



Office of Naval Research Awards Kobourov and Collberg \$3.6 Million to Design Cybersecurity Map



Dr. Stephen Kobourov



Dr. Christian Collberg

Professors Stephen Kobourov and Christian Collberg will collaborate with the Office of Naval Research's Computer Network Defense and Information Assurance (CND/IA) Project to develop a comprehensive visualization system to detect and display on-going cyber attacks. Using one visualization tool, this system will gather network activity data - malicious and normal - and convert it into what looks like a geographical map. As people are familiar with the concept of geographical maps in everyday life, it is easier to use maps as a means to convey complex data in a meaningful form. "This visualization system will be able to visualize suspicious network activity without overwhelming the cognitive ability of human analysts and exhausting available computational and communication resources," said Kobourov.

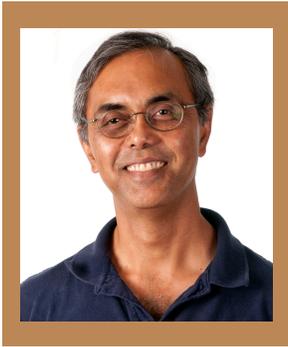
CS Big Sisters Program: Keeping Women Enrolled in Computer Science

According to Ashley Matthews, a CS undergraduate, it is difficult to recruit and retain women in Computer Science. She says that all too often, female students will leave the major prematurely due to feelings of inadequacy or not fitting in. Matthews wants to change this and has spearheaded a mentoring program called Computer Science Big Sisters. "The program is meant to be an orientation to provide support for women in intro CS courses. We plan on having sessions consisting of 7-10 intro-level women and 2-3 upper-division women. The sessions will be an opportunity for intro-level students to get to know other women in their classes, learn more about opportunities, support avenues, advanced CS classes and to be able to ask questions about a variety of topics such as programming/class advice and group dynamics. We hope that by giving students a little extra support early on it will encourage them to continue with the subject," said Matthews. To learn more contact amatthew@email.arizona.edu.



Computer Science Big Sisters mentors, pictured from left, Kate Maroney, Ashley Matthews, Elizabeth Connor and Isabel Kishi

Letter From the Department Head



It has been a while since our last newsletter appeared. A lot of exciting things have happened and we look forward to sharing these with you in this and future issues of our newsletter. Interest in the study of Computer Science has surged over the last couple years, making CS one of the most popular and fastest-growing majors in the College

of Science. There were over 700 students enrolled in Pre-CS and CS at the end of 2012: a 20% increase over the year before. This is consistent with enrollment trends at universities across the nation, though CS enrollments have grown faster at UA than national averages, which shows that our students have excellent taste.

Interestingly, though not surprisingly, this enrollment increase notwithstanding, the quality of CS students remains top-notch: for example, the SAT scores for CS undergraduates are among the highest in the College of Science. We've also been working hard to expand our course offerings to include Algorithms for Bioinformatics, Computer Security, Green Computing and Web programming, as well as courses on Cloud Computing and a Gen Ed. course for non-majors on Exploring Computational Creativity.

Finally, the CS department has teamed up with the two biology departments in the College of Science (Ecology & Evolutionary Biology and Molecular and Cellular Biology) to propose a new interdisciplinary BS degree program in

Bioinformatics. We hope to be enrolling students in this program in Fall 2014.

Our research activities have increased significantly over the last two years and our per capita research expenditures are now close to the highest amongst departments of comparable size across the country. We have received some significant new grants, including a \$3.6 million cybersecurity research contract from the Office of Naval Research to Drs. Collberg and Kobourov for visualizing suspicious activity on computer networks. We've also hired Todd Proebsting, one of the brains behind Microsoft's Azure cloud computing system. Todd joined us last semester and, as you will read in the interview on Page 3, he is glad to be back in the department.

The last couple years have seen many other changes to the department. Dr. Greg Andrews and Dr. Peter Downey retired, as well as John Luiten and (this summer) Phil Kaslo in Lab. Holly Brown, in Academic Services, is also leaving. We are delighted to welcome a number of new faces (pictured below): Christina Dentel and Christina Inocencio in Academic Services, Beth Marlatt and Pat Waters in the Business Office and Gemma Fenimore as Program Coordinator.

