitively engage with content and data using professional tools, while also collaborating with peers to develop content expertise and professional practices.

The Denver-Rocky Mountain Chapter of the Association for Computer Operations and Management (AFCOM) sponsored a new data center-focused scholarship at Mines. In the near future, three scholarships will be awarded annually with one going to a junior majoring in computer science each year.

CS Division Director and Professor Tracy Camp presented "Putting a Dent in the Universe" on March 30th, 2016 focusing on how we innovate and impact the world. She challenged Mines to consider requiring every student to take at least one coding course. She also emphasized how diverse groups lead to better and faster problem-solving. One of the most moving parts of her presentation was the story of when Dr. Camp received her 2013 ACM Fellow Award. A coordinator mistook her for the spouse of a fellow and gestured her to leave the stage, saying, "This photo is only for the actual Fellows." That photo can be seen above in the bottom right corner.

Each year, the Faculty Senate Distinguished Lecturer is given the honor of carrying the university mace into the commencement ceremony. The picture below is from the spring 2016 graduation.

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Research & Development

CS faculty to improve mine safety

Associate Professor Qi Han has been awarded an NSF grant to improve communications in underground mines. A collaboration with CSU and Mining Engineering at Mines, the project will design, prototype and test a novel framework of low-cost, energy-efficient and reliable sensor nodes and commodity smartphones to improve safety in mining.

A CS@Mines field session team, consisting of Austin Kauffman, Zac McClain, Evan Balogh, and Travis Johnson, advised by Christopher Painter-Wakefield, built an app to track gymnasts' performance data for the United States Olympic Committee.

After a successful summer internship at LGS Innovations in 2015, Ph.D. student Wendy Fisher helped bring $50K to Mines for further research on "Needle". Needle is a novel machine learning technique/application to identify non-commercial base station routers in protected space, which can disrupt the connectivity of end users and cause service issues for the providers (e.g., Sprint, Verizon, AT&T, T-Mobile). In related news, 22 CS students toured LGS Innovations in fall 2015, only to discover nearly half of their guides were Mines alumni!

NSF awards $1M for wastewater treatment smart sensors

A multidisciplinary team, including CS Professor Tracy Camp, has received a $1 million award from NSF to develop an innovative monitoring and control system for small wastewater treatment facilities.

The project, titled "Self-Correcting Energy Efficient Water Reclamation Systems for Tailored Water Reuse at Decentralized Facilities," draws on the bioreactor at Mines Park, which treats more than 7,000 gallons of domestic wastewater each day, and will integrate existing and new wireless sensor networks to monitor water quality.

NSF award for HPC research

Assistant Professor Bo Wu has received an NSF grant of $199,671 for his project, "Exploring Portable Data Placement on Massively Parallel Platforms with Heterogeneous Memory Architectures." His project aims to address the obstacles between heterogeneous hardware and applications due to programming complexity and fast hardware evolution.

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CS@Mines Alumni

Meet-ups

During her travels, Dr. Tracy Camp has been having informal meet-ups with CS Alumni. Two example meet-ups were with Doug Hakkarinen in Houston and Hassan Abdel-Rahman in New York City.


Rishi Malik, CS@Mines alum and co-founder of Parkifi, was featured in Denver Business Journal, Business Den, and Fortune for raising $9.5 million in Series A funding for Parkifi's real-time parking data technology.

Colin Marshall (B.S. in 2016) works at Amazon for a team that manages products and inventory for dropship vendors; her first project was to ensure that the services are prepared to handle the increased traffic over the holidays. She writes, "Operating at such a high scale can create complex problems, so I have learned a lot about making sure things work as efficiently as possible. Overall, working for Amazon has been a great experience."

Colton Thomas (B.S. in 2016) is an Implementation Consultant for Fast Enterprises, currently relocated in Baton Rouge, Louisiana, to help develop the States tax software. He writes, "I get the opportunity to pinpoint a solution that satisfies the client's business practices and knowledge - transitioning the client from an out-of-date and inflexible system to a robust, dynamic system."

Stacey Osborn (M.S. in 2016) is a Software Engineer Level II working with RF and cellular technology at LGS Innovations, working with new and exciting emerging technologies including ZigBee, Bluetooth, Wi-Fi, and various cellular and RF technologies. She writes, "My current team works in an agile environment doing everything from the conceptual architecture through the implementation and testing phases of product development."
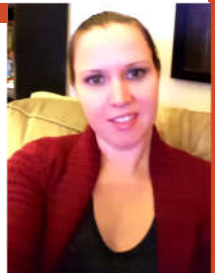
Victoria Kay (B.S. 2016) is a Software Engineer in the Signals Reconnaissance program at Lockheed Martin, coding mostly in C++ and Python in a Unix environment. She writes: "Because of my additional Applied Math degree, I have also gotten the opportunity to combine my math and coding skills to improve/redevelop one of the mathematical algorithms in the program."

