Greetings from the Computer Science Department at UCSB!

We are living in exciting times. The field of computer science is seeing unprecedented growth. In all areas of academia, business, and government, we are collecting and generating data at unprecedented scales, requiring new scalable algorithms and systems that are driving new discoveries and inventions. There is demand not only for new software and hardware, but also for skilled undergraduates and graduates. At UCSB, our campus’s unique interdisciplinary nature has brought the focus squarely on the department. We are leading and participating in multiple interdisciplinary projects with our colleagues on campus and at the same time adapting to changing practices in teaching and mentoring of students. The increasing demand has meant that we balance growth and quality and resources, and articulate an inclusive vision for the field. Happy to report that we are successful in this mission, thanks to our excellent faculty, staff, students, and support from the campus administration.

This newsletter summarizes some of our achievements for the past year: awards and honors and news from our students and alums. A unique event we have started in the past year has been a CS Summit that brings together our undergraduate students, graduate students, faculty, alums, and well-wishers into a single day of celebration. We had our inaugural event the past year and our next event is on March 6, 2017. Hope you will be able to join us!

Ambuj K. Singh
Professor and Chair
Prof. Rachel Lin’s research interests are in cryptography and theory of computation. Previously, she was a post-doctoral researcher at the Computer Science and Artificial Intelligence Laboratory at MIT, and the Department of Computer Science at Boston University. She received her PhD from Cornell University. Her research designs new cryptographic schemes and systems that securely implement these current and other forward-looking applications. An essential theme of her research is using cryptography to reduce or eliminate the need for trust on external entities. For instance, Rachel has focused on designing new protocols for performing computation over distributed sensitive data without central trusted servers, for outsourcing computation to unreliable cloud, for remote storage, access and processing of private information. She also maintains a broad interest in the connection between cryptography and theoretical computation science, and the integration of cryptography into large computer systems.

Dr. Diba Mirza joined the UCSB faculty in 2016. Previously, she was an Assistant Adjunct Professor in the Department of Computer Science and Engineering at UC San Diego. She received her PhD from UC San Diego. Dr. Mirza’s research interests are in embedded systems and sensor networks. She has worked as a researcher on multidisciplinary projects in the Electrical and Computer Engineering and Computer Science and Engineering departments, and in collaboration with the Scripps Institute of Oceanography at UCSD.

Prof. Stefano Tessaro’s research develops new provably secure cryptographic solutions for a number of tasks, and addresses the theoretical foundations of cryptography. His work interacts with many other disciplines beyond cryptography, such as theoretical computer science, computer security, information theory, and distributed algorithms. He currently holds the Glen and Susanne Culler Chair in the department.

Prof. William Wang joined the UCSB faculty from Carnegie Mellon in 2016. He is also an alumnus of Columbia University. He studies the theoretical foundation and practical algorithms for Artificial Intelligence. To build intelligent machines that can tackle challenging reasoning problems under uncertainty, Dr. Wang has pursued answers via studies of Machine Learning, Natural Language Processing, and Interdisciplinary Data Science. He is interested in designing scalable inference and learning algorithms to analyze massive datasets with complex structures. The central focus of his PhD dissertation research is to bring together all areas above and design scalable algorithms for large scale inference problems on knowledge graphs.
Divy Agrawal
Named a 2016 Fellow by the American Association for the Advancement of Science (AAAS) for his contributions to the design and development of scalable fault-tolerant infrastructures for large-scale data and information.

Tevfik Bultan
Named by the Association for Computing Machinery (ACM) as a 2016 ACM Distinguished Scientist for his contributions in formal modeling and verification. Prof. Tevfik Bultan has also received the 2015-16 Outstanding Graduate Mentor Award from UCSB’s Academic Senate. The Outstanding Graduate Mentor Award recognizes the contributions of faculty whose mentoring is considered exemplary.

