The State of CRA

By Robert S. Fish

Panasonic Information & Networking Technologies Lab

By Jim Foley

Panasonic Information & Networking Technologies Lab

By Robert S. Fish

Computing Research News

A Publication of the Computing Research Association

September 2001 Vol. 13/No. 4

The eighth in a series of occasional columns that CRA's new Board Chair will contribute during his term of office.

I am pleased to tell you that our organization is very healthy. Indeed, CRA has never been healthier. Recall that the mission of CRA is to strengthen research and advanced education in computing and allied fields. We do this by working to influence policy that impacts computing research, encouraging the development of human resources, contributing to the cohesiveness of the professional community, and collecting and disseminating information about the importance and the state of computing research. What is CRA healthier than ever? Here are some of the reasons.

Our activities continue to grow thanks to an active board of directors and an expanding group of non-board volunteers, all supported by an excellent staff in our Washington office that has grown from five to eight in the past 5 years. We owe many thanks to all of our volunteers and to our excellent and very professional staff. If you haven't recently visited www.cra.org, you will be quite impressed with the scope of activities, all of which address our four mission areas.

Let me highlight a few recent areas of notable impact:

- A program of the CRA Women's Committee (CRA-W) was cited in NSF's budget submission to Congress earlier this year: "The CISE-supported Distributed Mentor Project is increasing the pipeline of women advancing into graduate study in science and engineering. Participants in the program are 20 times more likely to continue to graduate or professional school than non-participants."
- Our IT workforce study, The Supply of Information Technology Workers in the United States, attracted considerable attention from policy makers and the media. More than 3,500 copies were distributed, and it remains one of the most popular items on our website.
- CRA, working in coalition with other professional groups, helped enact into law the major funding recommendations of PITAC, the President's Information Technology Advisory Committee.

Our membership rolls include 182 academic departments and 25 research labs and centers, compared with 142 and 17 just 5 years ago. We have five affiliate members—

1. Human Resources

Let there be no mistake—while the temporary economic slowdown may be giving a bit of breathing room to the demand for Ph.D. computing professionals, the supply still is woefully short. In fact, our most recent Taulbee Survey found that Ph.D. production actually decreased this past year by 6 percent. Here's what we intend to do:

- Find the funding to provide CRA-W with the support it needs to scale up its efforts in areas such as distributed mentoring, and support its new NSF-funded study "Recruitment and Retention of Women Graduate Students in Computer Science and Engineering."
- Support the Coalition to Diversify Computing (CDC) to help improve the status of minorities within computing research.
- Establish and support a new Workforce Committee to carry out an NSF-funded project to provide suggestions for improving the recruitment

CRA Continued on Page 8

Inside CRN

Expanding the Pipeline ……….. 2
Digital Government Fellow ……….. 3
Digital Millennium Copyright Act ……….. 4
New Board Members ……….. 6
CRA Member List ……….. 7
Professional Opportunities ……….. 9
Expanding the Pipeline
CRA-W Takes its Show on the Road to Recruit for Graduate School

By Carla Schlatter Ellis

While faculty in computer science and engineering departments may be gratified by the attention that IT industry recruiters lavish on their undergraduates, they have trained, the level of awareness among those undergraduates that the full range of career options remains limited. Even in the recent economic downturn, recruiters have been descending on college campuses with stacks of pizza boxes, logo-bearing toys, gadgets to raffle off, and well-crafted messages about employment opportunities in their companies.

Meanwhile, alternatives involving graduate school and research careers that require advanced degrees suffer from the lack of effective recruiting campaigns. Traditionally it has been left to individual faculty members to encourage selected students to consider graduate school, but often that doesn’t happen until the student initiates the conversation by expressing interest in getting a letter of recommendation. Even in the top research-oriented departments, the undergraduates may hold a number of misconceptions about the lives of the graduate students around them. In schools where there is little contact with graduate students, students tend to assume that graduate school will be a continuation of their undergraduate experience. There is a need to raise the level of understanding among undergraduates about the attractions of graduate study.

The under-representation of women in the fields of computer science and engineering is another familiar issue to readers of this column, with declining percentages at each higher level referred to as the “incredible shrinking pipeline.” The lack of diversity is an area that is often cited as a contributing factor. There are those rare occasions, such as the Grace Hopper Celebrations, where technical women come together in significant numbers, and these events result in a very different and powerful experience for young women. Even the opportunity to meet and interact with four or five successful women computer scientists at one time may provide a glimpse of the fact that a community of women, and not just a few exceptional and isolated individuals, exists in the field.

In order to address both of these issues, the CRA-W/Lucent Distinguished Lecture Series and Graduate School Recruiting Program was created. The goal is to highlight the accomplishments and experiences of successful women researchers from both academia and industry by bringing them to college campuses across the United States and Canada to talk directly to undergraduates. Each event features a research seminar given by a distinguished speaker, a panel discussion encouraging students to consider going on to graduate school, and a luncheon for women in the department and the eminent women researchers who are visiting.

The program was the brainchild of Margaret Wright, former director of Scientific Computing Research at Bell Labs and a strong promoter of graduate education. She proposed the program to Lucent’s University Relations Office and secured initial funding; then she enlisted CRAs’ Committee on the Status of Women in Computing Research (CRA-W) to organize the events. Additional funding has been provided by the National Partnership for Advanced Computational Infrastructure (NPACI).

