COMPUTING RESEARCH NEWS

More than 25 Years of Service to the Computing Research Community

September 1998 Vol. 10/No. 4

Rally Behind the New PITAC Report

By Ed Lazowska
Chair, Computing Research Association

Federal support for research in information technology is "dangerously inadequate" and is "taking a short-term focus," according to the Interim Report of the Presidential Information Technology Advisory Committee (PITAC), sent to the White House on August 6. "Unless steps are taken now to reinvigorate federal research in this critical area, we could see a significant reduction in the rate of progress over the coming decades. The cost to the nation of such a reduction would be significantly greater than the investments needed to address the problem now."

Chaired by Bill Joy (Sun Microsystems) and Ken Kennedy (Rice University), PITAC was established in February 1997, fulfilling a mandate of the High Performance Computing Act. A recent flurry of public activity follows a year of intensive behind-the-scenes effort by the Committee. A letter report sent to the White House on June 3 warned that recent trends will "interrupt the flow of ideas that are needed to fuel the information economy and solve critical national problems," and recommended that "over the next five years federal funding for information technology R&D be doubled or better" and "creatively managed to ensure that sufficient attention is given to innovative, long-range projects." In his June 5 commencement address at MIT, President Clinton responded by promising that his FY2000 budget "will call for significant increases in computing and communications research." The filing of the Interim Report, and the President's August 10 response in which he observed that "we have a duty — to ourselves, to our children, and to future generations — to make these and other farsighted investments," are the latest actions.

The key findings and recommendations of the PITAC Interim Report include:

- Information technology will be one of the key factors driving progress in the 21st century.
- Vigorous IT R&D is essential for achieving America's aspirations.
- We have had a spectacular return on past federal IT research investments.
- Current federal support for IT research is "dangerously inadequate."
- There is also a dangerous focus on near-term problems.
- As a result, "critical problems are going unsolved and we are endangering the flow of ideas that has fueled the information economy."
- Four areas of the overall research agenda particularly need attention: software, scalable information infrastructure, high-end computing, and socio-economic and workforce impacts.
- There must be new modes of research support: support for projects of broader scope and longer duration (multi-investigator, multi-year), centers for "Expeditions into the 21st Century," and "Enabling Technology Centers."
- There should be a lead agency for coordinating information technology research, probably NSF.

It is essential that those of us engaged in computing research read and absorb the PITAC Interim Report, and actively support its major themes. The "high-order bits" are uncontestable: the nation needs a greater investment in computing research, and a greater focus on high-risk long-term questions. The rest is details. Resist the temptation to circle the wagons and fire inwards! The Presidential Information Technology Advisory Committee has created an enormous opportunity, which is ours to seize or to lose.

Material related to PITAC may be found on the web at http://www.ccic.gov/ac/. Relevant presentations from the CRA Conference at Snowbird are linked from the top of the CRA homepage: http://www.cra.org. ∎

1997-1998 CRA Taulbee Survey is in the mail.

Completed surveys are due by November 13, 1998.

Inside CRN

New Director of NSF, Rita Colwell, Speaks at Snowbird

By Stacy Cholewinski and Jean Smith

The new Director of the National Science Foundation, Rita Colwell, addressed conference attendees in a special session at the CRA Conference at Snowbird '98 on Monday, July 27, 1998. Colwell began by saying, "It is both inspiring and appropriate that I have this chance to meet with such a distinguished group of leaders from the computer science and engineering community" (speaking to the fact that this was her first speaking engagement as NSF Director).

Her afternoon session concentrated on the recognition of the importance of computing in the advancement of all areas of science and technology and the catalyst it has been to industry, which in turn betters the whole economy. Colwell also relayed her concern and awareness of pipeline issues in computing, discussed some factors that affect it, and provided some examples of ways to increase the numbers of minorities in the field.

Throughout her talk, Colwell emphasized the larger picture and the fact that computing is an integral part of it all. She spoke about doing her research as a biologist in the decades since her graduation, and that it would have been impossible without computing. She stated that "information sciences also stand out in the role as the mortar, the cementing material for the entire edifice of modern science."

And then she pledged NSF's support for computer science as a fundamental field, along with other basic disciplines. Colwell championed the fact that we should not be "allergic to change" and stated that, "[technology] has evolved through repeated exchange of ideas and people, through synergy, among industry, universities, and government." She urged the audience to continue their work and directed them to "embrace new directions and make them work for us."

CRA's biennial conference was well attended in its eighth year with more that 230 participants. The conference convened July 26-28 for two and a half days of plenary sessions, special speakers, and workshops geared toward issues relating to computer scientists and engineers in academia, industry, and government.

Basically four main topics were discussed at the conference: IT Workers, Industry-related issues, Education, and Research Policy. Of these, the most popular appeared to be the issues surrounding IT workers. Graham Spanier, President of Pennsylvania State University, officially opened the conference with an after-dinner speech and presentation in which he discussed the increasing but changing needs for IT workers, the way in which the university might respond to the new demands, and the new program being developed for this purpose at his own institution.

The reported shortage of IT workers and its effects on the community were addressed in the opening plenary session. Undergraduate enrollments appear to be going up a lot and this should be good for addressing the labor shortage; however, it also puts pressure on faculty and creates the need to hire additional faculty when the supply is tight. Participants also emphasized the need for people who can work across several disciplines.

Further discussions in the sessions addressed issues such as how to define an IT worker. Other questions to consider include: where are IT workers placed in an organization, what skills and educational background should they have, and of

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Expanding the Pipeline

Women Role Models in Computer Science History

By Denise Gürer

In the past year there has been much concern and debate over the rapidly declining numbers of women in computer science. As reported by Dr. Tracy Camp in a previous issue of this newsletter and in *Communications of the ACM*, October 1997, the number of BA/BS degrees awarded to women over the last ten years (1983-84 to 1994-95) has decreased by 23.5 percent. In other words, we are losing one of every four potential women graduates with CS degrees. Interestingly, the numbers of women graduating with BA/BS degrees in other science related disciplines have been increasing over the same time frame.

This underrepresentation of women in computing is alarming. It raises the disturbing possibility that the field of CS functions in ways that hinder or discourage women from entering and then staying with it. In addition, the demographic trends in the United States suggest a significant decrease in the number of white males entering college during the next decade, while the number of jobs requiring computer science and technical skills is on the rise. There has been much discussion and concern in the news lately over the great need for and lack of computer scientists in the job market. Thus, it becomes imperative that we encourage and retain more women in computing and tap this underutilized wealth of talent.

One proven method of increasing the numbers of women in computing is through the use of role models. As Mary Frank Fox, Professor of Sociology at the Georgia Institute of Technology, states, "Women role models in science and engineering demonstrate the presence, the participation, and the continuing prospects of women in the science and engineering fields. These role models are important for both women — and then for the whole scientific community —who need to work together to enhance the quality and effectiveness of science and engineering." Indeed, as Gerhard Sonnert, Professor of Physics at Harvard University, says, "When young women think about science as a career choice, the presence of successful women in science is an encouraging signal. Senior women scientists serve as role models not only in terms of scientific excellence; young women also appreciate models of balancing a science career with family and other aspects of life."

If you explore the history of computing, you can find a wealth of women role models. Even though it is not well documented by the computing community, women made substantial contributions to the field of computer science (see *Communications of the ACM*, Gürer, January 1995). Often, these pioneers go unrecognized for their achievements. In fact, in the history books, women are not mentioned, with the exception of Ada Lovelace and Grace Hopper. Both of these well-known and remarkable pioneers exhibited an ability to see the future directions of computer science. Lovelace was the first conceptual programmer, while Hopper foresaw the importance of higher-level programming languages in the future of computing. However, there were many other women pioneers in computing who deserve mentioning and who can serve as role models.

We can immediately find six women pioneers and role models with the world's first electronic computing machine, the ENIAC, whose first programmers were six women. In recognition of their work, these pioneers were recently (1997) inducted into the Women in Technology International (WITI) Hall of Fame: Kay Antonelli, Jean Bartik, Betty Holberton, Marlyn Meltzer, Frances Spence, and Ruth Teitelbaum (see http://www.witi.org/Center/Museum). These six remarkable women joined the World War II effort as "computers" for the Army's Ballistics Research Laboratories in a Philadelphia project where they worked on a new, top secret machine. The programmers were handed the schematics of the machine and told to make it perform numerical calculations for the war effort. This is exactly what they did, with no manuals or instruction set or even the concept of how to program such a machine. The programmers had to hardwire their programs using hundreds of cables, dozens of digit trays and 3,000 switches.

In addition to the WITI award, Betty Holberton also recently received two additional and well-deserved awards for her pioneering work: the Lovelace Award and the IEEE Computer Society Pioneering Award. Other computer science pioneers were recently honored at the Grace Hopper Celebration (GHC-1997): Fran Allen, a pioneer in compiler optimization; Jean Bartik, ENIAC programmer; Judy Clapp, a programmer of the world's first real-time control computer, the Whirlwind; Thelma Estrin, a pioneer in bioengineering at UCLA; Milly Koss, a programmer of the first commercial computer, the UNIVAC; Joyce Little, a developer of one of the first curriculums for computer science; and Ethel Marden, a programmer of one of the first stored program computers, the SEAC (see http://www.acm.org/women/speech.html). In addition to the award ceremony, the pioneers participated in a workshop, facilitated by Denise Gürer, and sponsored by the GHC and the ACM Committee on Women in Computing (ACM-W). For an hour and a half the pioneers discussed and shared their experiences with each other and the audience. Many interesting stories came forth through the discussion and interaction from the audience (videotapes of this and other workshops at the GHC are available for purchase, see http://www.sdsc.edu/Hopper). Needless to say, this was an exciting time. Many of the GHC conference attendees remarked that they were astonished and delighted to learn about the achievements of the pioneers. Honoring and displaying their accomplishments in such a public forum inspired many women computer scientists, both young and old.

