CRA-W Newsletter

Winter - Spring 2012

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Editors

Sandhya Dwarkadas,
University of Rochester
Carla Ellis, Duke University

Highlight on Grad Cohort Alum, Carole-Jean Wu

Carole-Jean Wu is a Ph.D. candidate in the Electrical Engineering Department of Princeton University. Her research focuses on shared resource management for Chip-Multiprocessor (CMP) systems. In particular, she investigates software and hardware techniques to assist the management of the last-level shared caches, targeting performance throughput and guaranteeing quality of service. She is also interested in techniques that exploit potential parallelism hidden in multi-threaded applications on CMP systems. Carole-Jean Wu has interned with Intel, IBM, and Google and is the recipient of the 2011-12 Intel PhD Fellowship Award. Prior to Princeton, Carole received her B.S. degree in Electrical and Computer Engineering from Cornell University. Carole has attended three CRA-W Graduate Cohort workshops, where in 2009 she presented with Janie Irwin on confidence building. She also participated in CRA-W's Career Mentoring Workshop (CMW).

Q: How did you become interested in pursuing a research career in computer science?

When I was an undergraduate student in Cornell's ECE, I participated in the cooperative program between Cornell and industry. Via this program, I had two internships at Intel (Software Solutions Group in Chandler, Arizona), where I had the *Continued on page 6*

Carla Romero wins the Service to CRA Award

The Service to CRA Award recognizes outstanding service to the Computing Research Association as an organization. Carla Romero has been named as a 2012 recipient of this award.

Carla is specifically recognized for her years of superb service as CRA's Director of Programs, working primarily with CRA-W and the Coalition to Diversify Computing (CDC) to create, implement, and evaluate their programs.

An interview with Carla was featured in the Summer - Fall 2011 CRA-W newsletter.

Alum News

Kathryn McKinley
Co-chair, 2011-2014; Speaker, CMW 2003, 2007; Speaker, Grad Cohort 2004, 2005; Mentor, DREU 1996, 1997, 1999, 2004.

My recent work with Steve Blackburn and our graduate students on measuring power consumption of applications is getting a lot of attention.

Our study is the first to systematically measure and analyze application power, performance, and energy on a wide variety of hardware. The results may point the way to how companies like Google, Apple, Intel and Microsoft can make software and hardware that will lower the energy costs of very small and very large devices, from cell phones to giant data centers. We did measurements that no one else had done before. We showed that different software and different classes of software have really different levels of power usage. Without such detailed power profiles of how microprocessors function with different software and different chip architectures, companies are limited in terms of how well they can optimize for energy usage. We believe that the future of software and hardware design is one in which power profiles become a consideration at every stage of the process.

This work was recently invited to appear as a Research Highlight in the Communications of the Association for Computer Machinery (CACM). Read about our work at http://cacm.acm.org/news/145639-researchers-corral-chip-power-performance-requirements/fulltext. Our 2011 ASPLOS paper, "Looking Back on the Language and Hardware Revolutions: Measured Power, Performance, and Scaling," has been selected as one of this year's "most significant research papers in computer architecture based on novelty and long-term impact" by the journal *IEEE Micro*.

In other news, I joined Microsoft Research in May 2011 and am on leave from the University of Texas.

In June, I received the ACM SIGPLAN Distinguished Service Award (2011).

Seniha Esen Yuksel
Grad Cohort 2007, 2009

I received the College of Engineering Outstanding International Student Award from the University of Florida, and graduated with my Ph.D. degree in Computer Engineering this past August. Upon graduation, I started working as a postdoctoral researcher at the Materials Science and Engineering Department at the University of Florida. I am working on explosive detection from hyperspectral imagery, and my group has been invited to Amsterdam to field test their prototype device at an active security check point this summer. This is a very exciting opportunity for me and my group. In the meantime, my work has been accepted to WHISPERS, SPIE and APMAS conferences. I am also on the job market for a faculty position in the machine learning, data mining, computer vision and statistical data analysis areas.

Karen Panetta
Mentor, DREU 1997

I won the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring.

Here is the press release:
On Nov. 15, 2011, President Obama named Karen Panetta, Professor in Electrical and Computer Engineering, among nine individual and eight organization recipients of the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring.

The Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring, awarded by the White House to individuals and organizations, recognizes the crucial role that mentoring plays in the academic and personal development of students studying science and engineering—particularly those who belong to groups that are underrepresented in these fields. By offering their expertise and encouragement, mentors help prepare the next generation of scientists and engineers while ensuring that tomorrow's innovators reflect and benefit from the diverse talent of the United States. Candidates for the award are nominated *Continued on page 3*

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Alum News

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President Barack Obama greets the 2010 and 2011 awardees for the Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring recipients in the Oval Office, Dec. 12, 2011. Karen is the woman near the center of the group. Official White House Photo by Pete Souza

by colleagues, administrators, and students in their home institutions. The mentoring can involve students at any grade level from elementary through graduate school. In addition to being honored at the White House, recipients receive awards of $25,000 from the National Science Foundation to advance their mentoring efforts.

"Through their commitment to education and innovation, these individuals and organizations are playing a crucial role in the development of our 21st century workforce," President Obama said. "Our Nation owes them a debt of gratitude for helping ensure that America remains the global leader in science and engineering for years to come."

Dr. Panetta is the founder of the Internationally acclaimed Nerd Girls Program to inspire young girls to pursue STEM careers and celebrate their interdisciplinary talents. She is also the Editor-In-Chief of the IEEE Women in Engineering Magazine.