In the first year of the program (the 2000-01 academic year), 35 computer science or computer engineering departments responded to the call for applications to host an event. Twelve sites were chosen across North America: Carnegie Mellon University, Duke, Texas A & M, University of California-Berkeley, University of California-Irvine; University of Illinois-Urbana Champaign; University of Massachusetts-Amherst; University of Mississippi and Mississippi Valley State (an historically black college); University of Toronto; University of Virginia; and the University of Washington. The Distinguished Speakers were Bo-Chen Lin (Stanford), Jessica Hodgins (CMU), Barbara Liskov (MIT), Margaret Martinez Naval (Princeton), Kathryn McKinley (University of Massachusetts), Lori Pollock (University of Delaware), Mango Sel erase (Harvard), Valerie Taylor (Northwestern), and Katherine Yelick (University of California-Berkeley).

The panel discussions have been a key part of each event. Not only did Lucent Technologies provide funding, but also a commitment to participate. Women researchers from Bell Labs have served on each panel, offering an industry perspective on the value of a graduate education for a research career. These panels feature researchers from Bell Labs and surprised to learn about the exciting work that Ph.D. students do in academia and industry (rather than just academia) with a Ph.D. degree.

Each panel also included two or three women graduate students relating their experiences and the view “from the trenches.” The professors who have come as distinguished speakers also sit on the panel, contributing their insights into their own choice of an academic career and what the graduate admissions process looks like from the faculty perspective. While these panel discussions have been open to all undergraduate students at the host school, the fact that the panelists and the moderator have all been women has helped to encourage women students to attend.

The most important message we hope to convey through the panel discussions is that Ph.D. training offers the chance for a research career with a great deal of creative freedom. The panelists show their enthusiasm for research and the ability to define their own problems. The panelists also try to characterize how the graduate school experience differs from the classroom-based education most undergraduates receive. Graduate school at the Ph.D. level is described as an apprenticeship, and the relationship with one’s advisor becomes a major focus.

Several of the panelists’ stories and experiences highlight that there are many paths that can lead into a graduate school that uncertainty about precisely what one wants to do is OK. Questions from the audience tend to cover the more concrete issues such as what admissions committees look for in an application, advice on choosing which schools to apply to, and how graduate school is financed. One point that consistently comes up is the value of having some undergraduate research experience, both for the strength of the application and for determining whether graduate school is a good choice for the student.

At the end of each panel discussion, we asked audience members to fill out an exit survey to help us evaluate the success of the event. Estimates by the hosts indicate that more than 400 students attended the panels last year, and from 25 to 33 percent of the attendees were women. Approximately 30 percent of those attending the panels returned the surveys and rated the value of the program as an average of 3.1 out of 4. In survey questions trying to ascertain whether the panel had affected the choices students might
Evolution of Next-Generation Internet Services and Applications

By Kevin C. Almeroth

As the second Computer Research Association (CRA) Digital Millennium Copyright Act (DMCA) Government Fellow, I was given the opportunity to give a talk at the Government Technology Conference (GTC) for the Western Region. Both the fellowship and my talk had the same goal: finding ways to bridge the gap between academia and government’s use of the Internet. As technology evolves ever more rapidly, it is a challenge for government agencies to keep up with these changes. Therefore, the goal of my talk was to help those in attendance better understand 1) where the Internet was headed for next 2) how the evolution is going to happen. Given the close ties between my research in one-to-many (multicast) communication and related applications, and my work with the Internet2 initiative, the logical conclusion was to give a talk entitled, “The Evolution of Next-Generation Internet Services and Applications.” I expected that the audience would be interested in hearing where the Internet was likely to evolve; what kinds of applications and services were already being deployed; and what kinds of technologies they would soon be expected to deploy. For an academic, the conference represented a real-world environment. While my colleagues and I often interact in a conference setting, this conference was unusual in that the topics were a far cry from hardcore networking. Some of the sessions were two to three hours covered topics like record preservation in the digital age, privacy, and launching government on the Web. There were some seemingly traditional sessions like “Designing High Availability Systems,” but these had a strange perspective. For example, one of the questions heard in this session was about how important Universal Power Systems (UPSs) were, given the likelihood of rolling blackouts in California. Sessions presented prior to mine were a good reminder to be prepared for a widely diverse audience.

In the first part of my talk, I polled the audience to determine the kinds of jobs and responsibilities that each of them had. About half the audience dealt with and understood the network, but the rest simply saw it as a black box. This second group held positions like “City Manager” and used the Internet as a service. They were less concerned with how the Internet worked, but were certainly interested in the kinds of things the future Internet was capable of doing. Even the half of the audience that was aware of the details beyond the host was still very focused on the short term. These audience members were responsible for keeping their own networks running; hence, they were less interested in the theory behind next-generation Internet services and more interested in what they would have to deploy and how they would manage it.

As predicted by others, however, the Internet was likely to evolve; what kinds of technologies they would soon be expected to deploy. For an academic, the conference represented a real-world environment. While my colleagues and I often interact in a conference setting, this conference was unusual in that the topics were a far cry from hardcore networking. Some of the sessions were two to three hours covered topics like record preservation in the digital age, privacy, and launching government on the Web. There were some seemingly traditional sessions like “Designing High Availability Systems,” but these had a strange perspective. For example, one of the questions heard in this session was about how important Universal Power Systems (UPSs) were, given the likelihood of rolling blackouts in California. Sessions presented prior to mine were a good reminder to be prepared for a widely diverse audience.

In the first part of my talk, I polled the audience to determine the kinds of jobs and responsibilities that each of them had. About half the audience dealt with and understood the network, but the rest simply saw it as a black box. This second group held positions like “City Manager” and used the Internet as a service. They were less concerned with how the Internet worked, but were certainly interested in the kinds of things the future Internet was capable of doing. Even the half of the audience that was aware of the details beyond the host was still very focused on the short term. These audience members were responsible for keeping their own networks running; hence, they were less interested in the theory behind next-generation Internet services and more interested in what they would have to deploy and how they would manage it.
Historical Trends from Taulbee Surveys: Women Students & Faculty

By Jay Vegso

This is the second in a series of articles on trends in data from the Taulbee Survey and its antecedents, which stretch back to 1970. The first article dealt with faculty salaries and is available on the CRA website (www.cra.org). This article reports on the proportion of women who either have received degrees from or are on the faculty of computer science and engineering (CS/CE) departments in the United States and Canada.