These women pioneers serve as wonderful role models for both young and accomplished computer scientists. They have broken their way into a male-dominated field and have been highly successful, and in many cases have been "firsts." Fran Allen is the first woman to become an IBM Fellow at IBM's T.J. Watson Research Laboratory; Ethel Marden is the first woman to be appointed a division chief at the National Bureau of Standards (NBS); Thelma Estrin is the first woman to be elected to the IEEE Board of Directors and the first woman to be a member of the Aerospace Corporation; and Joyce Little was the first chair of the ACM Community Curriculum Committee, which produced the first guidelines for a two-year computer science program.

Breaking the mold and becoming "firsts" is difficult and important. It paves the way for more women to be accepted in the inner circles, which in turn paves the way for more women to enter the field. However, not only do these pioneers serve as role models through their work, they have also been actively involved in improving the computing environment for women. Ethel Marden helped to improve working conditions for women at the NBS by initiating part-time and flex-time for her workers. At that time, the concept of flex-time was unheard of: Marden had to fight hard with upper management for those rights and even threatened to go to The *Washington Post*. As she said, "They (women) didn't turn off their brains when they left the office. They were thinking about problems from work while they were at home." Another pioneer and role model, Thelma Estrin, is actively pursuing activities to increase awareness of the obstacles facing women in computing and engineering. Grace Murray Hopper did not consider herself a mentor or

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LETTERS TO THE EDITOR

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Letters may be edited for space and clarity.

Nominations Sought CRA Service-Related Awards

CRA Invites nominations for the 1999 CRA Distinguished Service Award and the A. Nico Habermann Award. Nominations should be no longer than two-pages and describe the contributions that are the basis of the nomination. Letters in support of the nomination are welcome, but not required.

Send nominations for both awards to:
CRA Service Awards
Computing Research Association
1100 Seventeenth St. NW, Suite 507
Washington, DC 20036
Tel. 202-234-2111
Fax: 202-667-1066
E-mail: awards@cra.org

Deadline: see http://www.cra.org/main/cra.awards.html

Policy News

Critical Infrastructure Protection

By Louise Arnheim

Last January, *CRN* reported on recommendations by the Presidential Commission on Critical Infrastructure Protection (PCCIP); the commission was charged with assessing the United States ability to protect critical infrastructures from both physical and cyber attacks. Key among PCCIP's recommendations were establishing coordinated federal government mechanisms to detect, manage, and recover from such attacks, and directing $1 billion towards information assurance R&D by 2004. The report also endorsed the administration's key recovery and key management approach to encryption.

In May, President Clinton issued a Presidential Decision Directive (PDD) based on the Commission's report. And though the directive set into motion many structures called for by PCCIP, increased funding for information assurance R&D may not materialize until FY2000 at the earliest.

Announcement of the directive, "Critical Infrastructure Protection" (PDD-63), came during President Clinton's commencement speech at the U.S. Naval Academy. Referring to PCCIP's work, the President told graduates: "They [the Commission] returned with a pointed conclusion: our vulnerability, particularly to cyber attacks, is real and growing. And they made important recommendations that we will now implement to put us ahead of the danger curve."

But rounding that curve may call for skillful maneuvering. The issues surrounding infrastructure protection, says Peter G. Neumann, Principal Scientist, SRI, are "murky." "Most of the computer and communications systems we are dealing with are not adequate for what we need if we really want survivable systems." Further, he observes, "we're much too far away from where we need to be." Getting to where the nation needs to be, or, perhaps, even making the case to do so, says Dr. Jeffrey Hunker, "is made more difficult because the sort of threat we are talking about hasn't happened yet to a great extent." Hunker, a former Deputy Assistant to the Secretary of Commerce, heads up the new Critical Information Assurance Office (CIAO), one of the new entities established by PDD-63.

Emerging Federal Structure

Echoing many of PCCIP's basic recommendations regarding structure and organization, the directive calls for a complex mix of federal interagency relationships involving several interrelated infrastructure sectors: telecommunications, banking and finance, energy, transportation, and essential government services infrastructures. And like the PCCIP report, the directive attempts to foster an unprecedented degree of information-sharing between the public and private sectors.

Among the new entities are:

The *National Information Protection Center (NIPC)*, housed within the Federal Bureau of Investigation (FBI), with representatives from the Department of Defense (DoD) and National Security Agency (NSA). NPIC's duties include compiling and distributing threat and vulnerability information to both government and industry.

Critical Infrastructure Coordinating Group (CICG), chaired by the National Coordinator for Security, Infrastructure Protection, and Counter-Terrorism (a new position created by a separate directive).

The *Information Sharing Analysis Center (ISAC)*, which, according to the White House, "is encouraged to be set up by the private sector in cooperation with the federal government."

National Infrastructure Assurance Council (NIAC), to be comprised of Presidential appointees from private industry, as well as state and local government.

CIAO, which will soon be housed within the Department of Commerce, is tasked with coordinating the activities of the above entities, as well as working with federal department liaisons from each of the affected infrastructure

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COMPUTING RESEARCH NEWS

Vol. 10/No. 4/September 1998

Computing Research News (ISSN 1069-384X) is published five times per year: in January, March, May, September, and November.

Subscriptions: Call 202-234-2111, send e-mail to crn@cra.org or mail subscription inquiries to CRA, 1100 Seventeenth Street, NW, Suite 507, Washington, DC 20036-4632. A free subscription is available to qualified subscribers. One-year paid subscriptions are $30 in the United States, $45 (US) in Canada and $54 (US) elsewhere.

Change of Address: Note that a change of address must include the old and new addresses with ZIP+4 if available. Please include a street address or PO Box.

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Status of NSF Appropriations

By Fred W. Weingarten

This summer, during preliminary markup, the full House Appropriations Committee increased NSF research funding by $70 million over the subcommittee mark. This, a 10.5 percent increase, is very close to the 12 percent originally requested by the President. Since the Senate Committee on Appropriations had already approved an increment of 7 percent for research, NSF stands to come out of conference this fall with a healthy boost (Congress reconvenes September 9 following the summer recess). This is especially good news for the agency, and for computing research, coming as it does on top of last year's 6 percent increase.

Now that the bill has cleared both the House and the Senate the numbers are as follows: the House Committee has approved for NSF research and related activities a total mark of $2.815 billion, and the Senate has approved $2.725 billion.

Area	Request	House	Senate
Research	$2,847	$2,815	$2,725
Education	683	643	683
Equipment	94	90	94
Operations	149	149	142
Total	$3,773	$3,697	$3,644

Table 1: Figures in millions of dollars

The overall budget for NSF has been marked at $3.697 billion in the House and $3.644 billion in the Senate.

To Come...

If the opportunity presents itself while the members are back home, it would be most helpful for researchers to urge them to vote for the NSF increase and in the case of those on the Appropriations Committee, to thank them profusely. If you can't do it in person letters will do. (Thank You letters can be as important and often more important than letters asking for something.) Rodney Frelinghuysen (R-New Jersey) and Mark Neumann (R-Wisconsin) offered the amendment in full committee. (Our friends in New Jersey and Wisconsin should take note.)

CRA (Peter Freeman) testified on NSF appropriations in the House and sponsored a computer science entry at a Congressional exhibition of NSF research that took place in May of this year (see " CNSF Exhibition and Reception," page 4). CRA has also joined in coalition letters calling for strong NSF support. Of course, we will continue to monitor this closely.

The next step, assuming the Senate and House bills pass on schedule, will be a conference to negotiate between the two different versions. At that time, of course, the scientific associations will be urging adoption of the House mark, although some splitting of the difference is the most likely outcome.

But, for all the good news so far, don't start planning on spending the money yet. The fall appropriations end-game could be very messy. A Budget Resolution is still to be agreed on between the two chambers. Of course, although a budget is required by its own law, Congress has been known to go through a year without one, so it may never happen. The House and Senate versions differ significantly, with the House's being more draconian on discretionary spending. Neither version is terribly friendly to research.

Furthermore, there isn't as much money as people might have expected. The tobacco bill has failed, cutting one revenue source, the Transportation Act was a real budget buster, some expensive tax cut proposals are being made (it being election year), and, in the eyes of some in the House, the Congres sional Budget Office (CBO) is not generating high enough income estimates. Some in the House leadership have reportedly even threatened to fire the current CBO director and hire one who will come up with better numbers. As one House committee staff member observed, "so much for impartial analysis."

Some Hill staff say that these fiscal uncertainties, coupled with other factors of uncertainty including a spending cap set in last year's budget agreement, could mean that all appropriations bills are rolled into one omnibus package at the last minute. If that happens, all bets are off on what could result. NSF funds then become negotiable among a wide variety of other claims on the floor and in conference.