Seyda Ertekin
Career Mentoring Workshop 2007

I am currently a postdoctoral research associate at the Sloan Management School at Massachusetts Institute of Technology. I got my Ph.D degree in Computer Science and Engineering at Penn State. My current research at MIT Sloan bridges theoretical and experimental computer science in an effort to develop new efficient machine learning algorithms for the analysis of large scale data for industrial problems. My specific application areas include maintenance prioritization and early fault detection in electrical grids and online prediction algorithms in crowdsourcing systems. At MIT, I am also affiliated with the MIT Energy Initiative and the MIT Intelligence Initiative.

I am the local arrangements co-chair of the Collective Intelligence conference which will be organized at MIT campus, Cambridge, MA in April 2012. I will also attend the conference as a speaker since my paper, "Learning to Predict the Wisdom of Crowds," has been accepted to the conference for presentation. An earlier version of this work was also presented at the NIPS Workshop on Computational Social Science and the Wisdom of Crowds in December 2011. Another exciting highlight is that I will be moderating a panel on engineering solutions to the future energy problems at the annual conference of TASSA in March 2012.

My favorite thing to do when I am not working is spending time with my two beautiful daughters Lara and Alya and exploring the Boston area with them.

Jennifer Mankoff
Mentor, DREU 2007, 2008, 2009; Mentor CREU 2002

I have been on sabbatical in India and Switzerland and writing a blog on my experiences. There is a particularly interesting story about the cultural differences of teaching students from rural India at the Rajiv Gandhi University of Knowledge Technologies (RGUKT). Take a look at http://tenuretravels.wordpress.com/2011/07/15/breakthrough/.

CRA-W Alums Named Fellows of IEEE and ACM

The IEEE and ACM, two of the major professional societies dedicated to scientific and technological innovation, including advancements in computing, have recently named several women who have been active in CRA-W programs as new Fellows of their organizations.

IEEE Fellow is a distinction reserved for select IEEE members whose extraordinary accomplishments in any of the IEEE fields of interest are deemed fitting of this prestigious membership level. The total number selected in any one year does not exceed one-tenth of one percent of the total voting Institute membership.

The Association for Computing Machinery (ACM) has recognized 46 of its members for their contributions to computing and computer science that have provided fundamental knowledge to the field and generated multiple innovations in industry, commerce, entertainment, and education. The ACM press release states that the 2011 ACM Fellows, from the world's leading universities, corporations, and research labs, achieved accomplishments that are driving the innovations necessary to sustain competitiveness in the digital age.

The following CRA-W alums are among the new IEEE and ACM Fellows:

IEEE Fellow Sarita V. Adve
University of Illinois at Urbana-Champaign.
Recognized by IEEE for contributions to shared memory semantics and parallel computing. Sarita also won the ABI 2012 **Women of Vision Award for Innovation** for contributions in parallel computing, resiliency, and power management. Sarita has been a speaker at CMW.

IEEE Fellow Lydia Kavraki
Rice University
Recognized for contributions to robot-motion planning and computational biology. Lydia has been a mentor in the DREU/DMP program for many years.

ACM Fellow Susan Landau
Harvard University
Recognized for public policy leadership in security and privacy.
Susan is a former CRA-W board member and speaker at CMW and CAPP workshops.

ACM and IEEE Fellow Ming C. Lin
University of North Carolina at Chapel Hill
Recognized by ACM for contributions to geometric modeling and computer graphics and by IEEE for contributions to real-time physics-based interaction and simulation for virtual environments, robotics, and haptics. Ming has spoken at Grad Cohort workshops.

ACM Fellow Martha E. Pollack
University of Michigan
Recognized for contributions to planning systems design and for service to the computing community. Martha is a former CRA-W board member.

ACM Fellow Diane L. Souvaine
Tufts University
Recognized for contributions to computational geometry and for service on behalf of the computing community. Diane has been a mentor in the DREU program and participant in the CMW.

IEEE Fellow Valentina Salapura
IBM Thomas J. Watson Laboratory
Recognized for contributions to the architecture and design of multiprocessor systems. Valentina was a speaker at a Discipline Specific Workshop.

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More Awards to CRA-W Alums

Barbara Liskov inducted into National Inventors Hall of Fame

Barbara Liskov, MIT Institute Professor, has been named as one of the 2012 inductees of the National Inventors Hall of Fame, for contributions in programming language and systems design. The Inventors Hall of Fame has been honoring individuals who have "conceived, patented, and advanced the great technological achievements since the birth of our nation." The citation reads:"Barbara Liskov is considered an innovator in the design of computer programming languages, largely for helping to make computer programs more reliable, secure, and easy to use. Her innovations can be found within almost all modern programming languages." Barbara was the winner of ACM's 2008 A. M. Turing Award.

Barbara has been a speaker in the Distinguished Lecture Series (DLS) and Discipline Specific Workshops (DSW).

Sarah Revi Sterling wins the Anita Borg Institute Women of Vision Award for Social Impact

Sarah Revi Sterling, ATLAS Institute at the University of Colorado at Boulder, has been awarded the Women of Vision Award for Social Impact by ABI. Her focus is Information and Communication Technology for Development (ICTD), working with private and public sector organizations in locations such as Haiti, Nepal, India, and underserved communities in the United States. She is firmly committed to the practical, sustainable, and equitable application of ICTD to support education, health, and other development efforts.

Revi was instrumental in helping to get CRA-W's Grad Cohort Workshops started with sponsorship from Microsoft Research.

Consider Nominating Women for Awards

It is inspiring to see women researchers getting the recognition they deserve for their contributions. However, many extremely accomplished women may not be nominated for awards as early in their careers or as often as their male colleagues. Here are some upcoming award nomination deadlines. Please consider nominating women for these awards!