Figure 1 charts the percentage of bachelors, masters, and Ph.D. degrees granted to women since 1985. Although the gender of Ph.D. recipients has always been tracked by the Taulbee Survey, questions about the gender of bachelors and masters recipients have only been included since 1994. The results from Taulbee are compared with data from National Science Foundation surveys on science and engineering degrees (S&E). The most recent results for the NSF surveys are from 1998 for bachelors and masters degrees, and 1999 for Ph.D. degrees.1

Figure 2 focuses on the percentage of bachelors and masters CS/CE degrees that have been granted to women. Although the NSF figures reflect CS degrees only, while the Taulbee results combine CE and CS results, the inclusion of CE data has little impact on the ratio of men to women in Taulbee’s results.

Figure 2 reveals that the Ph.D.-granting departments targeted by the Taulbee Survey grant a lower proportion of bachelors and masters degrees to women than the much broader range of schools that are surveyed by NSF.

Figure 3 looks at the percentage of faculty, both current and those newly hired, who are women. As can be seen, the proportion of newly hired faculty who are women has either declined or failed to rise in the past few years, even as the ratio of Ph.D. degrees granted to men and women has been stable.

As a point of comparison for the data found in Figure 3, according to NSF, 11% of full-time full professors, 22% of associate professors, and 33% of assistant professors in S&E departments were women in 1997.2 The Taulbee results for the same year indicate that only 6% of full professors, 18% of associate professors, and 19% of assistant professors were women in CS/CE departments.3

Panasonic Information from Page 1

CPU, an operating system, and networking capability. So, preserving the virtue for the consumer while tapping the technology has become the goal of the CE industry.

PINTL’s Goals and Organization

The goal of the lab is to create software and intellectual property that will be used in products and services that encompass the secure networked devices of the future. Trends in the marketplace show that the Internet will continue to grow steadily, while growth in personal computer penetration is slowing down. Meanwhile, alternative Internet devices are starting to catch on in the marketplace—and the television set and its peripherals like VCRs, DVD players, and Set Top Boxes (STBs) are prime candidates for transformation. So the strategy at PINTL is not to focus on next-generation computer systems, but rather to think of a future in which Panasonic is selling interesting products and services that contain computer-like elements.

PINTL’s researchers focus on product areas or on core technologies and competencies, which are then blended together to address particular product themes. PINTL’s core technical competencies are in networking, security, languages, database, and operating systems technologies—basic computer science sub-disciplines. These core competencies are then focused on product themes such as interactive digital television, residential networking, professional digital broadcast, mobile communications, and multimedia document technology. This allows a balance between maintaining competence in core technical disciplines and meeting the needs of the business to address new markets in a timely fashion.

Projects Follow Broad Themes

When it comes to selecting particular projects at the lab, the company provides broad themes about where it wants to do business in the future—for instance, digital television or mobile communication. Within these themes, individual groups in the lab look to create projects in which technical innovation will have an impact on business for the company.

In addition, the modern marketplace really demands that technologies and intellectual property be developed and utilized quickly. If a company spends too much time deciding whether to develop technology in a particular area, industrial competitors pass by it very quickly. So it is always a challenge for researchers to know when to start and, maybe even more importantly, when to stop working on a project. For PINTL’s members, a shift in research themes represents an opportunity to do something new and different.

In order for its work to have impact, PINTL devotes a lot of its energy to interacting and collaborating with other organizations in MEI’s global R&D effort. For instance, an algorithm created in Princeton could be integrated with other software in the United Kingdom, incorporated into a product release in Japan, and finally manufactured into a product in Malaysia for sale in Germany. This global collaboration structure encourages every lab to find the correct niche for its efforts. Not every lab can do everything and be cost effective about it. In the United States, the emphasis tends to be on high-value, high-return innovation rather than on tasks that can be done more effectively elsewhere.

Innovation Areas

What are some of the particular areas that PINTL is working on now?

Panasonic Information Continued on Page 5
make, about 40 percent of the responses indicated an increased likelihood that the student would consider going to graduate school. Of course, it would require follow-up to determine whether the program has actually had a long-term effect on the behavior of the attendees, and that has not yet been done. The comments on the exit surveys were extremely positive. One Berkeley undergrad said: “This event has been very inspirational. I never thought of grad school as exciting before this talk!” A student from the University of Washington said: “It is very useful to have an opportunity to hear perspectives from research labs, grad students, and academia.” It is clear from many of the comments that the diversity of the student body is part of undergraduates for more information about graduate programs, and that this program fills a serious need. Women students were especially enthusiastic about a panel composed entirely of women.

Plans for the current academic year (2001-2002) are shaping up. This year 33 schools applied with incredibly strong proposals. The sites selected for this year include Bryn Mawr and Swarthmore, Colorado State, Cornell, Florida International University (Hispanic-serving institution), Georgia Institute of Technology, Princeton, Purdue, Tufts, University of British Columbia, Columbia-Berkeley, and the University of California-Santa Cruz. In addition to geographic distribution of the selected sites, we have tried to include some small liberal arts colleges in addition to big universities. Several of the sites have proposed coordinating with nearby colleges for their event. The list of distinguished speakers for the 2001-2002 series will be available on the program’s website (http://cra.org/Activities/craw/project/dlist_lect.html) as soon as it has been finalized.