In other words, what Congress can give, it can take away — thus proving one of Rick's rules of Washington life: "No Decision is Ever Final." I can't overstate the critical importance of individual ongoing constituent contacts between those who care about NSF funding and their Representatives. Believe me, those who most likely view NSF appropriations as a convenient last-minute cookie jar will be walking the halls of the congressional office buildings daily for the next several months. ∎

Awards

Early Deadline for Outstanding Undergraduate Awards

Nomination Information

The Computing Research Association is pleased to announce the fifth annual CRA Undergraduate Award program, recognizing undergraduate students who show exceptional promise in an area of computing research.

Based upon comments we have received from a number of members of the computing research community, we have made several important changes to the program for this year:

1. In order to have the results known early enough that the winners and honorable mentions can indicate the recognition they have received in their applications to graduate school and in job applications, we have moved up the timetable. Applications are now due on October 1, 1998, and results will be announced on December 1, 1998.
2. Because of the large number of high-quality applications we have received in the past for students who went unrecognized, we anticipate we will present a larger number of honorable mentions this year — to all the applicants who show real research promise.

A cash prize of $1,000 will be awarded to each of two undergraduate students, one female and one male, who are majoring in computer science, computer engineering, or an equivalent program. Other outstanding candidates will be recognized with Honorable Mention. The awards will be presented at the 1999 Federated Computing Research Conference(FCRC) in Atlanta, Georgia. The two first-prize winners will receive financial assistance toward their travel to the conference. CRA encourages home departments to provide similar assistance to other students who are recognized.

We encourage you to make this award widely known in your department. CRA hopes that your strongest undergraduates will be nominated. The award is a terrific way to recognize your best students and your department.

Nomination procedure

A nomination package consists of the following items:

1. Nomination form
2. Nominee's resume (two-page maximum)
3. Nominee's transcript of academic record
4. Verification statement signed by department chair *
5. Letters of support from two other supporting nominators (two-page maximum)
6. One-page description of student's research or other achievements

*The verification statement signed by the department chair should simply state that the student is in good standing and eligible for the award.

The complete nominations must be submitted by the candidate's department chair by October 1, 1998. A department may nominate more than one candidate. Nominees must attend a university or college located in the United States or Canada.

Four copies of the nomination package should be sent to:

CRA Undergraduate Award Competition
Computing Research Association
1100 Seventeenth Street NW, Suite 507
Washington, DC 20036-4632
Tel. 202-234-2111
Fax: 202-667-1066
E-mail: awards@cra.org

Criteria for selection of winners

1. Evidence of unusual talent in some area of computing research as demonstrated by one or more of the following:

a. Significant research contributions, individually or as a member of a team.

b. Creation of highly innovative software or hardware design.

c. Demonstration of exceptional leadership or vision in a field of computing research.

d. Other evidence of extraordinary interest, excellence, or commitment to computer science and engineering, including industrial experience, participation in special programs, and mentoring or tutoring of other students.

2. Outstanding academic record.

Questions and inquiries involving this years Outstanding Undergraduate Awards should be directed to Kimberly Peaks and Jean Smith at awards@cra.org

Award for Outstanding Undergraduates 1998-99 Nomination Form

CRA

Each copy of the nomination package should include a copy of the following form:

Name of nominee: _____
Sex: _____
Social Security Number: _____
Program of study: _____
Year in program: _____
Department: _____
University: _____
Academic year address: _____
_____
Permanent home address: _____
_____
Academic year telephone: _____
Permanent telephone: _____
E-mail address: _____

Name of department chair: _____
Chair's e-mail address: _____
Name of first supporting nominator: _____
Supporting nominator's e-mail address: _____
Name of second supporting nominator: _____
Supporting nominator's e-mail address: _____

Signatures

Applicant: _____ date: _____
Department Chair: _____ date: _____
Supporting nominator: _____ date: _____
Supporting nominator: _____ date: _____

Please send all nomination packages to:
CRA Undergraduate Award Competition
Computing Research Association
1100 Seventeenth Street NW, Suite 507
Washington, DC 20036-4632

If submitting the nomination form only, please fax or send e-mail to:
Fax: 202-667-1066; E-mail: awards@cra.org

1997-1998 Outstanding Undergraduate Award Winners

The Computing Research Association honors the reciepients of the 1997-1998 CRA Outstanding Undergraduate Awards competition, sponsored this year by Microsoft.

The awards were given in the two categories: the Outstanding Female Undergraduate award, which went to Karla Miller from the University of Illinois, and the Outstanding Male Undergraduate award, which went to Chris Olston from the University of California at Berkeley. Honorable Mention was given to the following:

Natasha Gelfand,
Brown University
Sharon Goldwater,
Brown University
Sarita James,
Harvard University
Samjung Kim,
Northwestern University
Robert Sumner,
Georgia Institute of Technology
Jaime Teevan,
Yale University
Omri Traub,
Harvard University
Kevin Vlack,
University of Illinois

This year the Selection Committee consisted of Janice Cuny of the University of Oregon, Tom Murtagh of Williams College, and Larry Snyder of the University of Washington.

About the Winners

Karla Miller is in her senior year at the University of Illinois at Urbana-Champaign, majoring in Computer Science. She was nominated for her research in medical imaging. Karla worked in the Magnetic Resonance Imaging Research Group at the University of California, San Diego Medical Center on a biophysical model for the changes in blood flow, blood volume, and blood oxygenation in the brain during activation. The model takes physiological parameters and predicts temporal patterns of the measured MR signal; Karla's research focused on the inverse calculation. She is currently working on automation of electron crystallography, using adaptive pattern techniques to predict high-resolution image quality based on crystal features. Karla received her department's Spyglass Award for Academic Achievement and the Franz Hohn and J. P. Nash Scholarship, an award established to recognize students with exceptional talent in scientific computing. She plans to attend graduate school at Stanford University.

Chris Olston is a junior in the EECS Department at UC Berkeley. He was nominated for his work with their database research group on Tioga DataSplash, a data visualization system. Chris extended the system with a graphical query tool that integrates a query language for generating SQL queries with the Tioga "what you see is what you get" drag and drop environment. Thus, he provided a seamless interface for both browsing and querying. He is now focusing on the "online" visualization of large datasets. Chris carries a 3.94 GPA and is a member of the Tau Beta Phi, Eta Kappa Nu, and Golden Key National Honor Societies. ∎

Awards

CRA Service Award Winners

Usually annually, CRA presents two awards in the of area of service. The first, the Distinquished Service Award is presented to a person who has made an outstanding service contribution to the computing research community. This award is meant to recognize service in the areas of government affairs, professional societies, publications, or conferences, as well as leadership that has had a major impact on computing research.

The second service award honors the late A. Nico Habermann, who headed the National Science Foundation's Computer and Information Science and Engineering (CISE) Directorate until his death. He was deeply committed to increasing the participation of women and underrepresented minorities in computing research. In this spirit, this award is presentd to a person who has made an outstanding contribution to aiding members of underrepresented groups within the computing research community. This award recognizes work in areas of government affairs, educational programs, professional societies, public awareness, and leadership. The recipient has made a major impact on advancing underrepresented groups in the computing research community.

CRA Distinguished Service Award

Merrell Patrick has been selected as the recipient of the 1998 CRA Distinguished Service Award. This award is made in recognition of the significant contributions he has made to the computing research community.

Patrick's selection is based on his distinguished service at NSF and the Department of Energy(DoE). At NSF, Patrick is currently Chief Science and Technology Officer for the Directorate for Computer and Information Science and Engineering (CISE). Previously, he served as acting executive officer for CISE, as High-Performance Computing and Communications (HPCC) coordinator, and as program director for New Technologies. At NSF, he also helped draft the National Science and Technology Council Committee on Information and Communications Strategic Plan for Federal Information and Communications Research and Development. At the DoE, Patrick supervised the Academic Strategic Alliance Program of the Accelerated Strategic Computing Initiative (ASCI).

Patrick's many accomplishments include a long career in computing, first as an industrial researcher at Lockheed, then as a teacher and computer scientist at Duke University, where he headed the Computation Center, co-founded the Computer Science Department, and served as Professor and Department Chair. He also served as a member of the Institute for Computer Applications in Science and Engineering (ICASE) at the NASA Langley Research Center.

CRA A. Nico Habermann Award

Bryant York has been selected as the recipient of the 1998 A. Nico Habermann Award. This award is made in recognition of his outstanding contributions, spanning many years, to underrepresented groups within the computing research community, on both the local and national level.

York is currently an Associate Professor of Computer Science at Northeastern University. During his academic career, he has initiated and contributed to many projects involving minorities, women, and the disabled. In 1989, he organized an NSF-sponsored workshop on "Computers and Persons with Disabilities." Upon joining NSF in 1990 as a rotator, he supported several projects for improving accessibility to science for the blind. At the same time, he worked with the director of the Clearinghouse for Computer Accommodation of the General Services Administration and the director of the National Institute of Disability Research and Rehabilitation on impacts of the Americans with Disabilities Act on NSF programs. He subsequently co-edited a special section of the *Communications of the ACM* on Computers and Persons with Disabilities and moderated an NSF workshop on Access to the NII for the Elderly and Persons with Disabilities.

For a number of years, York has been active in encouraging minority students to pursue careers in science. For the past eight years he has served as a mentor for minority high school and undergraduate students in New England; he is a member of the curriculum planning committee and volunteers at the Young Achievers School in Roxbury, Massachusetts (he also helped to wire the school during NetDay96). He has chaired the ACM Committee on Minorities, and an NSF-sponsored workshop "Increasing Participation of Minorities in the Computing Disciplines." While at NSF, he conducted a six-week computer-programming contest at Benjamin Banneker High School, a predominantly black high school in Washington, DC and in 1991 York received NSF's prestigious Equal Opportunity Prize.