Chandra Krintz
Selected as UCSB 2016 Faculty Sustainability Champion for her SmartFarm project that uses computer technology with the goal of making farmers and farms more productive and more sustainable. Atop funding from the National Science Foundation, Prof. Chandra Krintz and her SmartFarm team of students and fellow faculty members also have been supported by the California Energy Commission.

Linda Petzold
Awarded the 2016 SIAM Prize for Distinguished Service to the Profession. The prize is awarded to an applied mathematician who has made distinguished contributions to the furthering of applied mathematics at the national level.
Rich Wolski
Named a 2016 Fellow by the Institute of Electrical and Electronics Engineers for his contributions to high-performance, grid, and cloud computing. Prof. Rich Wolski also was chosen as “Outstanding Faculty Member” by Computer Science graduating seniors in 2016. In addition to teaching the department’s Operating Systems course, he is co-founder of Eucalyptus Systems, Inc. and also has led several national-scale research efforts in the area of distributed systems and is the progenitor of the Eucalyptus open source cloud project.

Stefano Tessaro
Received the 2016 Northrup Grumman Excellence in Teaching Award. The award recognizes early-career faculty for their contributions and dedication as undergraduate educators, reflected in part by feedback from students.

Rich Wolski
Named a 2016 Fellow by the Institute of Electrical and Electronics Engineers for his contributions to high-performance, grid, and cloud computing. Prof. Rich Wolski also was chosen as “Outstanding Faculty Member” by Computer Science graduating seniors in 2016. In addition to teaching the department’s Operating Systems course, he is co-founder of Eucalyptus Systems, Inc. and also has led several national-scale research efforts in the area of distributed systems and is the progenitor of the Eucalyptus open source cloud project.

Ben Y. Zhao
Named Distinguished Scientist by the Association for Computing Machinery (ACM). The designation is awarded to computing professionals whose significant accomplishments and advances in computing will yield real world impact.

Heather Zheng
Received a 2016 Google Faculty Research Award towards “60GHz Mobile Imaging Radar,” as part of Google’s growing efforts to support excellent research in academia. The highly competitive Faculty Research Awards program plays a critical role in building and maintaining strong collaborations with top research faculty globally.

Tim Sherwood
Received the 2016 ACM SIGARCH Maurice Wilkes Award. Presented “for contributions to novel program analysis advancing architectural modeling and security,” this annual award acknowledges an outstanding contribution to computer architecture made by an individual in the first 20 years of their career.
The research team of Aaron Demby-Jones and Professors Pradeep Sen and Theodore Kim was awarded Best Paper at the 2016 ACM SIGGRAPH / Eurographics Symposium on Computer Animation (SCA) for their paper titled “Compressing Fluid Subspaces.” This is the 15th year of the two-day SCA symposium, where industrial and academic researchers come together to discuss the art and science of computer animation.

Professor Huijia (Rachel) Lin was awarded Honorable Mention for Best Paper at the 2016 Eurocrypt, for her paper titled “Indistinguishability Obfuscation from Constant-Degree Graded Encoding Schemes.” The annual five-day international conference on the theory and applications of cryptographic techniques is one of the two top conferences on cryptography.

The research team of Benjamin Nuernberger, Kuo-Chin Lien, and Professors Tobias Höllerer and Matthew Turk was awarded Honorable Mention for Best Paper at the 2016 IEEE Symposium on 3D User Interfaces; for their paper titled “Interpreting 2D Gesture Annotations in 3D Augmented Reality.” The two-day, eleventh international symposium brought together industrial and academic researchers to present and exchange ideas on the state of the art and future directions in 3D user interface research.
Stacy Patterson
With support from the National Science Foundation, CS alum and researcher Stacy Patterson is building tools for programmers and developing a framework that developers can use to easily perform data analytics over a multitude of devices—making it easier to create applications that combine devices and the cloud. Dr. Patterson is the Clare Boothe Luce Assistant Professor of Computer Science at Rensselaer Polytechnic Institute (RPI). A prestigious five-year $618,661 NSF Faculty Early Career Development Award (CAREER) supports this project, “Toward a Machine Learning Framework for the Internet of Things.”