DMCA from Page 3

DMCA and address the law’s intended, as well as unintended, con-
sequences. Recently, Congressional supporters of the DMCA suggested that the law is working exactly as intended. Additionally, they even suggested that “no credible opposi-
tion to the DMCA exists.” Therefore, it is incumbent upon the Congress demanding that changes must be made to the DMCA.

Panasonic Information from Page 4

At the moment, Panasonic’s leader-
ship is committed to the idea that the next generation of globally avail-
able systems will connect people to the worldwide Internet, and PINTL is working on ways to facilitate this transformation. Some of the particu-
lar project themes are:

- Secure Operating Systems. The next generation of operating sys-
tems will have to set a new standard for reliability, security, and compact-
ness as CE devices become in a global-scale, distributed computing envi-
ronment.
- Media and Network Security. One of the challenges in the CE
arena is that many audio/video devices have evolved from being
analog waveform reproducers to contain-
ters for perfect digital copies of
intellectual property. One only needs
the MP3 phenomenon to understand that this change has
many communities of interest very
concerned about their futures. Balancing the needs of users, plat-
form providers, and content providers presents both technical
and sociological challenges. In addition, the home is traditionally a very pri-

tive domain, so connecting it to the
Global Internet presents a particular set of security challenges. Key
relevant technologies in designing net-
worked digital appliances are
cryptography, software tamper resist-
ance, and data hiding.
- Middleware. Once one has a basic secure platform, creating
content that can run on a variety of CE
platforms, that has compelling pro-
duction values and is interactive,
becomes a high priority. Various ap-
proaches that involve designing,
placing, and maintaining presenta-
tion and execution engines on CE
platforms are being investigated. Whether interactive TV is able to
transform the television set from a pas-
sive receiver to the nerve center of a
networked home depends largely on the
development of appropriate mid-
dleware.
- Residential Networking. Computer networking grew up to
serve the need to move vast quantities of
bursty data between computers. Legions of professionals could be
relied on to move the more arcane aspects of networking in order to
keep the bits flowing. However, once
networking becomes an integral part of
consumer environments, creating
easy-to-use, cheap, upgradable,
termination environments becomes
a key issue.

PINTL’s People

Like any R&D organization, the principal asset is the people who work there. The staff currently consists of 50 employees, 40 of whom are scientists and engineers and 50 per-
cent of whom have Ph.Ds. Besides our core staff, we usually increase our numbers by about 25 percent every summer as we accommodate graduate students interested in
leading scientists. We maintain relationships with many universities, both domestic and overseas, to facilitate the exchange of students and other personnel. This resource is relied on for access to a wider variety of special expertise than can be housed. Exchanges with overseas universities give a global perspective to our work that is quite refreshing.

In addition, PINTL enters into many partnerships and alliances that allow us to collaborate on cutting-
edge technology. The lab partners with universities, typically funding several projects a year to work on a certain area of technology that Panasonic believes may be useful. For example, recently we have funded some open source projects in areas where we believe that Panasonic could benefit from the results. In addition, there are technology consor-
tries (e.g., the Java Community Process) of various sorts in which we participate in order to raise the gen-
eral level of technology in industry.

Overall, PINTL attempts to provide an intellectually stimulating environment in which to work, while focusing on problems that will have some impact on the lives of our customers. For more information, see our website at http://www.research.panasonic.com.

Robert S. Fish is Vice President, Panasonic Technologies, Inc. and Director of Princeton, NJ-based Panasonic Information and Networking Technologies Laboratory (robf@research.panasonic.com).

CRA Offers Workshop for New Faculty and Advanced Graduate Students

The CRA Academic Careers and Effective Teaching Workshop is sched-
uled for February 10-12, 2002 at the Key Bridge Marriott Hotel in
Arlington, Virginia. Designed for new faculty and advanced graduate stu-
dents in computer science, computer engineering, and other related disciplines, it focuses on practical methods for
having a successful and fulfilling academic career. Topics include learning
styles, designing a course, lecturing effectively, and collaborative learning.
Other sessions will discuss important aspects of the academic career, such as selecting and managing a research project, preparing a tenure dossier, time management and family issues, and writing a successful research-funding proposal.

The workshop will include talks by senior members of the two largest funding agencies for computing research: NSF and DARPA, and a session by NSF staff on how to write a good funding proposal.

CRA has received a grant from the National Science Foundation to
assist a number of advanced graduate students interested in an academic
career who want to attend the workshop. For details about the application
process and other information, see: http://www.cra.org/activities/work-
shops/academic-careers/
Incumbents
Leah Jamieson is Professor of Electrical and Computer Engineering at Purdue University. Her research interests include parallel algorithms and software for image, signal, and speech processing; algorithm design and analysis; and parallel computer systems. Jamieson received a Ph.D. from the University of Toronto Computer Science and Electrical Engineering Departments he chaired from 1997-2001. He recently was appointed to represent CRA's new Industry Committee. Dr. Waltz received a Ph.D. in Electrical Engineering from the Massachusetts Institute of Technology.

Edward Lazowska, Professor and Acting Chair of the Department of Computer Science and Engineering at the University of Washington, recently completed a four-year term as CRA's board chair. Lazowska is an ACM Fellow, IEEE Fellow, NAE member, and a winner of the Outstanding Public Service Award at the University of Washington. He is a member of: NRC's Computer Science and Telecommunications Board (CSTB); DARPA's Information Science and Technology Working Group; the Technical Advisory Board for Microsoft Research; and the Board of Directors, Washington Software Alliance. Lazowska served as chair of NSF's Advisory Committee for CISE (Computer and Information Science and Engineering) in 1999-2000. He was awarded a Ph.D. in Computer Science from the University of Toronto.