York's service to the minority computer science community has been recognized by ADMI (Association of Departments of Computer Information Science & Engineering at Minority Institutions), which presented him with awards in 1991 and 1997. He has helped ADMI in important forums during the organization's infancy and has served as an ADMI consultant to minority universities for grant proposal development. ∎

Colwell from Page 1

greatest concern, is there a shortage of IT workers in American industry (as reported by the ITAA and the Department of Commerce), and what is the CS&E field doing about it?

In the workshop session on CRA's Taulbee Survey, audience members provided feedback to last year's committee. They suggested ways to improve data solicitation from the community that could be used to answer some of the questions concerning IT workers who originate from CS&E departments.

IT workers were further discussed in the session on a current National Research Council (NRC) Computer Science and Telecommunications Board (CSTB) study looking at what all citizens should know about IT. This session emphasized that the skill set possessed by university graduates, in terms of ability to complete IT tasks, is becoming a more prevalent concern for all.

The conference this year contained several sessions targeted toward concerns of those in industry. Moving ideas from the research lab into the world of venture capital was addressed in a session that described this process as "a new and interesting way of creating opportunity for the corporation."

A workshop on managing industrial labs reviewed the CRA Industrial Salary Survey conducted in May 1998. How to familiarize students with the concepts, issues, and terminology to enhance their effectiveness in working in a research lab environment was also discussed. The session identified two areas for possible CRA activity: 1) develop several model intellectual property agreements between university and industry; and 2) define a set of topics and resource material to teach graduate students about industrial research labs and issues relevant to them. Topics might include patents and copyrights, technology transfer processes, business plans, and marketing.

In a session on technology transfer and industrial relations, participants emphasized that the need for talented computer scientists presents an opportunity for universities and companies to work together to increase the number of people entering the field. It was also concluded that involving industry in the CS department, through curriculum advisory boards and CEO advisory boards, is a useful strategy in getting input from those in the field and making the needs of the department known to those in industry.

Distance Education was another hot topic. How might technological advancement enhance such programs and what are their benefits and cost? The Chair of a session discussing the IT revolution in education pointed out that many online, web-based offerings are available from universities, publishers, commercial firms, and corporations. In this session it was pointed out that students tend to prefer a joint online/lecture model (small talking head rather than just audio).

Similar opportunities in distance and continuing education in CS&E and software systems via web-based distance education were discussed in a workshop that featured the history and context of the Open University (OU) in the United Kingdom. Florida State University (FSU) and OU are collaborating in a program that includes 2 years of community college and 2 years of FSU/OU distance education, with community colleges providing local support. Computer science is the first discipline to implement this program, which will begin in fall 1999.

There is still speculation about such projects though. Concerns about examinations — how do you know the remote student is "real?" — and questions about the viability of the four-year residential college were raised.

Another major focus of the conference was computing research policy. In attendance at the conference and participating in some of the sessions were not only the new Director of NSF, but also Al Teich, AAAS, David Tennenhouse, DARPA, Sid Karin, NPACI & SDSC, Juris Hartmanis, NSF, John Cherniavsky, NSF, and Marjory Blumenthal and David Clark, CSTB.

A session on new directions for federal agencies covered NSF-CISE, DOE-ASCI, and DARPA. Speakers indicated that the budget outlook is good and that government wants to harness the expertise of the broad scientific community. Speakers emphasized the need for the community to line up behind the PITAC interim report (see article, page 1): the operative phrases were "it's the software, stupid," "many visions, one voice," and "no food fights."

The chair and executive director of CSTB updated its activities in a workshop that covered their functional themes, including research agenda-setting, reconciliation of government and private sector interests, and reaching out to new communities.

There is no doubt that the CRA Conference at Snowbird this year was a success!

Further information about the individual workshops and plenaries, including slides from presentations, can be found on our website at http://www.cra.org/Activities/snowbird/ ∎

Affiliate News

Computing Research Repository for Computer Science

Researchers have made their papers available by putting them on personal webpages, departmental pages, and on various ad hoc sites known only to selected cognescenti. Until now, there has not been a way to integrate these efforts and make available to the CS community a uniform source of papers covering the whole field. This is about to change. Thanks to a partnership of ACM, the Los Alamos e-Print archive, and NCSTRL (Networked Computer Science Technical Reference Library — an online Computing Research Repository (CoRR) is being established. The repository will be integrated into the collection of computer science technical reports and other material available through NCSTRL and will be linked with the ACM Digital Library. Most importantly, the CoRR will be available to all members of the community at no cost.

We encourage you to test the service right away. It gains in value as more researchers use it. Submitting your research articles to the repository (see http://xxx.lanl.gov/help/submit for instructions) will be the surest way to have your work reach a wide audience. You can already browse the repository and subscribe to get notification of new articles of interest to you.

In the rest of this article, we briefly describe how the repository has been set up and answer some frequently asked questions.

Some background

In May 1997, a group was formed under the auspices of the ACM Publications Board to consider how an electronic repository for computer science should be set up. We discussed three options for the design of the repository.

The first option was to become part of the LANL repository. LANL started as a repository for high-energy physics e-prints in 1991. It now covers most of physics, and has recently started initiating a more comprehensive coverage of mathematics with the assistance of a mathematics advisory committee (REF). LANL had many attractive features. The most important was that it clearly worked and worked well. It now has over 75,000 e-prints, is growing at the rate of about 25,000/year, handles over 70,000 transactions/day, and has over 35,000 users. Thanks to funding from the DoE and NSF, it also has a full-time staff. It is mirrored in 16 countries, has reasonable search facilities, and offers services such as email notification of new submissions of interest.

We decided against this option primarily because the LANL interface was not open in the sense that it did not provide an interface to which other repositories could link.

The second option was to become a node in the NCSTRL system. The most important feature of NCSTRL from our point of view was that it was explicitly designed with an open interface. Its user interface was also somewhat friendlier than that of LANL, and it was a computer science effort. On the other hand, NCSTRL did not have all the software necessary for running a repository.

The third option was to build a new system from scratch. This had the obvious advantage that we could do it right and the obvious disadvantage that it would take time.

The approach we chose combined what we viewed as the best features of LANL and NCTRL, while making it easy for us to add new features. Thanks to cooperation between LANL and NCSTRL, we will be able to use the well-tested LANL software for submission, notification, and searching. The NCSTRL architecture will make it easy to build new gateway forms with which to access the files using a more user-friendly interface and new features. (In fact, LANL will now be a node on NCSTRL.) We anticipate that our use of an open protocol will encourage other scholarly archives to join in this framework. The result could be a global multi-disciplinary research collection that could have substantial impact on the nature of scholarly publishing.

CoRR FAQ

How is the CoRR organized?

Authors submitting a paper will choose a primary classification from among the roughly 100 third-level headings in the 1998 ACM Computing Classification System (see http://www.acm.org/class/1998/overview.html). The submission will be checked by a moderator for relevance to the area. This check is intended to be a quick, cursory check for relevance, and not a check for quality. If it is deemed relevant, it will appear in the repository in 24-48 hours. Authors have 24 hours to withdraw or change the paper.

What facilities are provided?

You can submit papers through the LANL interface. Through both LANL and NCSTRL, you can view recent submissions or all submissions. You can also request to be notified of new submissions in a given area (a second level heading in the Classification System determines an area). (Note that the user interface is quite different at LANL and NCSTRL.)

What about copyright?

Submission to the repository does not require a transfer of copyright. Authors will continue to retain copyright when they submit (although they may have to transfer it to a journal if they publish their paper there).

How long will papers stay on the repository?

The intention is to have the repository be permanent (but see also the next question). Even if papers are corrected, previous versions are retained (unless the paper is corrected within 24 hours of submission). The version of the paper accessed will be the most recent version, but there will be pointers to the earlier versions.

How will this affect journal publication?

Submitting a paper to the CoRR should not affect your ability to publish it in a journal. There are fields (such as medicine) for which publishers will not publish papers that have appeared on the web (even on an author's personal website). This does not appear likely to happen in computer science. Some journals may require authors to remove a paper from the repository once it appears. If this is the case, we will remove a paper at an author's request.

ACM has committed to allowing e-prints to remain on the repository after publication in ACM journals; it will also be possible to link to the definitive version on the ACM DL. We will work to convince other publishers to adopt a similar policy.

What submission formats are acceptable?

You can submit using Tex/Latex/AMSTex, HTML+GIF, PDF, or Postscript.

What happens when electronic formats change?

While this is clearly a serious concern, we expect that software will be written to automatically convert the files in the repository to whatever platform is current, just as there is now software to convert Postscript to PDF.

What is planned for the future?

Some plans currently being discussed include:

- Constructing a gateway on the ACM website and improving the interface at NCSTRL.
- Adding a comment facility (although so far such facilities have not been too successful at other sites).
- Adding facilities to allow automatic forward pointers to relevant papers.
- Expanding the scope of the repository so that it includes conference proceedings and perhaps more ephemeral information like job postings and conference listings.
- Using the repository as a testbed for building better information retrieval facilities.

This repository is meant to be a service to the community. It will succeed only with your participation and that of your colleagues. Feedback and suggestions are more than welcome.

Welcome Our Newest Staff Member, Malika Jackson

CRA is pleased to announce the hiring of a new Administrative Assistant. Late this past winter Phillip Louis, our former assistant, left our organization — we sincerely thank him for his years of hard work and wish him well.