The ACM awards the **Gordon Bell Prizes** to recognize outstanding achievement in high-performance computing, with particular emphasis on rewarding innovation in applying high-performance computing to applications in science. The deadline is **April 27, 2012**. See http://awards.acm.org/html/award_nominations.cfm.

The **IEEE Computer Society** has several awards with deadlines on **July 1**, including the Sidney Fernbach Award for applications of high performance computing, the Ramakrisna Rau Award for contributions in microarchitectures and compiler code generation, and the Ken Kennedy Award for contributions to productivity in high-performance computing with significant community service or mentoring contributions. **July 31** is the deadline for nominations for the **Seymour Cray Computer Engineering Award** for contributions to high performance computing systems. Many other IEEE award nominations are due on **October 15, 2012**. For more information, go to http://www.computer.org/portal/web/awards/.

Nominations for **ACM Distinguished Members** are due **August 1, 2012** (http://awards.acm.org/html/distinguished_member_nom_guide.cfm). Nominations for **ACM Fellows** are due **September 5, 2012** (http://awards.acm.org/html/fellow_nom_guide.cfm).

Many major awards of the **ACM** are due **November 30, 2012**. These awards include the **A. M. Turing Award**, our field's most prestigious award, as well as the following: the Distinguished Service Award, the Grace Murray Hopper Award, for technical or service contributions made before the age of 35, the Paris Kanellakis Theory and Practice Award, the Karl V. Karlstrom Outstanding Educator Award, the Eugene L. Lawler Award for humanitarian contributions, the Outstanding Contribution to ACM Award, the ACM/AAAI Allen Newell Award, for career contributions that have breadth within computer science, or that bridge computer science and other disciplines, and the ACM Presidential Award. See http://awards.acm.org/listing.cfm.

Highlight on Alum, Carole-Jean Wu (cont.)

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opportunity to work on hardware platform trace generation and system performance analysis. Through these experiences, I became interested in computer architecture. Thus, after returning to Cornell, I decided to take more advanced, elective courses to strengthen my background in computer architecture. Furthermore, to figure out whether research was the "right" path for me, I chose to work with Professor J. Martinez on a research project funded by Intel. This later became my undergraduate honors thesis, namely "Predictability of Microprocessor Cache Miss Values".

I found computer research to be intriguing and challenging. A lot of research involved real-system implementations or full-system simulation. I enjoyed collecting and analyzing data that supported my research assumptions and I loved the process of building computer systems.

Q: How did you decide where to apply for graduate school and what was your rationale for your final choice?

Since I knew that I'd like to pursue a research career in computer architecture related fields, I sought advice from my academic and research advisors at Cornell and applied to top-ranked schools in computer architecture.

After visiting a few schools during their open houses, I had a clearer picture of the kind of professors I'd like to work with in the future. This was a determining factor for my decision. Another important perspective for me was the availability of funding and the teaching requirement. Considering all these factors, I decided to join Princeton's EE. This was primarily because there are many active distinguished computer architects in this department. On top of that, while each professor focuses on a specific topic in computer architecture, the department offers a diverse mixture of research opportunities. Furthermore, Princeton is generous and provides Graduate Fellowship Awards to all first year graduate students. This gave me the freedom to explore and pick the right match for my PhD advisor.

Carole-Jean at her second Grad Cohort with Maria Kazandjieva (Stanford) and her advisor, Margaret Martonosi (on right)

Carole-Jean presented her poster at Grad Cohort to Rhonda Hoeningman from U Colorado (on left)

Q: Any retrospective thoughts or advice on how someone applying to graduate school should approach the problem of selecting where to apply and where to go?

If you already have a research field in mind, I suggest applying to schools where there are professors actively conducting research in relevant topics. If you are undecided, I would advise to apply to schools where there is a diverse range of choices and professors whom you are interested in working with in the future. Before making the final decision, I strongly recommend that all prospective students visit the schools and seek opportunities to talk to professors (as well as graduate students) they are interested in working with.

Q: Can you tell us a little about your research and how you chose your research topic?

I am broadly interested in computer architecture with an emphasis on shared resource management for chip-multiprocessor systems. In particular, I am investigating software and hardware techniques to assist the management of the multi-level cache hierarchy, targeting performance throughput, quality of service, and fair sharing. I am also interested in techniques that exploit potential parallelism hidden in sequential and parallel applications.

My internships with Intel and undergraduate research experience made me interested in exploring architectural designs that can influence the performance of computer systems. As I delved deeper into identifying the limiting factors for performance, I found that resource management for the scarce on-chip shared caches and memory bandwidth

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Highlight on Alum, Carole-Jean Wu (cont.)

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Carole-Jean presents her recent research on PACman at the MICRO conference, Dec 2011 in Brazil.

plays a key role. This led to my first research project, where I used time counters to retain high-priority and good-locality data in the shared cache.

Q: Do you have any insight to share with graduate students who might strive to replicate your success?

I want to encourage students to be immersed in a research project as soon as possible. This allowed me to learn whether going to graduate school was the right path for me and also to experience the process of evaluating the potential of a research idea early.

In addition, I would like to encourage graduate students to seek internship opportunities. In the early PhD years, it is important to diversify a student's research interests and sharpen her technical skills by interning in industrial research labs. Toward later years, it is critical for a student to pick the "right" industry research lab to intern with. It is the best (if possible) to intern with researchers whose work aligns well with the student's dissertation research.