Amitabh Saran
Entrepreneurial alum Amitabh Saran, Founder and CEO of Altigreen Propulsion Labs and CS alum, won “Most Significant Innovation in Electric Vehicles” at the 2016 IDTechEx Show in Berlin. His team’s project was “HyPixi – Every Car a Hybrid.” The premise of his company’s technology is to build an affordable solution for developing countries that are suffering under high fuel prices and heavy tailpipe emissions.

Christo Wilson
CS graduate Christo Wilson has received a 2016 National Science Foundation CAREER Award (Faculty and Early Career Development Program) to develop methodologies and tools for conducting algorithm audits. Dr. Wilson is an Assistant Professor at Northeastern University in the College of Computer and Information Science.

Xia Zhou
PhD graduate Xia Zhou is off to a running start in her academic position: Dr. Zhou has received an NSF CAREER Award on “Ubiquitous Sensing Using Computational Light.” Dr. Zhou is an Assistant Professor in the Department of Computer Science at Dartmouth College.
WHAT INSPIRES FRESHMEN TO BECOME COMPUTER SCIENCE MAJORS?

While recent graduates Vivian Escalante and David Acevedo began their respective UCSB educations for different reasons, along the way they each pursued academic and personal passions that successfully carried them through the challenging and ultimately rewarding CS curriculum. Both earned their BS in Computer Science in 2016. Vivian is now as a Technical Project Manager at MobileProgramming LLC, and David develops websites and web aps at Citrix. David’s Capstone Team “CitrixNChill” mentored by Citrix, won First Place at UCSB.

In this Q&A feature, David and Vivian shared a few highlights.

Q: What attracted you to UCSB’s computer science program?

VIVIAN: I knew I somehow had to combine my passion for math with something practical for today’s world. This is when computer science came into my life. I had finally found something that included math as its foundation and also broadened my opportunities immensely. I also remember the day I sent my SIR (Statement of Intent to Register) for UCSB. It has been one of the happiest days of my life because I knew I’d found a place where I would be accepted for who I was, and where professors truly cared about their students.

DAVID: I didn’t know what computer science was back then. I just liked computers and playing computer games. I chose whatever had the word ‘computer’ in it. My favorite class at UCSB was the first one I took (Intro to Computer Science), even though I didn’t understand what was going on. The first test I basically failed. But after seeing the...
correct answers I began to understand what the questions were asking. That’s when it all clicked, and I ended up passing the class.

Q: Talk about your experience as team leader for your Capstone project.

VIVIAN: As team leader, the most essential characteristic to have in my opinion was to know when it was time to put on the leader face and when to switch it to team member face. The fact that we were engineers with different backgrounds emphasized the importance of being able to work with different types of people. In school, most projects are done individually, so if I fell behind this would only affect me. The stakes with Capstone were much higher because we were on a schedule with deadlines and we all depended on each other to keep our project on track. I ended my last year at UCSB with great friends and amazing teammates.

DAVID: I liked the Capstone project because there were lots of firsts. We had to come up with an idea out of thin air, we had to make a project from scratch, and we had to research what is available in our field in order for us to transform our ideas into reality. Basically, we had to apply everything we learned in school into one single project. I valued that the most about Capstone, as it made me understand why I needed all my lower and upper division classes. As the team leader, I made sure we functioned as a collaborative group. I also took care of whatever needed to be done to keep our project focused and moving in the right direction.

Q: Any closing thoughts you’d like to share, or advice for students entering the computer science program?

VIVIAN: Choosing a major and applying for college was quite a journey, especially being a first-generation college applicant. Specifically, I would thank my digital imaging teacher at Fairfax Senior High School in Los Angeles for inspiring me to pursue a career in computer science.