Malika's first responsibility is to be the main point of contact for CRA. All requests and inquiries originate with her and then are directed to the appropriate staff person. Her other responsibilities include assisting the staff with a wide variety of activities and projects in Administration, Communication, and Programs.

Malika Jackson comes to us from the University of Virginia where she received a BA in Anthropology. Malika formerly worked in the Department of Health and Human Services Maternal and Child Health Bureau in Rockville, Maryland.

Her work includes maintaining the multiple CRA databases (including Forsythe and *CRN*); answering inquiries that come into info@cra.org, by phone, and via regular mail; ordering office supplies and other materials along with general office coordination; preparing mailings; and assisting with accounting duties.

Malika can be reached at mjackson@cra.org. ▮

Subscribe to the New CRA Bulletin

Anyone may subscribe to the online information source "CRA Bulletin." This free service, provided by the Computing Research Association, was created to prompt individuals via e-mail of timely news from and about CRA in areas of interest to computing researchers.

An online archive is available with past issues at http://www.cra.org/cr-bulletin/home.html. Subscription to the list, cra_b@cra.org, are free.

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Note: Always leave subject line blank when sending e-mail to listproc@cra.org!

Association News

CRA Announces Executive Fellowship Appointments

CRA selected two individuals for the 1998-1999 Executive Fellowship Program. After the initial blue-ribbon panel of distinguished leaders in computer and information science evaluated the professional credentials of the applicants, the second stage of the application process began with senior agency officials evaluating the candidates. Both met the program's requirements and were compatible with a particular agency's needs. The Fellows were placed in an area of government that most closely fit their expertise and interests.

Victor Rosenburg, University of Michigan, will be working with the Acting Under Secretary for Technology, Gary Bachula, in the Technology Administration (TA), the Federal agency that works to maximize technology's contribution to America's economic growth. Victor wants to be "an effective advocate of IT," and is excited at the opportunity to work on the Small Business Innovative Research Project (SBIR). Victor's background supports his appointment to such a role as he has successfully carried on an academic career, as well as founded and owned his own high-tech firm.

Vice President Al Gore, in a letter committing the support of his office and the Executive Branch in making the program a success, wrote:

> *"I look forward to working with [CRA] to attract the 'best and brightest' in the community to help promote the National Information Infrastructure and its applications."*

Of interest to Victor is technology transfer from Federally funded research and development projects to commercially viable products in the private sector.

Our other Executive Fellow, T.C. Ting, is Professor and recent Interim Head of Computer Science and Engineering at the University of Connecticut. He will be working on the National Performance Review initiative in the Office of the Vice President. NPR's mission is to, "reinvent government to work better, cost less, and get results Americans care about." T.C.'s responsibilities will be in the area of data security and privacy.

After the Fellows complete their special AAAS "boot camp," which is intended to acquaint them with Washington and working in the political arena, they will be resident in Washington, DC, for the entire term of the fellowship — there may be a possibility for renewal of the fellowship for a second year. The fellows will participate in AAAS seminars throughout the year. They will also maintain contact with CRA on a regular basis through scheduled meetings, occasional articles for *CRN*, and

The fellowship offers an outstanding opportunity for current and future leaders of the computing profession to learn first-hand about Washington's technology policy processes, and at the same time to serve their country through the practical application of information technology knowledge and expertise in government.

Executive Fellowship Applicants

This past year, when CRA initiated this new program, it was hoped that the fellowship would turn into an annual program. Through this programs researchers from computer science and engineering come to Washington and participate in government as "special assistants" in one of the offices or agencies of the Executive Branch of the Federal Government. CRA Fellows are to work in close cooperation with the senior staff of their host agency to help develop policies and strategies for the effective use of information technology in key areas of American society.

CRA is again looking for Fellows to come serve their community and country in Washington. The 1999-2000 CRA Executive Fellowship Program committee is looking for candidates who are mid-career or more senior computer scientists, computer engineers, information scientists or other computing professionals who are US citizens or permanent residents, and who are employed by a college or university. Minorities and persons with disabilities are encouraged to apply. Applicants must hold a tenured appointment at their college or university, or have attained their Ph.D. more than 10 years ago. Non-US citizens may not be eligible to participate in certain agencies associated with the national defense. It is important that Fellows be nonpartisan, act in the best traditions of national service, and be committed to using their expertise for the benefit of society at large.

Applicants should have extensive technical expertise in some area of information technology. They should also have a strong interest in the broader application of information technology in government and in society. Actual experience in applying technology to societal problems is highly desirable.

The deadline for the 1999-2000 fellowship is January 15, 1999. Remember, when submitting applications — electronic submission is encouraged. More information is available from our website: http:\\www.cra.org\Policy\execfell.html. Send non-electronic information to:

CRA Executive Fellowship Program
1100 17th Street, NW, Suite 507
Washington, DC 20036-4632
or
Fax: 202-667-1066 ∎

CNSF Exhibition and Reception

"Project LISTEN: A Reading Tutor That Listens," was selected to represent CRA at the 1998 Exhibition sponsored by the Coalition for National Science Funding (CNSF). This was the fourth year that CNSF has put on the Exhibition for Members of Congress and their staffs.

The 1998 CNSF Exhibition and Reception was held Wednesday, May 20, 1998, in the Rayburn House Office Building. All Members of Congress and appropriate staff were invited.

Project LISTEN, directed by Dr. Jack Mostow, Carnegie Mellon University, is an interdisciplinary research project to develop a novel cure for illiteracy — an automated Reading Tutor that displays stories on a computer screen, and listens to children reading them aloud.

The purpose of the CNSF Exhibition is to showcase the crucial role of the National Science Foundation in meeting the Nation's research and education needs. In addition to sponsoring an exhibit, CRA is also a member of CNSF and a donor to the Exhibition. ∎

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CRA Board Elections

Incumbents

Sandra Johnson Baylor is a research staff member at the IBM T.J. Watson Research Center. She earned a Ph.D. in Electrical Engineering from Rice University. Baylor is an incumbent, having served CRA as Chairperson of the CRA/ACM Coalition to Diversify Computing (CDC), a member of the CRA women's committee (CRA-W), and a member of the CRA awards committee. While a member of CRA-W, she wrote the graduate information kit for women in CS&E.

Baylor is also a member of the Institute of Electrical and Electronics Engineers (IEEE), the IEEE Computer Society (IEEE-CS), and the Association for Computing Machinery (ACM). Her most recent awards include: Best Paper Award (in Systems), International Conference on High Performance Computing (1997); IBM Research Division Award (1995); and IBM Invention Plateau Awards (1995, 1996, 1998). She would like to "become more involved in efforts to educate Congress on the importance of computing research to the nation's economic health."

C. William Gear, President of the NEC Research Institute, earned his Ph.D. in Mathematics from the University of Illinois. His awards and honors include: Fulbright (1956), ACM SIGNUM Forsythe Award (1979), Honorary Doctorate, Royal Institute of Technology, Stockholm (1987), National Academy of Engineering (1991), and the American Academy of Arts and Sciences (1996).

He would like to use "[his] past experience of 30 years in an academic environment to improve interactions and collaboration between university and industrial researchers."

Gear has served the community as SIAM President (1987-88); Chair, Committee for International Congresses on Industrial & Applied Mathematics, (1991-95); SIAM - VP for Publications (1990-92); ACM Council Member (1975-77); and ACM SIGNUM Chair (1973-75).

Edward Lazowska, incumbent and CRA Board Chair, has been involved with CRA for about seven years. Lazowska believes that "CRA is the main player that the computing research community has in critical areas such as research policy, community building, information gathering and dissemination, and workforce strengthening and diversification." He's looking forward to continuing to provide what leadership he can to these efforts, throught working with the headquarters team, the Board, and the membership.

He is a member of the National Research Council's (NRC) Computer Science and Telecommunications Board(CSTB); Chair of the National Science Foundation Advisory Committee for CISE (Computer and Information Science and Engineering); a member of the Technical Advisory Board for Microsoft Research; and a member of the Board of Directors, Washington Software Alliance.

Lazowska is Professor and Chair of the Department of Computer Science and Engineering at the University of Washington and earned his Ph.D. in Computer Science from the University of Toronto.

Newly Elected

John Gannon earned his Ph.D. in Computer Science at the University of Toronto. His research interests include software engineering, particularly program testing and applications of formal methods to analyze software artifacts, and information security.

Gannon states, "there is less understanding of the role of federally funded research in advances in computing technology. Reducing defense spending on research. . .[has] drastically reduced funding for basic computing research. We must try to convince decision-makers that producing systems which are truly novel or control critical devices is as difficult and exciting as science's other grand challenges."

Gannon is Professor and Chair of the Department of Computer Science, University of Maryland.

Leah H. Jamieson earned her Ph.D. in Electrical Engineering and Computer Science from Princeton University. She has been an IEEE Fellow (1993), IEEE Computer Society Distinguished Visitor (1990-94), IEEE Acoustics, Speech, and Signal Processing Society Distinguished Lecturer (1990-91), and a Co-recipient of the 1997 American Society for Engineering Education (ASEE) Chester F. Carlson Award for Innovation in Engineering Education (1997).

Jamieson was profiled in the CRA-W Careers Booklet "Women in Computer Science'' (1996). She is a Professor in the Electrical and Computer Engineering Department, Purdue University. She led the development of Purdue's BS in Computer Engineering degree and is co-founder of the Engineering Projects in Community Service (EPICS) program (funded by NSF, US Department of Education, US Corporation for National Service, and industrial sponsors).