Brandon Rodriguez (M.S. Dec. 2015) is a Software Engineer at Google in Boulder, Colorado working on Google Realtime API, which is a service for developers to create collaborative applications. Brandon writes, "The Realtime API allows developers to design custom Drive files. When a user edits the custom files, changes are propagated automatically to all users who are viewing the same document."

Daniel Zarrini (B.S. 2016) works at ConocoPhillips and is involved in several interesting (and challenging) projects, e.g., to send data from oil wells and store them in a Hadoop Cluster in real time. He writes, "I also work with Raspberry Pi's to create modules and code that can help our team be more efficient. Every day is different and interesting in its own way."

Taylan Dillion (B.S. in 2016) works at Nasdaq in Lakewood, Colorado. He works with a vast technical stack, from writing a browser user interface to working with big data in Amazon Web Services. Taylan writes, "The independent culture of the Colorado office is very supportive of adopting and implementing new technologies, driven by the passion to write software that is efficient, idiomatic, and easily scaled."

**CS@Mines alum:
come back and see us Jan 19th!
See: cs.mines.edu/alum**

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Student News & Honors

Mines students Jessica Gillan, Jade Irizarry-Swordy, and Krista Horn (pictured with HackPrinceton organizers)

Mines all-female team won second place in the Hardware category and the KPCB Build For Good Award as Team PowerGrab at HackPrinceton. The competition brought together over 600 of the nation's most promising developers and designers to create software and hardware projects. The three seniors (two EE and one CS) built a DC power supply to harvest the free vibration energy produced by a Pebble watch in an attempt to feed it back into the device to charge itself. Even more impressive, the students participated on their own initiative and not as part of a team or class.
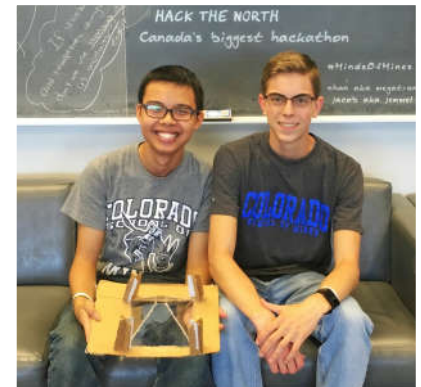

Wendy Fisher, Ph.D. candidate in Computer Science, presented "Crack Detection in Earth Dam and Levee Passive Seismic Data Using Support Vector Machines" at the International Conference on Computational Science, June 8, 2016 in San Diego, California. After competitive selection, she was invited to expand the paper for publication in a special issue of Journal of Computational Science. Fisher also won the EECS Outstanding Research Award for her research-related contributions in 2016.

Nicolás Rodríguez won third place for his presentation, "A Parallel Implementation of a Methodology for Fusing Existing Land Cover Products," at the RMACC High Performance Computing Symposium in Fort Collins. As part of his prize, Rodriguez will be attending the International Conference for High Computing, Networking, Storage and Analysis.

CS@Mines hosted the 2015 ACM Programming Competition with 16 teams competing. Congratulations to team "um": Martin Kuchta, Nate Lane, and Michael Harvey on placing 1st in the site competition and 2nd overall in the Rocky Mountain Region (out of 52 teams competition). They are pictured left with their advisor, Teaching Associate Professor Jeff Paone.

Doctoral student Rui Zao has been selected for the Rath award for best PhD thesis with the potential for the greatest societal impact in Dec 2016.

CS@Mines student Gokul Natesan was featured by the Denver Post in "Mines Guard Gokul Natesan is a super student and athlete."

CS@Mines undergraduates Nhan Tran and Jacob Emmel attended Hack the North, Canada's biggest hackathon, September 17-18, where they built a holographic emotional recognition system in real time. You can see all the highlights in Nhan's video of their adventure.