David Waltz, President of NEC Research Institute, is an ACM Fellow, AAAI Fellow, and a Senior Member of IEEE. His research interests include constraint propagation and applications to computer vision; massively parallel systems for relational and text databases; memory-based and case-based data mining and reasoning systems; protein structure prediction using hybrid methods; and connectionist models for natural language processing. Waltz participated in a number of CRA activities in his role as President of the American Association for Artificial Intelligence, a CRA member society. His experience spans academia, startup R&D, corporate board membership, industrial research management, professional society leadership, and funding-agency service. He serves on a number of editorial boards, and currently chairs CRA's Industry Committee. Dr. Waltz received a Ph.D. in Electrical Engineering from the Massachusetts Institute of Technology.

Appointees
Frank Tompa, Professor of Computer Science at the University of Waterloo, served as a CRA board member and chair of the Canada Committee from 1999-2001. He recently was appointed to represent CRA's new Canadian affiliate member, CACS/AIC, on the board. Tompa has been named a “leader in Canadian science” by the Natural Sciences and Engineering Research Council of Canada and is a recipient of a University-Industry Synergy R&D Partnership Award from the Conference Board of Canada and NSERC. His research interests span the fields of data structures and databases, particularly the design of text management systems suitable for maintaining large reference texts and large, heterogeneous text collections. He was a founding member of the board of the Computer Systems Research Group. Richard Tapia received a Ph.D. in Computer Science from the University of Texas at Austin.

Richard Tapia
Celebration of Diversity in Computing Symposium 2001
Celebrating the technical contributions and career interests of diverse people in computing fields.
October 18-20, 2001
Houston, Texas
Details: www.sdsc.edu/Tapia2001

Newly Elected
Philip Bernstein is a Senior Researcher at Microsoft Research and an Affiliate Professor at the University of Washington. He has worked as an industrial researcher, executive manager, executive technical consultant, and product architect at both hardware and software companies, and as a professor in large and small departments. Bernstein's research interests include database systems, meta-data management, and transaction processing. Bernstein is currently a member of the Board of Trustees of the Very Large Data Base Endowment and chairs the ACM SIGMOD Awards Committee. He has played an organizational role in a number of database research conferences and served on many program committees. He is particularly committed to promoting university-industry cooperation, educating students about career alternatives, and increasing workforce diversity. Dr. Bernstein received his Ph.D. in Computer Science from the University of Toronto.

Barbara Grosz, Gordon McKay Professor of Computer Science at Harvard, was recently named the first Dean of Science at the Radcliffe Institute for Advanced Study. Professor Grosz is an AAAS Fellow and an AAAI Fellow, and the winner of AAAI's Distinguished Service Award and the Donald E. Walker Distinguished Service Award, IJCAI. Her research interests include collaborative multi-agent systems; modeling of collaborative behavior; human-computer interface design; and natural-language dialogue processing. She was a member of NRC's Computer Science and Telecommunications Board (1994-98), and served as Conference Chair and Chair of the Board of Trustees of the International Joint Conference on Artificial Intelligence (1989-1991). Grosz has been active in the American Association for Artificial Intelligence in a variety of roles, serving as its President from 1993-95. At Harvard she serves on the FAS Ad Hoc Committee on Faculty Diversity. Professor Grosz received a Ph.D. in Computer Science from the University of California, Berkeley.

James Horning is the Laboratory Director and Senior Vice President, Research, at InterTrust Technologies Corp. Strategic Technologies and Architectural Research Laboratory (STAR Lab). He is an ACM Fellow (1998) and was awarded the IJIP Silver Core (1981). His research interests include formal languages and translation; electronic commerce; and programming methodology. Dr. Horning has a long-standing interest in improving public policy on computing, as well as strengthening university-industry interactions. He has been a member of ACM's Committee on Computers and Public Policy since 1985, and served on USACM from 1994 to 1999. Dr. Horning previously served as a Senior Consultant Software Engineer at DEC Systems Research Center and as a Principal Scientist at Xerox PARC. At the University of Toronto Computer Science and Electrical Engineering Departments he chaired the Computer Systems Research Group. Dr. Horning received his Ph.D. in Computer Science from Stanford University.

Moshe Yardi is the George Professor and Chair of Computer Science at Rice University. He is an ACM Fellow (2000) and was awarded the Goedel Prize in 2000. Yardi also has won a number awards for innovation. His research interests include database management systems; logic in complexity theory; multi-agent systems; and design specification and verification. The author of more than 150 technical papers, Moshe Yardi has also served as Conference Chair, ACM Symposium on Principles of Database Systems; and Program Chair, 8th IEEE Symposium on Logic in Computer Science. Currently he chairs the Steering Committee for the Federated Logic Conference; is a member of the Kanellakis Award Committee; and serves on a number of editorial boards. Professor Yardi received a Ph.D. in Computer Science from Hebrew University in Jerusalem.

Grace Hopper Celebration of Women in Computing 2002 Conference
Hyatt Regency Vancouver, British Columbia, Canada
October 9-12, 2002
Call for Participation Deadline: October 1, 2002
Details: http://gencerp.org