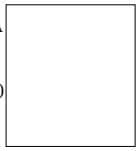
Sidney Karin is the Director of the National Partnership for Advanced Computational Infrastructure (NPACI), Director of the San Diego Supercomputer Center (SDSC), and a Professor in the Computer Science and Engineering Department at the University of California, San Diego.

Karin stated, "Continued excellence in computing research is of vital importance, as technology has become a mainstay of American life. . . I hope to bring to the CRA Board my long experience in bringing government, industry, and academia together for productive research projects."

Karin comes to CRA with a background including accomplishments such as Founder, SDSC (1985); co-author, "The Supercomputer Era"; member, NSF's CISE Directorate Advisory Committee (presently); Chair, Federal Networking Council Advisory Committee (1991-97); and member, CSTB, NRC(1988-92).

He earned a Ph.D. in nuclear engineering from the University of Michigan.

Barbara Ryder, a Professor in the Department of Computer Science, Rutgers University, earned her Ph.D. in Computer Science from Rutgers University.



Ryder has served CRA as a selected panelist at three CRA Workshops on Academic Careers for Women in Computer Science (1993,1994,1996), and has also served the community on the ACM SIGPLAN Executive Committee (1989-99) as elected Chair (1995-97), Vice Chair (1993-95), member-at-large and Chair of the Professional Activities Committee (1989-93). She was also an NSF site visitor, Center for Research on Parallel Computation (1991,1993,1994); recent NSF panel participant (Experimental Software Systems, 1998, Software Engineering, 1996, Careers, 1995, Research Infrastructure, 1995); Acting Director of the Laboratory for Computer Science Research, Rutgers University (1996); Co-PI on NSF travel grant to fund faculty from primarily minority and female institutions to attend tutorials and conferences at ACM SIGPLAN PLDI'94; member of the Editorial Board, *Journal of Programming Languages* (1992-present) and *IEEE Software* (1989-92); and an Associate Editor for *ACM Letters on Programming Languages and Systems* (LOPLAS) (1989-94).

Her research interests include programming languages and compilers, and software for sequential and parallel programming environments.

Daniel Reed is Professor and Head of the Department of Computer Science at the University of Illinois at Urbana-Champaign. He has served on the editorial board of the *IEEE Transactions on Software Engineering* and *IEEE Transactions on Parallel and Distributed Systems*, and currently serves on the boards of *Concurrency Practice and Experience*, the *International Journal of High-Speed Computing*, and *Performance Evaluation and Modeling for Computer Systems*. He is past treasurer and member of the board of directors for the ACM SIGMETRICS special interest group.

In addition, he is an affiliate of the Center for Research on Parallel Computation (CRPC), where his research group is integrating performance analysis tools with data-parallel compilers.

Reed earned his Ph.D. in Computer Science from Purdue University.

Appointees

Timothy W. Finin is a Professor of Computer Science and Electrical Engineering at the University of Maryland, Baltimore County. Prior to joining the faculty at UMBC, he was a Technical Director at the Unisys Center for Advanced Information Technology, a member of the faculty of the University of Pennsylvania, and on the research staff of the MIT Artificial Intelligence(AI) Lab.

He earned his Ph.D. in Computer Science from the University of Illinois and his current research is focused on the theory and applications of intelligent software agents. A former AAAI councillor, he is currently serving as AAAI's representative on the CRA board.

Finin's past experiences include organizing the CRA Effective Teaching Workshop, and serving as past program chair and general chair of the IEEE Conference on Artificial Intelligence for Applications, the general chair of the first two ACM Conferences on Information and Knowledge Management, and the program co-chair of the Second ACM Autonomous Agents conference.

Eugene Spafford is a Professor of Computer Sciences at Purdue University. Spaf (as he is known to his friends, colleagues, and students) is interim director of the COAST Laboratory and the Purdue CERIAS (Center for Education and Research in Information Assurance and Security).

His current research interests are primarily in the areas of: computer and network security; ethical and societal implications of computing; software validation, verification, and debugging; and reliable distributed computer systems.

Recent accomplishments include being named an ACM Fellow in 1997; serving as program chair of a workshop on Security in Large-Scale Distributed Systems; and being named the interim director of CERIAS (he is expected to be named as the first full-time director by year's end). He also coordinated a letter to various Congressional leaders against World Intellectual Property Organization (WIPO) legislation, explaining that it threatens some forms of computer security research.

He earned his Ph.D. in Information and Computer Science from the Georgia Institute of Technology, and is currently serving as the ACM representative to the CRA board. ∎

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Purdue University(CS)
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University of Waterloo(CS)
University of Western Ontario(CS)
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University of Wisconsin, Milwaukee(CS)
University of Wyoming(CS)
Vanderbilt University(CS)
Virginia Polytechnic Institute(CS)
Wake Forest University(CS)
Washington State University(EECS)
Washington University(CS)
Wayne State University(CS)
West Virginia University(CE)
Western Michigan University(CS)
Williams College(CS)
Worcester Polytechnic Institute(CS)
Wright State University(CS)
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Affiliate Professional Society Members

American Association for Artificial Intelligence
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IEEE Computer Society
Society for Industrial and Applied Mathematics
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Professional Opportunities

CRN Advertising Policy

Send copy and payment for Professional Opportunities advertisements to Advertising Coordinator, *Computing Research News*, 1100 Seventeenth Street, NW, Suite 507, Washington, DC 20036-4632. tel. 202-234-2111; fax: 202-667-1066; e-mail: crn@cra.org. E-mail submissions are preferred.

The format of an ad must conform to the following: 1) the first line must contain the name of the university or organization, 2) the second line must contain the name of the department or unit, and 3) the body of the ad should be in paragraph form. The words in the first two lines are included in the total word count for the ad. You may request in writing that some text be set in bold; a bold word in the body of the ad counts as two words.

The rate is $2.25 (US) per word. Purchase orders, money orders, and checks are acceptable (please do not send cash). All CRA members receive 200 free words per dues year. CRA's standard advertising package consists of running an ad in *CRN*, and distributing it electronically to CRA's jobs listserv and webpage (where it remains for no less than two months). As an alternative to this package, advertisers may request that their Professional Opportunities ads just be published in *CRN* or just distributed electronically. The cost of the ad is the same whether the standard or the alternative package is selected.

Professional Opportunities display ads cost $60 (US) per column inch, with a two-inch minimum. Ads must be submitted in camera-ready, offset (positives or negatives) or mechanical form. If your ad is larger than three inches, please request our Advertising Rate Card.

Computing Research News is published five times per year: in January, March, May, September, and November. Professional Opportunities ads with application deadlines falling within the month of publication of *CRN* will not be accepted for publication in *CRN* unless the ad says applications will be accepted until the position is filled. If the closing date of a Professional Opportunities ad does not correspond with the publication of an issue of *CRN*, advertisers can choose the alternative advertising package and only have the ad distributed electronically. Advertising copy that is to appear in *CRN* must be received at least one month before publication. The deadline for the November issue is October 1. Ads for electronic distribution only may be submitted at any time.

Brown University
Department of Computer Science
Faculty Position

Applications are invited for a senior position in computer science with tenure, commencing no later than July 1, 1999. Outstanding applicants are sought in the following areas of systems: databases, distributed systems, environments, networks, operating systems, programming languages, software engineering, and Web-related technologies.

Candidates are expected to have outstanding research credentials, a strong commitment to teaching, and demonstrated leadership ability. They must also have a doctoral degree in computer science or closely related areas. Candidates are sought who will meet the teaching and research needs of the department.

Successful applicants will find at Brown a stimulating environment conducive to professional growth. Brown has a strong department with a variety of interesting research projects in analysis of algorithms, artificial intelligence, combinatorial optimization, computational complexity, computational geometry, computer graphics, concurrent data structures and architectures, database systems, graph drawing, operating systems, parallel computation, parallel and distributed debugging, programming environments, programming languages, robotics, and software engineering. The undergraduate and graduate students are first-rate.

Applicants should send a resume in hard copy and have at least five referees send letters of recommendation to:

Prof. Stanley Zdonik
Dept. of Computer Science
Brown University, Box 1910
Providence, RI 02912

Inquiries may be addressed to:
faculty_search@cs.brown.edu.

All application materials must be received by October 15, 1998 for full consideration.

Additional letters of recommendation may be requested.

Brown University is an equal opportunity/affirmative action employer and strongly encourages applications from women, minorities, and protected persons.

Case Western Reserve University
Department of Electrical, Systems, Computer Engineering and Science
Case School of Engineering
Chair

The Case School of Engineering is seeking an outstanding leader to become the Chair of Electrical, Systems, Computer Engineering and Science (ESCES), a new department created through the merger of Systems and Control Engineering, Electrical Engineering, and Computer Engineering and Science. The Department Chair will build on the existing expertise and capabilities of the department in order to enhance its position among top tier academic programs. We are seeking an individual who is committed to excellence, demonstrates strong leadership and interpersonal skills, who would be an effective advocate for the department and who would be able to help attract additional resources. The new Chair will serve as academic leader for the department and will identify and build upon the many resident synergism's and lead the department into new areas where it can excel. Further, this individual should demonstrate an ability to understand the critical issues in the wide range of disciplines represented in the department. The chair should be able to set and maintain high standards in research and teaching.