It is also important to attend conferences and seek mentors when possible. While nurturing a good professional network takes efforts and time, it creates future collaboration and job opportunities. My final piece of advice is to do what you love and to love what you do.

Carole-Jean and Janie Irwin gave a presentation on Confidence Building at Grad Cohort 2009.

Q: Life as a graduate student can be quite stressful. What are some of the ways in which you have managed to stay focused and strike a balance?

Carole-Jean enjoys hiking

I enjoy hiking and traveling, which helps me recharge after exhausting paper deadlines. For other frustrating moments in graduate school, I have a few cheerful friends to chat with and I can always talk to my mentors if I need technical advice. Luckily, my family has been my biggest cheerleader in graduate school.

Q: What challenges do you think you will face (or are currently facing) in your job search?

The biggest challenge in my job search is to cope with the tight travel schedule. I am interviewing for positions in both industry research labs and academia and hoping to synchronize the interviews as much as possible to ease my decision making. This, however, creates a lot of stress, since I am also revising my thesis at the same time. The advice I am getting is to stay healthy and enjoy these visits as much as possible.

Q: What impact has your involvement with CRA-W had on your career?

I am very grateful to have been part of CRA-W's Grad Cohort Workshops 2007—2009. The Grad Cohort sessions prepared me well for upcoming challenges, which I did not know I was going to face until the later years of my PhD. It also offered me an invaluable opportunity to network with other women in computing. Finally, learning the success stories of so many outstanding women in computing was fascinating and encouraging during stressful moments of my PhD life.

I was invited to give a speech at the Grad Cohort Workshop in 2009. I gave a joint presentation with Professor Mary Jane Irwin on confidence building to over 200 attendees from all

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Highlight on Alum, Carole-Jean Wu (cont.)

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Receiving the Excellence in Leadership Award for organizing Computer Architecture Days at Princeton

around the world and we shared our experiences as women in computing technology.

Q: Do you have any other involvement in activities supporting women in computing?

I helped in organizing the New York City Girls Computer Science and Engineering Colloquium, in which female engineers presented their research to high school girls, in an effort to help them gain more interest in learning math and science. In addition, I am an active member of Princeton's Graduate Woman in Science and Engineering (GWISE). I hope to continue supporting and motivating women to pursue majors in science, technology, engineering, and mathematics through future teaching and mentoring opportunities.

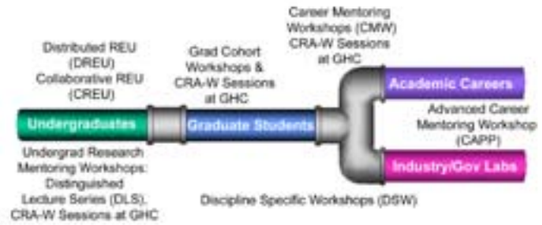
Q: Finally, what do you do for fun?

I love hiking, skiing, and traveling. Around Princeton, there are many beautiful hiking trails along the Appalachian Trail, which over the winter are converted to skiing trails. I take advantage of the mountains here for hiking and skiing during the different seasons. Also, over the years in Princeton, I have done three cross-country road trips with different routes. This gave me the opportunity to go hiking in different places in the country and visit various national parks with Yellowstone National Park as my all time favorite.

Skiing is a favorite outdoor activity for Carole-Jean's wintertime spare time.

What's Next in your Career? CRA-W has a Program for You.

We regularly highlight a single CRA-W program, but there is also a "big picture" that puts all of our programs in context. As you advance through your research career, CRA-W offers programs that are relevant for each step along the way. We have captured this career progression as a pipeline with programs at the appropriate stages. For example, as you "graduate" from the Grad Cohort, consider attending our Career Mentoring Workshops for new or soon-to-be PhDs or a Discipline Specific Workshop in your research area. Our goal is to support you throughout your career, whether in academia or R&D labs.



Thank You to our Individual Donors

CRA-W wants to show our appreciation to the individuals who have generously responded to our end-of-year fund-raising appeals. Every year since 2005, we have asked alumnae of our programs to donate to CRA-W. These gifts have allowed more women to share in the kinds of mentoring and research experiences CRA-W offers. Over the years, these annual fund-raising drives have raised over $25,000. We want to acknowledge and thank the following supporters for 2011, including contributors who have wished to remain anonymous:

Sponsors ($ 750+)
Anne Condon, Carla Ellis, Kathleen Fisher, Mary Jane Irwin
Friends ($250-749)
Tiffany Barnes, Leah Jamieson
Supporters ($100-249)
Sarita Adve, Laura K. Dillon
Contributors
ITing Angelina Lee, Sara Sprenkle

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Interview with Mary Lou Soffa

Mary Lou Soffa is the Owen R. Cheatham Professor and Department Chair of the Computer Science Department at the University of Virginia. From 1977 to 2004, she was a Professor of Computer Science at the University of Pittsburgh and also served as the Dean of Graduate Studies in the College of Arts and Sciences from 1991 to 1996. Mary Lou received the Nico Habermann Award in 2006 for outstanding contributions toward increasing the numbers and successes of underrepresented members in the computing research community. In 1999, she received the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring. She was elected an ACM Fellow in 1999 and selected as a Girl Scout Woman of Distinction in 2003. She served for ten years on the Board of the Computing Research Association (CRA). She has served on the Executive Committees of both ACM SIGSOFT and SIGPLAN, as well as conference chair, program chair or program committee member of many conferences. She has been a distinguished speaker and keynote speaker at a number of conferences and universities. Her papers have received a number of best paper awards as well as designation of one of the 40 most influential papers in 20 years to appear in the Programming Language Design and Implementation Conference, the premier conference in her area. She has directed 30 Ph.D. students to completion, half of whom are women, and over 50 M.S. students. She currently serves on the ACM Publication Board and was elected in 2008 to serve on the ACM Executive Committee. Mary Lou is a Board member of CRA-W. She served as Co-chair from 2000 to 2003. With Jan Cuny, she created the Grad Cohort and CAPP Workshops.