UBIQUITY
### 2000–01 Computing Research Association Members

#### Academic Members

**New members 2000-01**

- Abilene Christian University - MCS
- Arizona State University - CSE
- Auburn University - CSSE
- Ball State University - CS
- Boston University - CS
- Bowie State University - CS
- Bradley University - CS
- Brandeis University - CS
- Brigham Young University - CS
- Brown University - CS
- Bryn Mawr College - MCS
- Bucknell University - CS
- California State Polytechnic University - CS
- Carnegie Mellon University - CS
- Carnegie Mellon University - ECE
- Case Western Reserve University - EE&CS
- City University of New York - CS
- Clemson University - CS
- College of Charleston - CS
- College of William & Mary - CS
- Colorado State University - CS
- Colorado Technical University - CS
- Columbus University - CS
- Cornell University - CS
- Dalhousie University - CS
- Dartmouth College - CS
- DePaul University - CS
- Duke University - CS
- Florida Atlantic University - CSE
- Florida Institute of Technology - CS
- Florida International University - CS
- Florida State University - CS
- Florida State University - IS
- Georgia Institute of Technology - CS
- Georgia Institute of Technology - ECE
- Georgia Southern University - MCS
- Grinnell College - IT
- Harvard University - CS
- Harvey Mudd College - CS
- Indiana University - CS
- Indiana University - I
- Iowa State University - CS
- Johns Hopkins University - CS
- Kansas State University - CS
- Kent State University - CS
- Lehigh University - EECS
- Louisiana State University - CS
- Massachusetts Institute of Technology - AA
- Massachusetts Institute of Technology - ECE
- Michigan State University - CS
- Michigan Technological University - CS
- Mississippi State University - CS
- Missouri State University - CS
- New Jersey Institute of Technology - CIS
- New York University - CS
- North Carolina State University - CS
- Northwestern University - CS
- Northwestern University - CS
- Oakland University - CS
- Ohio State University - CIS
- Ohio University - ECE
- Oklahoma State University - CS
- Old Dominion University - CS
- Oregon Graduate Institute - CSE
- Oregon State University - CS
- Pace University - CSIS
- Pennsylvania State University - IST
- Polytechnic University - CS
- Portland State University - CS
- Princeton University - CS
- Purdue University - CS
- Purdue University - ECE
- Rensselaer Polytechnic Institute - CS
- Rochester Institute of Technology - CS
- Rutgers University - Busch Campus - CS
- Santa Clara University - CE
- Simon Fraser University - CS
- Southern Methodist University - CS
- Southwest Texas State University - CS
- Stanford University - CS
- State University of New York, Albany - CS
- State University of New York, Buffalo - CSE
- State University of New York, Stony Brook - CS
- Stevens Institute of Technology - CSE
- Swarthmore College - CS
- Syracuse University - IS
- Temple University - CIS
- Texas A&M University - CS
- Texas Tech University - CS
- Tufts University - ECECS
- Tolane University - EECS
- University of Alabama, Birmingham - CIS
- University of Alabama, Tuscaloosa - CS
- University of Alberta - CS
- University of Arizona - CS
- University of Arkansas - CSCE
- University of British Columbia - CSE
- University of California, Berkeley - ECECS
- University of California, Berkeley - IMS
- University of California, Davis - CS
- University of California, Irvine - ECS
- University of California, Los Angeles - CS
- University of California, Riverside - CS
- University of California, San Diego - CSE
- University of California, Santa Barbara - CS
- University of California, Santa Cruz - CE
- University of California, Santa Cruz - CS
- University of Central Arkansas - CS
- University of Central Florida - CS
- University of Chicago - CS
- University of Cincinnati - ECECS
- University of Colorado, Boulder - CS
- University of Delaware - CS
- University of Denver - MCS
- University of Florida - CS
- University of Houston - CS
- University of Idaho - CS
- University of Illinois, Chicago - ECECS
- University of Illinois, Urbana-Champaign - CS
- University of Iowa - CS
- University of Kansas - ECECS
- University of Kentucky - CS
- University of Louisiana at Lafayette - CACS
- University of Maryland - CS
- University of Maryland, Baltimore Co - CSE
- University of Massachusetts, Amherst - CS
- University of Michigan - ECECS
- University of Michigan - I
- University of Michigan, Dearborn - CIS
- University of Minnesota - CS
- University of Minnesota, Duluth - CS
- University of Mississippi - CSE
- University of Missouri, Columbia - CECS
- University of Missouri, Rolla - CS
- University of Nebraska, Lincoln - CS
- University of Nevada, Las Vegas - CS
- University of Nevada, Reno - CS
- University of New Mexico - CS
- Graduate Center - CS
- University of North Carolina, Chapel Hill - CS
- University of North Dakota - CS
- University of North Texas - CS
- University of Oklahoma - CS
- University of Oregon - CS
- University of Pennsylvania - CSE
- University of Pittsburgh - CS
- University of Puerto Rico, Mayaguez - ECE
- University of Puget Sound - MCS
- University of Rochester - CS
- University of South Alabama - CIS
- University of South Carolina - CSE
- University of South Florida - CSE
- University of Southern California - EES
- University of Southern California - CS
- University of Tennessee, Knoxville - CS
- University of Texas, Austin - CS
- University of Texas, Dallas - CS
- University of Texas, El Paso - CS
- University of Toronto - CS
- University of Tulsa - MCE
- University of Utah - CS
- University of Virginia - CS
- University of Washington - CSE
- University of Washington - I
- University of Washington, Bothell - CS
- University of Waterloo - CS
- University of West Florida - CS
- University of Western Ontario - CS
- University of Wisconsin, Green Bay - CS
- University of Wisconsin, Madison - CS
- University of Wisconsin, Milwaukee - EECS
- University of Wyoming - CS
- Vanderbilt University - ECECS
- Virginia Tech - CS
- Wake Forest University - CS
- Washington State University - CSE
- Washington University in St. Louis - CS
- Wayne State University - CS
- Wesleyan University - CS
- West Virginia University - CSEE
- Western Michigan University - CS
- Williams College - CS
- Worcester Polytechnic Institute - CS
- Wright State University - CS
- Yale University - CS
- York University - CS

#### Industry and Government Labs and Centers

**New members 2000-01**

- AF&T Labs
- Avaia (Supporting Member)
- Compaq Computer Corp.
- Computer Science Research Institute at Sandia National Labs
- Fraunhofer Center for Research in Computer Graphics
- FX Palo Alto Laboratory, Inc.
- Hewlett-Packard Co.
- Honda R&D Americas, Inc.
- IBM Research
- Institute of Human & Machine Cognition
- Intel Corp. (Supporting Member)
- InterTrust Technologies Corp.
- Lucent Technologies, Bell Labs
- Microsoft Corp.
- Mitsubishi Electric Research Labs
- NASA Ames Research Center
- National Center for Atmospheric Research
- National Center for Supercomputing Applications
- NERSC Research Institute
- Panasonic Information & Networking Technologies Lab
- Ricoh Innovations
- San Diego Supercomputer Center
- Sun Microsystems, Inc.
- Telcordia Technologies (Sponsoring Member)
- Xerox Corp.