A documented record of excellence in both teaching and research in one of or more of the academic disciplines represented in this new department is an essential qualification. The selected candidate will be appointed to the academic rank of full professor with tenure.

The school is committed to substantial expansion of the department beyond the present 27 faculty. Over 200 graduate students and 400 undergraduate majors are served by the department. All of the engineering degrees in the department are ABET accredited.

Applications and nominations, including curriculum vitae and the names of at least three references, should be sent to:

Dr. Kenneth Singer, Search Committee Chair
c/o Dean's Office
Case School of Engineering
Case Western Reserve University
10900 Euclid Avenue
Cleveland, OH 44106-7220

In employment as in education, CWRU is committed to affirmative action and equal opportunity.

URL: http://k2.scl.cwru.edu/cse/esces/

Concordia University
Computer Science
Information Systems

The Department of Computer Science invites applications for a tenure-track faculty position at the Assistant or Associate Professor rank commencing June 1, 1999, in the general area of Information Systems. The Department has a strong undergraduate option in information systems that admits more than 40 students every year. The established strengths of the faculty members in this general area include databases, human-computer interfaces, machine intelligence, real-time systems, and networks. We are particularly interested in candidates whose expertise includes one or more of the following: information systems design, information systems security, human-computer interfaces, multimedia systems design, databases, and intranet/internet-based information systems (including the processing and integration of knowledge from different sources, domains, and non-text media.)

Applicants should have a Ph.D. degree in computer science or a related field with a good and relevant publication record. A candidate at the assistant professor level is expected to have strong interest and ability to teach effectively at the Bachelors, Masters and Ph.D. levels. At the associate professor level, demonstrated excellence in both research and teaching are required. Included in the responsibilities of the successful candidates are participation in the development of courses and laboratories, supervision of graduate students, and the pursuit of external research funding, industrial collaborations, and technology transfer.

The Department houses approximately 700 undergraduates and 200 graduate students. Its activities are supported by approximately 29 full time faculty and 15 staff members. The Department has established a research centre, CENPARMI (Centre for Pattern Recognition and Machine Intelligence) with a specialization in pattern recognition and related expert-systems research. The Department is also involved in two inter university research centres in mathematical computing and in VLSI architectures. Several members participate in the Network of Centres of Excellence (for example, CITR and IRIS). To promote the development of new faculty members, the university has the FRDP program to provide seed grants for research in the beginning years. There are excellent opportunities of external funding from both government research agencies (NSERC and FCAR) and industries.

Concordia University is located in Montreal, a dynamic and vibrant city that has an exciting cultural diversity. Montreal has a flourishing software industry with particular strengths in telecommunications, simulation, multimedia, and aerospace.

Although the primary language of instruction is English, proficiency in French will be considered an asset. Interested applicants should arrange to send a detailed curriculum vitae, a list of publications, and at least three references to: Dr. H.F. Li, Chair, Department of Computer Science, Concordia University, 1455 de Maisonneuve,West Montreal, Quebec H3G 1M8 Canada; Tel. 514-848-300; Fax: 514-848-2830; Email: hiring@cs.concordia.ca; Website: www.cs.concordia.ca

In accordance with the Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada. Concordia is committed to Employment Equity and encourages applications from women, aboriginal peoples, visible minorities, and disabled persons.

Concordia University
Engineering & Computer Science
Software Engineering

The Department of Computer Science invites applications for two tenure-track faculty positions at the Assistant or Associate Professor rank commencing June 1, 1999, in the area of Software Engineering. Our new undergraduate software engineering program covers the specification, design, implementation, and maintenance of large-scale software, as well as management issues concerned with the production of such software. There are several faculty members in the department working in the area of software specification, design and reuse, and user interfaces. We are especially interested in candidates with expertise in one or more areas of software engineering such as: software architecture, software requirements engineering, software quality assurance, software reuse, reverse engineering, software project management, distributed software development (including component integration and systems design from scratch), and user-interface design.

Applicants should have a Ph.D. degree in computer science or a related field with a good publication record in the area of software engineering. A candidate at the assistant professor level is expected to have strong interest and ability to teach effectively at the Bachelors, Masters and Ph.D. levels. At the associate professor level, demonstrated excellence in both research and teaching are required. Included in the responsibilities of the successful candidates are participation in the development of courses and laboratories, supervision of graduate students, and the pursuit of external research funding, industrial collaborations, and technology transfer.

The Department houses approximately 700 undergraduates and 200 graduate students. Its activities are supported by approximately 29 full-time faculty and 15 staff members. The Department has established a research centre, CENPARMI (Centre for Pattern Recognition and Machine Intelligence) with a specialization in pattern recognition and related expert-systems research. The Department is also involved in two inter-university research centres in mathematical computing and in VLSI architectures. Several members participate in the Network of Centres of Excellence (for example, CITR and IRIS). To promote the development of new faculty members, the university has the FRDP program to provide seed grants for research in the beginning years. There are excellent opportunities of external funding from both government research agencies (NSERC and FCAR) and industries.

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Although the primary language of instruction is English, proficiency in French will be considered an asset. Interested applicants should arrange to send a detailed curriculum vitae, a list of publications, and at least three references to: Dr. H.F. Li, Chair, Department of Computer Science, Concordia University, 1455 de Maisonneuve,West, Montreal, Quebec H3G 1M8 Canada; Tel. 514-848-300; Fax: 514-848-2830; Email: hiring@cs.concordia.ca; Website: www.cs.concordia.ca

In accordance with the Canadian immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada. Concordia is committed to Employment Equity and encourages applications from women, aboriginal peoples, visible minorities and disabled persons.

Computists International
Computists' Communique

For careers beyond programming: research jobs, competitions, AI/industrynews, announcements. <www.computists.com>, laws@computists.com.

Florida Atlantic University
Computer Science and Engineering

The Department of Computer Science and Engineering seeks applications for several visiting faculty and instructor positions. For faculty positions, a doctorate in CS, CE, or a closely related field is required. For instructor positions, a Master's degree in CS or CE and about 5 years of experience are required. The appointments will begin from August 1998 or later. The search committee will begin reviewing applications immediately and continue until all positions are filled. Salaries, and fringe benefits, are competitive.

The Department offers bachelor's, master's and doctoral programs in CS and CE. An Undergraduate CS program is also being offered at Davie campus - about 25 miles south of Boca. Two faculty positions are for the Davie campus and the rest are for the Boca campus. For more information please visit http://www.cse.fau.edu.

Applicants should send a resume, including the name, phone number, and e-mail address of at least three professional references, along with a cover letter specifying teaching and research interests to:

Faculty Search Committee
Department of Computer Science and Engineering
Florida Atlantic University
Boca Raton, Florida 33431

Electronic mail communications should be addressed to searchcomm@cse.fau.edu.

Florida Atlantic University is an equal opportunity/access/affirmative action institution.

Georgia State University
Department of Mathematics and Computer Science

The Department of Mathematics and Computer Science of Georgia State University invites applications for two anticipated tenure-track positions of assistant professor beginning January, 1999. Earned Ph.D. in Computer Science, or a closely related discipline, and an excellent record in publications in computer science are required with preference for extramural funding. Preference is for individual with specialty in operating systems, artificial intelligence, human-computer interaction, software engineering, algorithms, or architecture. Departmental computing facilities for research and instruction include 128 networked computers, five laboratories, one with ATM switches for network research and another for hypermedia and visualization research. The departmental facilities are supported by two full-time systems programmers.

Applicants should send a letter of application, vita without birthdate, but with citizenship status, and three letters of reference and transcripts of all graduate and undergraduate work to: Chair, Department of Mathematics and Computer Science, Georgia State University, University Plaza, Atlanta, Ga. 30303-3083 (or e-mail to: mfraser@cs.gsu.edu).

Applications will be accepted until position is filled. Georgia State University, a unit of the University System of Georgia, is an equal opportunity educational institution, and an EEO/AA employer.

Georgia Institute of Technology
College of Computing

Georgia Tech's College of Computing invites applications for tenure-track faculty positions. We are primarily interested in entry-level candidates but will consider exceptional individuals at all levels. With an academic faculty of 48, a research faculty of 16, and 3 postdoctoral fellows, the College has a current enrollment of 1,150 undergraduates, 70 Masters students, and 150 Ph.D. students. The College has strengths in a broad range of areas and is ranked among the top computer science and information technology programs nationally. One of the College's missions is to interact significantly with other academic units; candidates with an interdisciplinary research focus and/or interest in potential joint appointments are welcome.

Preference will be given to applications received by January 15, 1999. We prefer electronic applications (consult http://www.cc.gatech.edu/general-info/faculty-application-instructions.html.) Please e-mail us a URL pointing to your application materials, including a resume, and the names of at least three references.

E-mail: recruiting@cc.gatech.edu

Professional Opportunities

Hardcopy applications should be sent to:
Dr. Janet Kolodner
Chair, Faculty Search Committee
College of Computing
Georgia Institute of Technology
Atlanta, GA 30332-0280
Tel. 404-894-1634
Fax: 404-894-9846

Georgia Tech is an Affirmative Action/Equal Opportunity Employer; applications from women and under-represented minorities are strongly encouraged.

Knox College
Department of Computer Science

The Department of Computer Science invites applications for a two-term (winter and spring) visiting position at the rank of visiting assistant professor (Ph.D) or instructor (ABD.) The position will begin January 1, 1999. A full tenure-track search for this position will take place during the 1998-99 academic year.