Q: As Department Chair at the University of Virginia, what are your goals and the opportunities to make an impact? What attracted you to strive for this position?

I am not sure "strive" is the word I would use. Becoming Department Chair at the University of Virginia was an opportunity that came along at the right time but in a roundabout way. Another department encouraged me to be a candidate for their chair, and I finally decided to apply. When I asked a colleague at the University of Virginia to write a letter of reference for me, he encouraged me to apply for chair there. I was offered both positions but I saw the offer to be the Chair of the Computer Science Department at the UVA as an opportunity and a much needed change for me. The Department is medium sized and has excellent and collaborative researchers. There was the potential to hire junior faculty to make it even stronger. Importantly, the Department supported my commitment to diversity. Another important factor was that my husband, who is an academician, also received a faculty position appointment at UVA. I have been Chair for almost 8 years now – this year is my last year. Much has happened during my two terms. Most importantly, we hired and tenured 5 wonderful junior faculty, with another to be put up this year. A new building was constructed for the home of the Department – we only moved in 6 months ago. We instituted a new BA program in the College of Arts and Sciences, and the number of students wanting to major in CS through this program continues to increase. We have worked on diversity but have not accomplished as much as I would have liked. I have enjoyed my years as Chair, except that the budget situation in Virginia made a number of years very tough for Department Chairs. Not having money to implement new ideas upsets the faculty and asking for money upsets the Dean. Right now, I am very much looking forward to returning to full time faculty status without administrative responsibilities. In both of my administrative positions, Dean of Graduate Studies at Pitt and Department Chair at UVA, I continued to remain active in research and mentoring graduate students, which made it possible to easily move between administrative and full time faculty positions. I would advise any faculty member who does move to an administrative position to maintain their research in case they decide administration is not their cup of tea.

Q: What is your path (background) that brought you to this point in your career?

Many years ago, I received my B.S. degree in mathematics and took a job at General Electric Research Lab in Schenectady, NY as a programmer, although I had had no courses in programming because they did not exist. At the Lab, I was trained to program in Fortran. However, part of my job turned out to include manual computations and some re-

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Interview with Mary Lou Soffa (cont.)

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searchers called me a "computer," which annoyed me no end. I found out that historically, women were hired for manual computation and were called "computers." The two other programmers in my group at the Lab who trained me were women. In the main part of GE, there were many programmers - probably around 50 sitting in a big room. Interestingly, they were all women. So during this time, programmers were women. Fran Allen also remembers women being the primary programmers. The question is what changed – why did men essentially take over and dominate the programming field? It was probably because the field became so important with high wages. I spent one year at GE and then followed my new husband to graduate school at Ohio State, where I worked on a Ph.D. in mathematics. As a TA at Ohio State, I taught a beginning programming course in Fortran, offered by the Computing Center as there was not a computer science department at the time. After receiving my MS (and my husband received his Ph.D.), I continued my graduate school career as a Ph.D. student in mathematics at the University of Pittsburgh. (My husband received a faculty appointment there.) This was in the 1970s, and there was social turmoil all around. I was doing research in abstract algebra and started to question the relevance of what I was doing. I finally left the mathematics department, and entered the Ph.D. program in sociology, but I stayed in that program only one year. I then took some graduate level courses in philosophy, and did not like this field either. I then entered the Ph.D. program in Environment Acoustics in the School of Public Health at Pitt, trying to find something I felt was relevant and that I liked. As part of this program, I took some computer science courses and finally found a field that I really loved (and still do). After finishing my Ph.D. degree at Pitt, I took a faculty position there. (My husband was an associate professor with tenure at the time at Pitt.) I went from an assistant to associate to a full professor in computer science. In 1990 I took the position of Dean of Graduate Studies in the College of Arts and Sciences and served for 5 years, returning to a faculty position in 1995. I left the University of Pittsburgh in 2004 to become Chair in the Computer Science Department at the University of Virginia (my husband followed me this time) – and here I will stay!

Q: Explain a bit about your current research.

For most of my career, I have been involved in both compiler/systems research and software engineering research. In compilers/systems, my research group is currently working on the challenges of exploiting multi and many cores for application software. An important issue is the contention that occurs for shared resources, including different levels of cache, the front side bus, and memory. We have been working on ways to map threads of applications to cores in order to reduce contention, and at the same time allow collocation of applications. We have developed methods to classify applications as to the resources that they use, as well as dynamically moving threads when we detect contention is happening. Another project is dynamically parallelizing binary code as the application executes. We use execution paths in the form of traces and speculate on branches. This project has been very difficult both conceptually and implementation-wise but we are finally getting very nice results. The value of this work is that legacy code as well as any sequential code can be parallelized transparently, without the user's involvement. Interestingly, when I did my early work in compilers, I did not have to know much about the architecture of the machine. However, today my students and I have to have a very good background and understanding of machine architecture in order to develop compiler techniques and run time systems.

My move to software engineering occurred after I saw a connection between the program analysis that I was doing in compilers and the analysis used in testing software. So most of my work in software engineering has focused on software testing and debugging, both of which need program analysis. A current research project is to analyze program paths rather than basic blocks; that is, perform path-sensitive analysis

Mary Lou with her former PhD students, Lori Pollock, Mary Jean Harrold, and Evelyn Duesterwald.