Through these and other changes, the UA Department of Computer Science continues to be a focal point of excellence: in teaching, in research and in service. I invite you to look through these pages to learn more about what we have been up to.

Saumya Debray

Our New Staff



Beth Marlatt
Business Manager



Pat Waters
Accounting



Christina Dentel
Academic Advisor



Christina Inocencio
Secretary



Gemma Fenimore
Program Coordinator

Interview: Todd Proebsting

The department is happy to welcome back Todd Proebsting. For those of you who do not know Todd, he was on our faculty from 1992-1997 before he left to join Microsoft Research. During his 15 years at Microsoft, Todd had many roles including being a founding member of Microsoft's cloud computing project which became Windows Azure. He also founded Microsoft's efforts to use prediction markets to help forecast future events. Todd enjoyed his success in industry and said he learned a lot. However, he is ready to return to academia, and we are glad to have him back at The University of Arizona.

Q. Why did you come back to The University of Arizona?

A. My decision was two-fold. I wanted to return to academia and I wanted to rejoin many of my former colleagues here at UA. We have a very close group of faculty in CS and I wanted the chance to collaborate with them again.

Q. What kinds of research are you involved in now?

A. Programming languages, cloud computing and information aggregation.

Q. What are software companies looking for in recent grads?

A. Knowledge. Resourcefulness. Independence. At Microsoft we looked for candidates with a solid education who had experiences that demonstrated the ability to get things done. Students who had participated in internships and/or academic research usually presented skill sets that we were



seeking. The software industry today is moving at such a fast pace, employers don't have time to coddle new employees. They need intelligent self-starters who can literally hit the ground running.

Q. How does it feel to be back in Tucson?

A. It's great to be back.

Interview: Isabel Kishi



Graduating senior Isabel "Izzy" Kishi is a vivacious and inspiring student who just might be what the department needs to energize new students and keep them interested in Computer Science.

Q. What makes you smile?

A. EVERYTHING! Seriously, there is a running competition amongst the section leaders to see who can make me laugh at something more ridiculous than the last joke or bad pun!

Q. What do you do in your spare time?

A. I'm addicted to Minecraft. It's how I avoid homework and grading.

Q. What made a Math Ed major switch to Computer Science?

A. Computer Science was my minor. I made the switch after months of being pestered by my section leaders to change my major. My hesitation was that I was not going to fit in and that I wouldn't be good at it. They kept telling me the

opposite and I finally realized they were right.

Q. Is there anyone in the department you admire?

A. Yes, Professor McCann. His teaching style is something I want to emulate in my classes.

Q. Speaking of teaching, how excited are you about teaching your own courses this coming year?

A. I am really excited (and also a little nervous)! As a section leader I always worked with Prof. McCann in 245. I will be teaching 127A which is a totally different class. It will be interesting to see where students have questions. But if there's something I love more than anything, it's helping students learn, so I'm really excited about the opportunity.

Student Awards



Katie Cunningham



Yi Huang



Benjamin Dicken



Isabel Kishi



Jawaharul Alam



Dan DeBlasio



Qiyam Tung

Katie Cunningham received the College of Science Outstanding Senior, Fall '12 CS Dept. Outstanding Senior and the UA Foundation Pillars of Excellence Awards. Katie brings together all of the qualities one expects of an outstanding student. In addition to maintaining a nearly flawless GPA, she volunteers teaching adults how to use computers and navigate through the Internet. She also played a key role in helping set up a collaboration between UA CS and the Pima County Library where CS Ambassadors work with library staff to teach computer technology concepts to middle and high school students.

Yi Huang received the Spring CS Dept. Outstanding Senior Award. Yi started working with computers at the age of 6 and is now pursuing an accelerated Master's at UA and working on numerous research projects including a digitization project called "Preserving and Creating Access to Unique Afghan Records" which is funded by the Endowment for the Humanities.

Benjamin Dicken received the Excellence in Undergraduate Research Award. This year, Ben worked with Profs. Debray and Snodgrass on research projects with the Micro-specialization group, developing infrastructure for running experiments and accessing empirical data, and with the SLIC computer vision group developing web and mobile interfaces for browsing instructional video content.