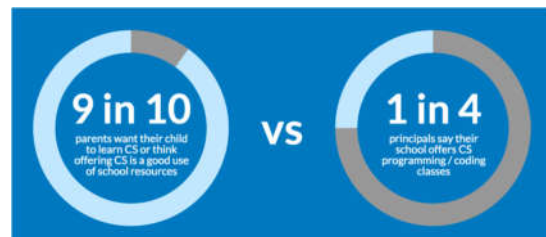**COMPUTER SCIENCE** DIVISION
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K-12 Outreach

CS@Mines Hosts CSPdWeek

Computer Science Professional Development Week was hosted by the Division of Computer Science July 21-22, 2016. Sponsors included NSF, NCWIT, and the Computer Science Teachers Association. More than 300 CS teachers gathered for training in hopes of providing K-12 students more opportunities. Speakers included Ruthe Farmer, White House senior advisor for tech inclusion; Robert Schnabel, executive director and CEO of the ACM; Ben Bayer, chief of stuff at Google; and Vandana Sikka, chairperson of Infosys Foundation.

Mines commits to #CSforALL

This fall the White House hosted a summit on Computer Science for All, marking progress on expanding computer science (CS) education and celebrating new commitments in support of the effort. Colorado School of Mines is a key member of the initiative and committed to doubling its outreach to CS educators in 2017. Mines will reach this goal due to its strong partnership with the Front Range Computer Science Teachers' Association (CSTA) .

Exploring Technology for middle school students

Computer Science students led summer camps for kids who want to learn to code during the summer of 2016. Exploring Technology offered 6th-9th graders experience using Scratch, a drag-and-drop introduction, and Greenfoot, a Java-based program. Middle school students also worked with the Finch robots, thanks to funding from Oracle Academy.

Discovering Technology supports girls in STEM


http://tech.mines.edu

Studies show that girls' interest in science/engineering subjects starts to decline the closer the girls get to middle school. In Fall 2012, Professor Tracy Camp and her female Computer Science students created a program targeting the 3rd-6th grade age group. Discovering Technology is designed to foster and continue girls' interest in the STEM subjects through creative and interactive activities. Last year more than 290 elementary-age girls participated, and the program has grown to include middle school in the Exploring Technology program, and high-school-aged girls in Creating Technology.

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C-MAPP and #idigmines
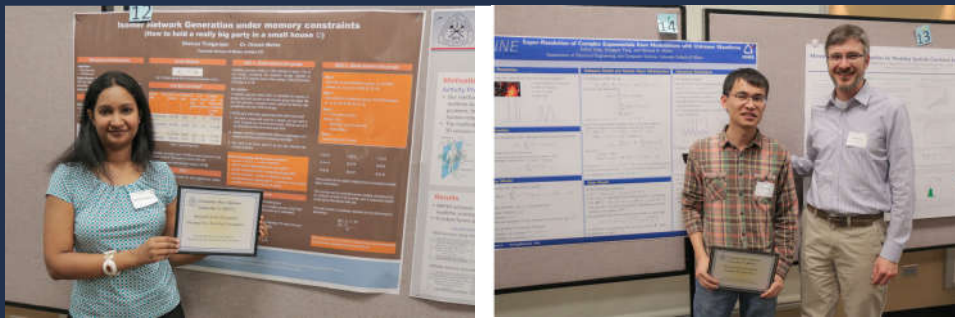
The Computing-Mines Affiliates Partnership Program (C-MAPP) is a new program as of 2014, designed to improve relationships between industry and CS@Mines while also providing professional learning activities for CS@Mines students. C-MAPP Partners (listed below) have a professional interest in the well-being of computing at Mines.

C-MAPP held its annual Awards Event in January 2016, which brings together CS@Mines students with C-MAPP leaders in the technology industry. At the event this year, Dehui Yangwon won Best Poster and Dheivya Thiagarajan won Best Oral Presentation. The 2015-2016 C-MAPP scholarship recipients were also announced at the event; 27 CS@Mines students received scholarships in Spring 2016 thanks to the C-MAPP sponsors.

Learn more about C-MAPP and the company sponsors at htpp://mapp.mines.edu. If your company is interested in becoming a sponsor, please contact Division Director Tracy Camp (tcamp@mines.edu).

Our next C-MAPP event will be Thursday, January 19, 2017, and CS@Mines alumni are invited. We look forward to seeing you there!

Please RSVP at: cs.mines.edu/alum

Thanks to our 2016-2017 Sponsors!

#idigmines

Watch for CS@Mines in the #idigmines competition that is being organized by the Mines Foundation. For CS@Mines to win the competition, we need *lots* of donors to participate on the #idigmines date (**set for Feb 9, 2017**). While large donations are clearly helpful as we continue to grow and improve CS@Mines, the winner of the competition will be the number of donations - thus, small donations are welcome!! And, as a reminder, many companies offer matching gift programs. Be sure to check to see if your employer may double, or even triple your contribution to Mines! We would love to see all CS@Mines students, faculty, alum, and industry partners participate in #idigmines on Feb 9th!

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