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Interview with Mary Lou Soffa (cont.)

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rather than path-insensitive analysis (which is less precise). Because path-sensitive analysis is very expensive, we developed a demand driven approach to ensure that the analysis is scalable.

Another software engineering project is exploiting the hardware advances in computer architecture to reduce the cost of structural software testing. In particular, we are using hardware performance counters to replace code instrumentation, and thus reduce the overhead in time and memory. Through this approach, we are developing techniques that enable the testing of applications directly on small handheld devices such as cell phones, which have severe power and memory constraints.

Q: What role has professional service played in your career?

Professional service has played a major role in my career, especially in the enjoyment of my career. In particular, my involvement with Anita Borg early on, when she was planning her institute and when she created the Systers lunch groups, had a large impact on me. And my membership in CRA-W has been a major part of my professional and, importantly, personal life. I firmly believe that the groups that have been formed to support women in computing have really changed the face of computing for women forever, and we need to thank them. For the first fourteen years as a faculty member, I was the only woman. When I attended the first Systers lunch group that Anita organized, it was like a breath of fresh air. I realized that many of the challenges and issues that I was having with my career were the same that other women were having, and we could talk about them. My entire impression and feeling about the field changed with the more contacts that I had with women through the women's groups. We were all working for the same purpose, and we supported one another, forming networks. Not only was the professional interaction valuable to me as a woman researcher but so were the personal interactions. I met many of my best friends through these relationships, some of which also developed into research collaborations. I really feel fortunate to have been involved with women's groups for many years.

Of course, other types of service, such as conference activities, professional organization activities, NSF panels, etc., have played major parts in my career. It is through these activities that many important contacts and networks are made. The more people that know about you and your work, the more visible you are, which can help in getting good graduate students, getting papers published, securing funding, and being considered for nominations and awards.

Q: What challenges have you had to overcome as a woman leader in the field? What is the most difficult aspect of your career right now?

The feeling of isolation has always been a challenge for me, and as chair, I think it is even worse. For most of my career, I have been the only woman faculty member. I have had wonderful friendships with some of my male colleagues but I always felt "different." There were problems and issues that I would have liked to discuss but figured either my male colleagues would not be interested or not understand. Unfortunately, being the only woman faculty member, I was typically the one to bring up issues relating to women. During one faculty meeting when we were talking about a woman candidate and someone said she was "too aggressive," I mentioned that a male candidate had been more aggressive, and that I was concerned that we were treating the woman candidate differently. I was told by the chair "not to bring up the woman's issue again." The environment got better as more women faculty were hired. When I arrived at UVA, there was only one other tenured woman. We did hire 2 more and at one time we had 4 women in a faculty of size around 25. These were all strong women and the situation was much improved. Unfortunately, we are now down to 2. Being the Chair further isolates you from the faculty. This is why I depend so much on my wonderful computer science woman friends that I have met over the years.

Mary Lou with some of her current students

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Interview with Mary Lou Soffa (cont.)

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Q: What accomplishments are you most proud of? (Be selective as there are so many.)

I am the most proud of the Ph.D. students whom I advised and the research they have produced. At the end of this term, I will have graduated 30 Ph.D. students, half of whom are women and two are minorities. My students are the reason that I love being a faculty member. My students have inspired me, driven me in new research directions, taught me, and shared my love for computer science. They have also tested my patience, confused me, and frustrated me. All together, they have brought me joy and a career which I love. I am proud of each and every one. About half of my students have become faculty members – so I guess I did not turn them off to academia. They have achieved so much - rising to the top in both academia and industry, winning awards and being selected for honors, including ACM Fellows and IEEE Fellows. They are dedicated teachers, researchers, and developers and continue to do such good work. Some have even become my mentors!

Another accomplishment that I am proud of is my efforts for diversity, both for women and minorities. I am especially proud of creating the CRA-W Graduate Cohort with Jan Cuny and getting it funded by industry. Jan and I also created and got funding for the CRA-W Cohort of Associate Professors Program. Both of these programs are still running today after a number of years.

Q: How do you balance work and family?

Balancing work and family has always been a struggle for me, and I am sure it is for most of you. I have two daughters and a husband (and have had many pets, including horses). I now have a daughter who is a single mom of a two-and-a-half-year-old daughter. They live near me, so I am still balancing family and work. I have tried to balance by realizing that sometimes, you can let some things drop while taking care of other things for awhile. So if something very important is happening in my personal life, the paper does not have to go out. As I tell my students, there will always be other conferences to which to submit papers but sometimes only one personal opportunity, such as a graduation. At other times, when a particularly important conference deadline is coming, I try not to feel that I have to be super mom/wife. The difficult task is deciding which is the most important at a time. I have made mistakes, but in general I think I have made good decisions. When I think back over my life, I cannot think of a time that I made the wrong decision in not doing something professionally. But I can think of one instance when my 6th grade daughter was the director of the school play, and the play took place in the afternoon. I had something that I felt I had to attend at work. So I did not go and my husband went instead. I have always regretted that decision, based on my daughter's excitement and pride about the play and her disappointment that I could not be there to share it with her. She is now an adult and still remembers that I did not attend!

Mary Lou's granddaughter

Q: Do you have any advice for women at any stage of their careers?

First, you can have it all – a great career, family, and personal life. It is tough sometimes but you can do it. It takes planning, sacrifices, and support from friends and family members. You don't have to write the perfect paper, teach the perfect course, and be a super-mom. No one does, so why do you think you should?