Isabel (Izzy) Kishi received the Excellence in Undergraduate Service Award. Somehow Izzy manages to confound the laws of Physics and show up everywhere, all the time, to help out cheerfully with whatever is going on. She has played a large role in our Section Leader program, served as the undergraduate representative on the CS

Department's APR Self-Study Committee and the Department Head Search Committee. She is also involved with Women in Computer Science (WICS) and is helping to launch the Big Sisters mentoring program. Go to page 1 for more information on Big Sisters.

Jawaharul Alam, winner of this year's Excellence in Graduate Research Award, is a 3rd year PhD student. His first research paper on the topic of proportional graph representation was one of the highest-ranked papers at the International Symposium on Graph Drawing and led to an invitation to the special issue of the Journal of Graph Algorithms and Applications. A follow-up paper won the best paper award (out of over 180 submissions) at the International Symposium on Algorithms and Computations.

Dan DeBlasio received the Graduate Student Service Award. Dan is a PhD student doing research in Bioinformatics with Prof. Kececioğlu, specifically focussing on algorithms for biological multiple sequence alignment. Dan gave a presentation on his research at RECOMB 2012 in Barcelona, Spain, and was published in the Journal of Computational Biology in 2013. Dan has served the dept. in many ways, including being Chair of the Graduate Student Council, organizing social and graduate student recruiting events.

Qiyam Tung, received the Graduate Teaching Award. Qiyam is a 4th year PhD student, focusing on data mining for educational videos. He is passionate about education and this is evident to anyone who sees him in lecture or observes how he cares for and nurtures his students. Qiyam put in many extra hours this semester making valuable and lasting contributions to CS education in our Dept.

News and Notes

Academic Program Review (APR)

In March, the department underwent an academic program review (APR). These reviews are conducted every 6 or 7 years by a committee comprised of internal (UA) faculty and external faculty from other universities, alumni and local industry. The committee spent two days meeting with faculty, students and staff and prepared a report of their findings. The committee's report noted, "We found a department that is productive in research and teaching, that has collaborations with other units on campus, that has a large, well-run undergraduate program and a robust PhD program, and that has staff of exceptional positive attitude."

PhD Research: Wireless Communication

Swaminathan Sankararaman, a CS doctoral student, is currently working on research that considers the application of geometric optimization in wireless networks where the communication "links" are not static, but may be dynamically changing.

Undergraduate Research - Software Development

Benjamin Dicken, a CS sophomore, began working with the Micro-specialization group in January, which is involved with data optimization technology, including HIVE Environment and HIVE Runtime. Ben's work includes designing and managing the database and building software using Java to interact with the database.

Newly Funded Faculty Research

David Lowenthal was awarded a 3-year \$400K grant by the NSF. The project entitled, "Conductor: A Run-Time System for Exascale Computing," will develop a run-time system that produces

near optimal parallel application performance under a prescribed power bound.

John Kececioglu was awarded a research grant for \$496,575 by the NSF. The grant is a single PI-award from the NSF CISE/IIS/III program, entitled, "Parameter Inference and Parameter Advising in Computational Biology."

Alon Efrat and **Jonathan Myers** were awarded \$193,000 for 3 years from the Minor Planet Center (MPC). They will work directly with MPC located at the Smithsonian Astrophysical Observatory in Massachusetts.

Ralph E. Griswold Memorial Endowment Scholarship

In memory of the department's founder, Ralph E. Griswold, who established the UA Department of Computer Science in 1971, the department is pleased to award its first ever scholarship to Ricky Gorowsky. In keeping with Dr. Griswold's insistence on high standards and excellence, Ricky, a sophomore, maintains a 3.9 GPA, together with a 32-hour a week job and a young family. He plans on double majoring in Computer Science and Mathematics, and is considering pursuing a doctoral degree in Computer Science. **To learn more about how to give to the Ralph E. Griswold endowment, please contact Gemma Fenimore gfenimore@email.arizona.edu**

WICS On The Move

Women in Computer Science or "WICS" has been busy over the last year. Last Fall, several WICS members attended the New Mexico Celebration of Women in Computing Conference. Ashley Slay, a CS freshman, said "my favorite part of the conference was being able to meet fellow female Computer Scientists and make friends with them. Seeing as I am new to the program and the University, I was glad to make some new friends." By providing a supportive

community for women in computer science and women who might have a curiosity in the subject, they hope to retain more women in the major.