#### Affiliate Professional Societies

- American Association for Artificial Intelligence
- Association for Computing Machinery
- IEEE Computer Society
- Society for Industrial and Applied Mathematics
- USENIX Association

---

**September 2001 COMPUTING RESEARCH NEWS**

**USENIX Association**

**Society for Industrial and Applied Mathematics**

**Association for Computing Machinery**

**IEEE Computer Society**

**National Center for Atmospheric Research**

**Supercomputing Applications**

**NERSC Research Institute**

**Panasonic Information & Networking Technologies Lab**

**Ricoh Innovations**

**San Diego Supercomputer Center**

**Sun Microsystems, Inc.**

**Telcordia Technologies (Sponsoring Member)**

**Xerox Corp.**
In this model, senders and receivers may not be known to one another. Support for dynamic groups makes multicast management more difficult. In particular, reachability monitoring—the task of verifying whether multicast data from a session source can be received at a session receiver—requires additional mechanisms. This is because in the current IP multicast service model there is no implicit group coordination or management. Therefore there can be no implicit way of knowing the group members.

As an example of why the specific characteristics of multicast are more of a challenge than unicast, we consider the case of monitoring reachability. One mechanism for determining who group members are and whether reachability exists between source(s) and receiver(s) of the ping utility. In unicast, ping allows a source/receiver to test bi-directional reachability to a peer receiver/source. In the case of multicast, because of the open service model and because ping requests are made to a group instead of a receiver, the source does not know from whom and from how many group members to expect responses. This creates a number of problems. First, there is the problem of implosion that can occur if a very large number of group members choose to send a response within a small interval. Second, the responses that are sent may only be from a subset of group members. Receivers who do not have bi-directional connectivity with the source will not be heard, i.e., receivers who do not hear the ping request (in the case of a broken link) or receivers who do not have connectivity in the reverse direction. On the other hand, a multicast version of ping tool is that truly analogous to the unicast ping should return reachability status for all the receivers in the group.

To finish the talk and round out the afternoon, I focused on Internet2 and its role in the development, refinement, and deployment of these kinds of advanced services. The Internet2 engineering working groups are focused on doing in Internet2 what is extremely difficult in the commodity Internet (for reasons of size). Through the academic institutions as well as affiliated government and industrial partners, Internet2 is working to build a small but highly advanced next-generation Internet infrastructure. While the audience was certainly impressed they were also a bit confused. The part I did not explain very well was how Internet2 integrates into the commodity Internet. Given that Internet2 is already integrated into the commodity Internet infrastructure, that participation in Internet2 does not require wholesale replacement of an existing enterprise’s infrastructure; and that given that advanced services will not be deployed incrementally; the usefulness of Internet2 is much easier to understand.

What I have already learned from the CRA Digital Government Fellowship is that a wide gap exists between the kinds of research that academics do and the kinds of roadblocks there are to the deployment of Internet-based technology in the U.S. government. No doubt a better understanding of the importance and complexity of advanced Internet services will benefit all affected.

CRA Undergrad Award Presented at IJCAI-01

The female winner of CRA’s Outstanding Undergraduate Award for 2001, Lisa Anthony of Drexel University, received her award on August 9 at the International Joint Conference on Artificial Intelligence in Seattle. CRA board member, David Waltz, President of NEC Research Institute, made the presentation.

The awards to the male winner (Kevin Zatloukal, University of Washington), male runner-up (Russell Cox, Harvard University), and several honorary mentions were presented in March at the ACM1 conference in San Jose.
Ball State University

Department of Computer Science

Florida State University is in a period of significant federal funding and national visibility. A commitment to high quality undergraduate and graduate education and research and instruction are priorities for the university. Associated with an appointment of an outside chair would be a ten-year commitment at the rank of Professor.

Florida State University (FSU) is an accredited Carnegie Research University situated in Tallahassee, the capital city of Florida. FSU has built a reputation as a strong research institution in both the sciences and the humanities, with significant outside research funding from private foundation, industries, and government agencies.

Tallahassee, situated in the Southeastern United States, is a high-tech hub, with major research centers in the University of Florida and Florida State University. The abundant research funding in this area includes a plethora of grants and contracts awarded to universities and research institutions, both private and public. Many of these grants are in the areas of computer science, computer engineering, and related fields.

The Mathematical Sciences Research Institute is a leading research institution in the field of mathematics and computer science. It is situated in Berkeley, California, and is a major contributor to the advancement of research in these fields. The institute is known for its support of research and collaboration among mathematicians and computer scientists from around the world.
Quantum computer has two new applications for testing. The first is for computing large computations. The second is for quantum chemistry. The program will present an introductory work- shop and a research symposium to discuss advanced workshops. Quantum Algorithms and the Sixth IEEE Symposium on The Theory and Cryptography. And Quantum Information and Classical Interactive Proof Systems (partial patent support for the latter). The program will be sponsored by the computer science department and will be held at the University of Illinois at Urbana-Champaign on October 3 and 4, 1996, with a registration fee of $150. The conference will include a book of abstracts and a CD-ROM containing the proceedings. The program will include a short course on quantum computing, a keynote address by a leading expert in the field, and a panel discussion on the future of quantum computing. The cost of the course is $150. Participants are encouraged to register for the course as soon as possible. The registration deadline is September 15, 1996. For more information, please contact the conference organizers at quantum@illinois.edu.
University of Florida and Computer Science and Engineering invites you to apply for several tenure-track faculty posi-
tions at all ranks beginning August 2001. While the Department of Computer Science and Engineering is welcoming, we are particularly interested in candidates whose research interests connect with the following: hardware and software systems; computer networks, communications and parallel systems; software engineering; system security; computer software; computer architecture; programming languages and environments; object-oriented computing; artificial intelligence; and robotics. 