Don't be discouraged. Everyone gets papers rejected, for example. However, in my experience, I find that women take rejection harder and personally. If a paper is rejected, don't read the reviews right away. When you do, think about how to improve the paper and not that the work is not good.

For the younger women, don't forget that women before you had to fight for what you now have. Don't let opportunities and rights for women fade away. Burn your bras if you have to, the way we did!

Form professional networks of both men and women. It is useful and indeed necessary to have the support of both. Enjoy yourself and have fun.

CRA W Newsletter Winter-Spring 2012

First Results from the Data Buddies Project

by Betsy Bizot

In the Winter-Spring 2011 newsletter, we told you about the Data Buddies project that had recently been funded by NSF as part of our evaluation efforts. The main goal of Data Buddies is to gather data on students who do not participate in our Broading Participation in Computing (BPC) Alliance programs so that we can compare participants to nonparticipants to demonstrate the value of our programs. In addition, Data Buddies has the potential to provide a significant national resource for knowledge about the educational experiences and career decisions of undergraduate and graduate students and faculty in computing, with an emphasis on data that are useful in encouraging promising students toward research careers and promoting their success. More information on the project is available at www.cra.org/databuddies.

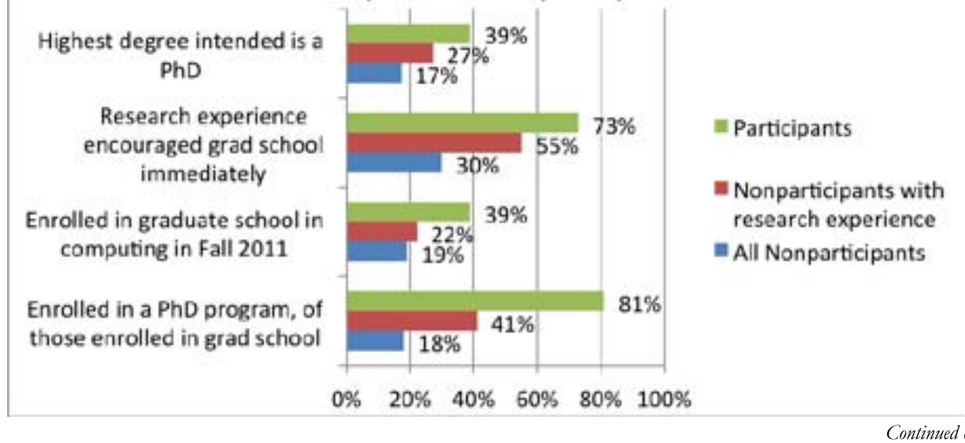
In spring 2011, we surveyed completing undergraduate and graduate students at 46 departments plus past participants of CREU, DREU, CMW, and Grad Cohort who were finishing degrees in the same time frame. We received survey responses from 706 undergraduates, including 41 program participants, and from 555 graduate students, including 60 program participants. The key finding from the undergraduate survey was that CREU and DREU participants were significantly more likely to be on a research track – not just more likely than the total group of nonparticipants (many of whom have no interest in research or graduate school), but also more likely than nonparticipants who had undergraduate research experiences other than CREU or DREU.

Figure 1 shows the impact of program participation throughout the decision to attend graduate school. Participants are more likely to say that their highest intended degree is a PhD, more likely to say that their research experience encouraged attending graduate school immediately after finishing an undergraduate degree, more likely to be enrolled in graduate school for the fall following their graduation, and if in graduate school, more likely to be enrolled in a PhD program.

From the graduate surveys, we learned that participants seem to have stronger professional networks than nonparticipants. When rating their knowledge of strategies for developing professional networks, 87% of participants completing PhDs rate themselves as knowing "some" or "quite a bit" compared to 67% of nonparticipants. Furthermore, they put this knowledge into action. About 71% of Ph.D. participants (vs. 37% of nonparticipants) served on a departmental, conference, or professional society committee at least once in their graduate careers, and 64% of participants report conferences as a significant source of job information, compared to 31% of nonparticipants.

Participants completing master's degrees are more likely than nonparticipants to be continuing directly to another degree program in computing (27.5% vs. 13.5%). Also, master's participants found their professional networks more useful than

Figure 1. Research Path Comparisons for CRA-W/CDC Program Participants and Nonparticipants



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Data Buddies (cont.)

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nonparticipants while job hunting: twice as many found their advisors and persons within their department useful (54% vs. 26%) and almost twice as many found their professional networks outside their department useful (92% vs. 48%).

In fall 2011, we surveyed continuing graduate and undergraduate students at 50 departments; we received responses from 2329 undergraduates and 1260 graduate students. Results are currently being analyzed. A faculty survey is under development for use with faculty at Data Buddy departments, past program participants who are currently faculty, and mentors of CREU and DREU students. This survey will address two main topics. First, we will look at the teaching, research, and service activities of the faculty themselves to evaluate the effectiveness of our mentoring programs in preparing faculty for career success. Second, we will look at faculty as mentors of undergraduate research.

In September 2011, the Data Buddies results contributed to a highly successful site visit for our BPC program. The Site Visit team identified two primary areas for improvement in the program: (1) Data Buddies should include more minority-serving institutions, and (2) We should quantify the particular program aspects of CREU and DREU that are resulting in better outcomes for participants. For the first item, the fall surveys already included two HBCUs and one Hispanic-serving institution that had not participated in the spring, and with the help of CDC board members we continue to recruit departments from minority-serving institutions. For the second, a key section of the fall undergraduate survey asked students who had a research experience the previous summer (CREU, DREU, or others) many questions about the experience: what they did, how they interacted with their mentor, who else they worked with, how satisfied they were with aspects of the program. We look forward to seeing the results.