DAVID: Talk to people— anyone and everyone you can. Have conversations with professors, students, people in the workplace, and people with differing backgrounds. You can ask for advice and also about things they’re working on. Talking to people is my best advice.
INAUGURAL CS SOCCER GAME SCORES BIG ON FUN

Our first-ever CS faculty/staff vs. undergraduates soccer game is now one for the books, and proved to be a fun time for all. On May 18, 2016, students mixed it up with faculty and staff at UCSB’s Rec Cen. Big thanks to Prof. Tobias Höllerer for working so hard to make it happen! Hopefully next year we’ll have enough faculty and staff to make up the whole team. What a great opportunity for our undergrad students to interact with faculty on a different “playing field.” Final score: 5-4 undergrads. Great job, yellow team!

HIGH SCHOOL STUDENTS EXPERIENCE HOLOGRAPHIC COMPUTER AT FOUR EYES LAB

Focused on the “four I’s” of Imaging, Interaction, and Innovative Interfaces, the Computer Science Department’s Four Eyes Lab is co-directed by Professors Matthew Turk and Tobias Höllerer. The lab hosted groups of enthusiastic students from the Dos Pueblo High School Engineering Academy and the Santa Barbara High School Computer Academy. In addition to learning about cutting-edge research, the students experienced augmented reality with the lab’s new Microsoft HoloLens devices.

CAPSTONE AWARD WINNERS: TO THE VICTORS GO THE SPOILS

Congratulations to the winners of the 2016 Capstone project awards! Last year’s Capstone project competition played out in grand style at the Computer Science Department’s first-ever summit.CS event, held on March 4 at Corwin Pavilion. Teaming up with industry leaders, students worked on RFID-based localization; collaborative playlists management; an augmented-reality interface for construction projects; thermal camera tracking and actuation; encrypted search; drone vision tracking; data visualization; collaborative coding for instruction; and a social hub for musicians.

Bragging rights for the summit. CS undergraduate Capstone presentations were secured by the following teams:

First Place, Team “CitrixNChill,” mentored by Citrix
Second Place, Team “Under Construction,” mentored by Procore
Third Place, Team “Euphoria,” mentored by Sonos

Capstone projects give students the opportunity to go fully hands-on, translating theory and research into action. Add to this the give-and-take experience of working in small teams to solve problems, assess alternatives, and ultimately agree on a final deliverable. The results of their efforts were then formally presented on stage to a live audience.
TEAM SHELLPHISH NETS $750,000 WIN AT CYBER GRAND CHALLENGE

Shellphish pitted their skills against cyber-security experts from across the country to become one of the top teams in the 2016 Defense Advanced Research Projects Agency's (DARPA) Cyber Grand Challenge (CGC). The team of UCSB computer science graduate students emerged third overall, taking $750,000 in addition to the $750,000 cash prize they won for qualifying for the finals in Las Vegas.

“The Shellphish team did great considering that it was the only academic team in the top-three positions,” said faculty advisor and UCSB Computer Science Professor Giovanni Vigna. The top two teams, ForAllSecure and TechX, have academic origins but have spent years in industry.

“This recognition represents a major advance in automated analysis of software and automated cyber defense, said Ambuj Singh, UCSB Computer Science Department Chair and Professor. “The ability to detect and patch software vulnerabilities is extremely important for businesses and our society at large. At the same time, this competition provides an important venue for training our students in new emerging scientific domains.”

Boasting some of the youngest architects in the challenge, UCSB’s Shellphish team includes Team Captain Yan Shoshitaishvili, Antonio Bianchi, Kevin Borgolte, Jacopo Corbeta, Francesco Disperati, Andrew Dutcher (undergrad student), John Grosen (high-school student, now graduated), Aravind Machiry, Chris Salls, Nick Stephens, and Ruoyu “Fish” Wang.

Added Vigna, “For the Shellphish team, participating as a finalist in the Cyber Grand Challenge is a great achievement. We are proud to share this achievement with the six other amazing teams from top universities and companies whose sole focus is on vulnerability analysis.”

Victory did not come easily however, and Shellphish almost didn’t compete this year. The road to Vegas was plagued with fits and starts, making this year’s CGC win especially significant.