UA Video Game Developers Reaching Out

If you are interested in the gaming industry or want to provide mentoring or support for students who are, check out the UA Video Game Developers. The club's weekly meetings cover topics such as art, sound design, business, game design, production and career advice. GameDev President Livio de la Cruz said that he has a lot of plans for next semester. They are planning to host regular Game Jam competitions and game development workshops which will be open to members and non-members. "We're hoping that the workshops will help more students get started with game development and it'll also help us give back to the larger CS community," said de la Cruz.

Sabbaticals

Come next Fall, the department is going to look a little different. Professors Debray, Zhang and Collberg will be away on sabbatical. Professor Debray will stay in Tucson where he will work on research projects including: his analysis of obfuscated malware code and dynamic specialization of database management systems. Professor Zhang will visit Tsinghua University in China where he will work on his research in future Internet architecture and green networks. Professor Collberg hopes to travel to Moscow where he will work on his research in cybersecurity.

Staff Awards

We would like to congratulate Holly Brown and Eneida Guerra de Lima for the awards they received for their service to our department. Holly received the UA Foundation's Star Excellence Award which is a prestigious award given to only a small number of UA employees each year. Eneida was

ALUMNI In Their Own Words



Barry Rountree, PhD
Class of 2010

After graduating in 2010, with a PhD in Computer Science, I took a postdoctoral research position in the Center for Applied Scientific Computing (CASC) at Lawrence Livermore National Laboratory (LLNL) in California. Last November, I accepted a permanent research staff position there.

The plurality of my work has been designing supercomputers two generations beyond the current state of the art. Right now, the largest machines have just over a million processor cores. I am working on machines that will be 1000x larger but that are only allowed to consume 3x more power. It is our goal for these efforts to filter down into consumer machines.

I've also branched out into performance analysis. I'm co-PI on a Department of Energy Small Business Technology Transfer grant together with the Krell Institute. We're working on making some of the advanced hardware features on Intel processors available to a wider audience. Together with LLNL, I have also been working on improving the efficiency and robustness of the nation's electrical grid infrastructure.

LLNL is the best place in the world to do supercomputing research: brilliant people, bleeding-edge physics and several of the fastest computers on the planet. Feel free to contact me to discuss my work or what life is like as a government scientist. routree4@llnl.gov



Nithya Krishnamoorthy, MS
Class of 2010

Since graduating from UA, I've been a Software Engineer at Google. I began working on a team in charge of the internal storage system that is built atop Megastore and am now on a team that enforces quota restrictions on various systems.

I am also a member of the board of Pudiyador, a non-profit that runs after-school programs in India for children in underprivileged communities. Pudiyador's aim is to provide a safe environment, wholesome education and tools for children to overcome obstacles and mature into confident, sensitive and responsible adults. We hope our work will help them break out

of the cycle of poverty that their families have been stuck in for generations. I have been a part of the organization since its founding and in the last few years, we have been slowly trying to scale our services, and have been experimenting with strategies to do so effectively. My role since moving to the United States has been to help with policy. I've recently starting working on mentoring our ground staff and I'm ramping up on fund raising for the growing number of kids we are trying to help. Email for more information. nithya84@gmail.com



James & Charles Magahern, BS
Class of 2012

We both graduated in Spring 2012, and are now Software Engineers at Apple working on iOS.

James works on the Mail team to bring email to the iPhone and iPad as well as develop messaging frameworks for developers to use in their applications. Charles works on the Media Apps team developing music and video apps on iOS devices, in addition to the MediaPlayer framework, which allows content providers like Netflix and YouTube to build multimedia applications for iOS.

We have a lot of advice to offer Computer Science students at the university,

the most important of which is to write software outside of class. Classes can provide a great deal of theoretical groundwork for your future endeavors in either academics or industry, but in order to truly become masters in the art of programming, you need to practice as much as possible. It is also the best way to keep up-to-date on the latest technologies and to become prepared for the competitive high-tech industry that awaits you. Most importantly, stay curious. Nobody will ever learn anything staying put in one place, so venture outside of your comfort zone and don't be afraid to try new things.



Share your alumni news with us!
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