We expect Data Buddies to continue and to grow. We are applying for additional NSF funding as part of our general BPC extension proposal. Following a presentation at the NSF CE21 PI meeting in February, representatives from several departments, an REU program, and another BPC Alliance approached us about participating in Data Buddies. The Computing Research Association Education Committee, CRA-E, is looking forward to seeing our information about REU participation. We welcome inquiries about collaboration; email databuddies@cra.org or Betsy directly at bizot@cra.org .

Changes on the CRA-W Board

CRA-W is chaired by two people with three-year terms. We would like to extend our warmest thanks to Carla Brodley and Kathleen Fisher who completed their terms on September 16, 2011. The new co-chairs are Tracy Camp (Colorado School of Mines) and Kathryn McKinley (Microsoft Research and The University of Texas at Austin).

Outgoing co-chair, Kathleen Fisher (center), introduces Tracy Camp (left) and Kathryn McKinley (right) as CRA-W's incoming co-chairs at CRA-W's 20th Anniversary Celebration on June 5, 2011

We honor and thank Kathleen Fisher who has been named an Emerita Member of CRA-W for her wonderful contributions to CRA-W. She has had to step down from an active role on the board because of work commitments.

We would also like to thank Dona Crawford for her service on the CRA-W Board. Dona has done a tremendous job working with the team of CAPP organizers.

Deb Agarwal (Lawrence Berkeley National Lab) has accepted our invitation to join the Board. Deb will serve as the CAPP-L Co-Director. Anna Karlin (University of Washington) has also agreed to join the Board as Co-Director of CMW-R.

Carla Romero, our long time CRA and CRA-W program manager, resigned to explore other career opportunities and to return to New Mexico. We are delighted that Erik Russell accepted our offer to replace her and started on January 1, 2012. He comes to us from NSF where he worked with Jan Cuny and was an Albert Einstein Distinguished Educator Fellow. He has an M.S. in Education and experience as a program manager, teaching K-12, and developing curriculum for K-12.

CRA W Newsletter Winter-Spring 2012

News of Affiliated Groups

Founders of NCWIT Win the A. Nico Habermann Award

The CRA Board of Directors has selected **Lucy Sanders**, CEO, National Center for Women & Information Technology (NCWIT); **Robert Schnabel**, Dean, School of Informatics, Indiana University; and **Telle Whitney**, CEO and President of the Anita Borg Institute for Women and Technology to receive the 2012 **A. Nico Habermann Award**.

The award is given for their joint efforts to establish and sustain NCWIT, a national resource dedicated to encouraging greater participation of women in the development of computing technology. Each of these individuals has played an essential role in NCWIT's creation and success.

In 2003, Lucy, Bobby, and Telle had a vision of creating a national center that would bring together institutions, organizations, and individuals committed to the goal of increasing the participation of women and girls in information technology. The stakeholders of this center would span academia, industry, K-12 educators, and entrepreneurs. The center would facilitate sharing of promising practices among its members, incorporate social science research about the impact of gender in computing careers and the effectiveness of intervention strategies, and create a community of change agents challenging each other to amplify their efforts toward this goal. It would provide a forum for greater cooperation and communication among various organizations working in this space (e.g., CRA-W, ABI, MentorNet, ACM, and the Girl Scouts are all current NCWIT members).

NCWIT's impact on the computing research community is especially evident in the activities of its Academic Alliance and Workforce Alliance. The Academic Alliance, comprised of nearly 200 colleges and universities, has focused on recruitment and retention of undergraduate and graduate women students, as well as making the overall climate within their CISE departments more supportive of women students and women faculty. The Workforce Alliance, whose members include corporations with the premier research labs, is dedicated to recruiting and advancing technical women in corporate R&D. As one professor commented, "In a short time, Lucy, Bobby, and Telle raised the visibility of computing's gender imbalance and distributed effective tools and practices for amplifying and quickening progress on this important issue."

Telle is a former Board Member of CRA-W and CRA-W is a member of NCWIT's Academic Alliance.

Telle Whitney, Lucy Sanders, and Bobby Schnabel at the first NCWIT meeting.

The award honors the late A. Nico Habermann, who headed NSF's Computer and Information Science and Engineering Directorate and who was deeply committed to increasing the participation of women and underrepresented minorities in computing research. CRA makes an award, usually annually, to persons who have made outstanding contributions aimed at increasing the numbers and/or successes of underrepresented groups in the computing research community. This award recognizes work in areas of government affairs, educational programs, professional societies, public awareness, and leadership that has a major impact on advancing these groups in the computing research community. Recognized contributions can be focused directly at the research level or at its immediate precursors, namely students at the undergraduate or graduate levels.

CRA-W Board Members

CRA-W Emerita Members

About CRA-W

CRA-W is an action-oriented committee of the Computing Research Association dedicated to increasing the access, retention, and advancement of women in computer science and engineering research and education, including undergraduate and graduate students, faculty, and industry and government research labs. See more about CRA-W and its activities at http://www.cra-w.org.

CRA-W has received funding from the National Science Foundation, Google, Henry Luce Foundation, Microsoft Research, Usenix, General Motors-Canada, NSERC, IBM, Yahoo!, and ACM Special Interests Groups. We thank them for their support.

CRA-W encourages individual contributions from alums of our programs and other CRA-W friends. Because CRA-W programs have touched so many lives, this initiative is an outlet for alums and friends to make contributions toward reaching the next generation of women computer scientists and engineers. To donate to CRA-W, visit http://www.cra.org/crawgiving.