An affirmative action/equal opportunity employer/Americans with disabilities Act. All applications should be sent to: CSE Chair Search Committee, Department of Computer Science and Engineering, University of Florida, PO Box 118440 Gainesville, Florida 32611-8440, by May 15, 2001. For more information, visit our URL at http://www.cse.ufl.edu. For the best consideration, applications must be received by May 15, 2001.

University of Florida is an equal opportunity/affirmative action employer and does not discriminate on the basis of sex, race, color, national origin, religion, age, handicap, sexual orientation, gender identity, gender expression, veteran status or sexual harassment.

Professor Paul F. Dukakis Chair
Faculty Search Committee
Department of Computer Science and Engineering
University of Florida
PO Box 118440
Gainesville, Florida 32611-8440

University of Illinois at Urbana-Champaign
Department of Computer Science
605 S Mathews Ave.
Urbana, IL 61801
Phone: (217) 244-3845
Fax: (217) 244-3829

The University of New Mexico invites applications from members of underrepresented groups in the sciences, the National Center for Geographic Information and Analysis, and the Center for Excellence in Document Analysis and Recognition to fill two tenure-track faculty positions in Computer Science. The Department of Computer Science at the University of New Mexico is an equal opportunity/affirmative action employer that is committed to achieving a diverse faculty. We are interested in recruiting highly qualified applicants to help us continue the growth of our Ph.D. program and to strengthen our computer science programs. We particularly encourage applications from women, members of underrepresented minority groups, and individuals who will enhance our program by adding diversity. 

The positions are available beginning Fall 2001. Applications will be accepted until the positions are filled. 

Interested individuals should submit a letter of application, curriculum vitae, and the names and addresses of three to five references to: Search Committee, Computer Science Department, University of New Mexico, Albuquerque, NM 87131-0940. Applications accepted until the positions are filled.

University of New Mexico is an Equal Opportunity/Affirmative Action employer and does not discriminate on the basis of sex, race, color, national origin, religion, age, handicap, sexual orientation, gender identity, gender expression, veteran status or sexual harassment.

University of New Mexico
Department of Computer Science
University of New Mexico
Albuquerque, NM 87131-1386

Additional information on University of New Mexico is available on the World Wide Web at http://www.unm.edu.

University of New Mexico and the University of New Mexico Foundation are Equal Opportunity/Affirmative Action employers. Women and minorities are encouraged to apply.

University of Southern California
Department of Computer Science
Email: cse-chair-search@cse.buffalo.edu

Page 11
University of Western Ontario
Department of Computer Science

Applications are invited for tenure track Assistants or Associate Professors (in Computer Science). Applicants are expected to have a Ph.D. in Computer Science or a closely related discipline. Candidates should have a strong interest in attracting faculty in the areas of networking and distributed systems.

The successful candidate will be expected to conduct high-quality research and have the potential for excellence in teaching. Interested candidates should submit a statement of research and teaching interests, a curriculum vitae, and the names and addresses of three references to:

Professor N. Fotouhi, Chair
Department of Computer Science
University of Western Ontario
London, Ontario, Canada N6A 5B9
Fax: (519) 661-3390
Email: fotouhi@cs.uwo.ca

Please reference the website at http://www.csd.uwo.ca for more details.

Wayne State University

Applications are invited for positions at all levels. Candidates should have a doctoral degree in computer science or a closely related discipline. Applications are encouraged from minority groups as well as individuals who will contribute to the diversity of the university.

Successful candidates are expected to attract funds through grants and contracts, to conduct high-quality research with the potential for excellence in teaching, and to initiate an active graduate program.

This position is available on the web at http://www.chairs.gc.ca.

University of Western Ontario

Applications are available on the web at http://www.chairs.gc.ca.

The University of Western Ontario is committed to employment equity, welcomes applications from men and women, and encourages applications from visible minorities, aboriginal peoples, persons with disabilities, and persons of any sexual orientation.

Citizens and Permanent Residents will be considered first.

Wayne State University

The Department of Computer Science and Engineering offers B.S., M.S., and Ph.D. degrees. Faculty members have active research programs that are supported by federal, state, and corporate grants.

Wayne State University is an equal opportunity/affirmative action employer and an equal access university.

Wayne State University offers B.S., M.S. and Ph.D. degrees. Federal agencies in the United States support a variety of research programs within the Department. The Department maintains active collaborative research partnerships with the Institute for Scientific Computing, as well as several other organizations.

Wayne State University is an Equal Opportunity/Affirmative Action Employer.

Wayne State University, College of Engineering

Wayne State University, Box 2083
Detroit, MI 48202-2083
Fax: (313) 577-6868
Phone: (313) 577-2500
www.cse.unl.edu

Wayne State University offers B.S., M.S., and Ph.D. degrees. Federal agencies in the United States support a variety of research programs within the Department. The Department maintains active collaborative research partnerships with the Institute for Scientific Computing, as well as several other organizations.

Wayne State University is an Equal Opportunity/Affirmative Action Employer.