To apply, please send a letter of interest, curriculum vitae, and three letters of recommendation to the address below. At least one of the letters should address the candidate's teaching ability and experience.

Sahnny Johnson, Chair,
Department of Computer Science
Knox College #67
Galesburg, IL 61401-4999
sjohnson@knox.knox.edu

Review of applications will begin immediately and will continue until the position is filled.

Knox College is an affirmative action, equal opportunity employer. In keeping with its 161 year commitment to equal rights, the College welcomes applications from individuals in under-represented groups.

For more information about the College, the department, and our computing facilities, see http://www.knox.edu

Midwestern State University
Department of Computer Science

The Department of Computer Science at Midwestern State University invites applications for a full-time, tenure-track position in Computer Science to begin January 1999. Ph.D. in Computer Science or a closely related field is required. The position is open to all areas of specialization in CS, however, preference may be given to those with a background in network theory, design, and administration, operating systems and object oriented programming, or theory of computation. Previous teaching experience is desired.

Midwestern State University is a liberal arts university offering both BS and MS degrees in computer science, and is dedicated to teaching excellence and research. For additional information see: http://cs.mwsu.edu

Send a letter of application, resume, graduate transcript, statement of visa status (if applicable), and have three letters of reference, one of which should address teaching ability, sent separately to: Dr. Ranette Halverson, Computer Science Program, Midwestern State University, 3410 Taft Blvd., Wichita Falls, Texas 76308.

Applications will be reviewed beginning September 1, 1998. Acceptance and review of applications will continue until the position is filled. MSU is an AA/EO employer.

Purdue University
Department of Computer Sciences

The Department of Computer Sciences at Purdue University invites applications for tenure-track positions beginning August 1999. Positions available are at the assistant professor level. Appointments at the associate and full professor levels, however, will be considered for highly qualified applicants. Areas of particular interest are: computer graphics and scientific visualization, database systems, information security, operating systems and networking, and software engineering. Excellent candidates in other areas of Computer Science and its applications will be seriously considered. Senior candidates must possess a distinguished record of accomplishments in research, teaching and service.

Applicants should hold a Ph.D. in Computer Science, or a closely related discipline, and should be committed to excellence in teaching and research. Salary is competitive and depends on background and experience.

The Department of Computer Sciences encompasses a wide range of research areas including analysis of algorithms and theory of computation, databases, distributed and parallel computing, geometric modeling and scientific visualization, information security, networking and operating systems, numerical computing, parallelizing compilers, programming languages, and software engineering.

Each faculty member has access to the departmental and University computing facilities, which include a variety of high-performance computing platforms. For more information see http://www.cs.purdue.edu.

Candidates should send a curriculum vitae, statement of career objectives, and arrange sending at least three confidential letters of reference. The interviewing process will commence in October 1998, and will continue until positions are filled.

Please send applications to:
Chair, Faculty Search Committee
Department of Computer Sciences
Purdue University
West Lafayette, IN 47907

Purdue University is an Equal Opportunity/ Affirmative Action employer.

Texas Tech University
Department of Computer Science

The Department of Computer Science invites applications for one or more tenure track positions at the rank of assistant or associate professor, to begin employment in the spring or fall of 1999. Areas of interest include databases, distributed and high performance computing, intelligent systems, programming languages, software engineering, and hardware. Applicants at the assistant professor level must have the requirements for the Ph.D. in computer science or related field completed before employment, and should demonstrate clear potential for effective teaching and research. Applicants at the associate professor level should have a proven record of scholarly accomplishments, including a strong record of publications and funded research. The department is committed to being a nationally recognized program in the computing field.

The Department of Computer Science is within the College of Engineering and offers BS, MS, and Ph.D. degrees. The department participates in both an EE/CS dual degree program and a Computer Engineering program in conjunction with the Department of Electrical Engineering, as well as dual degrees with both Chemical Engineering and Mathematics. At present, there are over 500 undergraduate and 80 graduate students in computer science degree programs. The graduate program offers specialties in computer engineering, software engineering, and intelligent systems. Faculty perform scholarly and funded research in many areas, including: distributed computing and modeling; graphics and haptics; high-performance computing; multimedia systems; neural networks; real-time systems; software development environments; and software metrics. Information about the department, college, university, and the City of Lubbock can be found at www.cs.ttu.edu/FacSearch/ . Applicants should send a letter expressing interest in the position, a detailed resume, and the names and addresses of three professional references to:

John K. Antonio, Search Committee
Chairperson
Department of Computer Science
PO Box 43104
Texas Tech University
Lubbock TX 79409-3104

All questions should be directed to antonio@ttu.edu. Applications will be reviewed as they are received, until the positions are filled. Applicants must be able to lawfully accept employment in the United States. Texas Tech University is an Equal Opportunity, Affirmative Action Employer.

University of Arizona
Department of Computer Science
http://www.cs.arizona.edu

Applications are invited for tenure-track faculty positions at all ranks, beginning employment August 1999. Candidates must hold a doctorate in computer science or related field, have a commitment to excellence in teaching, and have demonstrated strong potential for excellence in research.

The Department of Computer Science at The University of Arizona has a long history of research accomplishment, influential software distribution (e.g., Icon, SR, Blast, x-kernel, glimpse) and substantial external funding to individual faculty, exceeding 2.5 million dollars last year. Major funding has included two NSF Institutional Infrastructure grants over the past decade, and a Research Infrastructure grant funded three years ago. Research areas include programming languages, compilers, operating systems, networks, algorithm design, database systems, computational biology, and theory of computation. In addition to providing a broad range of equipment necessary to computing research, the Department supports its instruction and research programs through an exceptional laboratory staff.

Applicants must send a curriculum vitae and the names of at least three references to: Faculty Recruiting Committee, Department of Computer Science, The University of Arizona, PO BOX 210077, Tucson, AZ 85721-0077.

We will start the review of applications on October 1, 1998, and will continue to consider applicants until the positions are filled, subject to availability of funds. The University of Arizona is an EEO/AA employer - M/W/D/V.

University of California, Irvine
Department of Information and Computer Science (ICS)
Open Faculty Positions in Information and Computer Science

The Department of Information and Computer Science (ICS) has several tenured or tenure-track positions open in the following areas of research emphases:

A. Software and software engineering: requirements and design methods, distributed software engineering and technologies, software architectures and component-based technologies.

B. Computer networks: network protocols and management, mobility support, security and quality of service to applications, flexible and expandable middle-ware services.

C. Computer-supported cooperative work: social impacts of computing, information studies and human-computer interactions.

D. Embedded computer systems: system architectures, design, validation and testing of embedded systems, embedded software, compiler and software tools, hardware-software co-design.

E. Interdisciplinary applications of computing such as computer graphics and animation, scientific data visualization, computational statistics, computational biology, medical informatics, information organization, storage, retrieval and visualization.

Available positions are for a full professor in software/software engineering and assistant professor positions in other areas, but exceptional candidates from all ranks will be considered. In all cases, we are looking for applicants with a Ph.D. degree in Computer Science or a related field, and strong research credentials as evidenced by scholarly publications. Applicants for senior positions must also demonstrate a proven track record in original research and teaching activities.

The ICS Department is organized as an independent campus unit reporting to the Executive Vice Chancellor. It runs the second most popular major at UCI and has designed an undergraduate honors program that attracts the campus' most qualified students. The Department currently has 32 full-time faculty and 125 Ph.D. students involved in various research areas including computer science theory, artificial intelligence, networks and distributed systems, databases, multimedia systems, computer systems design, software/software engineering, human-computer interaction and computer-supported cooperative work. ICS faculty are involved in the forefront of research in the emerging areas of the computer science discipline such as multimedia/embedded computing, knowledge-discovery in databases, bioinformatics and the role of information in computer science and society. The faculty has effective interdisciplinary ties to colleagues in biology, cognitive science, engineering, management, medicine, and the social sciences. ICS at UC Irvine represents one of the fastest growing departments and a computer science program that builds upon our strengths in core as well as growth areas of computer science.

Although UCI is a young university, it has attained remarkable stature in the past 3 decades. Two Nobel prizes were recently awarded to UCI faculty. UCI is located three miles from the Pacific Ocean near Newport Beach, approximately forty miles south of Los Angeles. Irvine is consistently ranked among the safest cities in the U.S. and has an exceptional public school system. The campus is surrounded by high-technology companies that participate in an active affiliates program. Both the campus and the area offer exciting professional and cultural opportunities. Mortgage and housing assistance are available including newly built, for-sale housing located on campus and within short walking distance from the department.

Applicants should send a cover letter indicating which of the five areas above [A-E] best fits their research, a curriculum vitae, sample papers and contact information for five references to:

ICS Faculty Position [A-E]
c/o Joy Schuler
Department of Information and Computer Science
University of California, Irvine
Irvine, CA 92697-3425

Application screening will begin immediately upon receipt of curriculum vitae. Maximum consideration will be given to applications received by December 1, 1998. Salaries commensurate with experience.

The University of California is an Equal Opportunity Employer, committed to excellence through diversity.

University of Illinois at Urbana - Champaign
Department of Computer Science

The Department of Computer Science, UIUC, anticipates one or more full-time tenured and/or tenure-track appointments. Applicants are sought in all areas, with special emphasis on experimental systems (software and architecture). To be considered for a tenured position, applicant must have recognized national and international stature. Successful candidates will be expected to initiate and carry out independent research and to perform academic duties associated with our BS, MS, and Ph.D. programs.

Qualifications: Ph.D. in Computer Science or a closely related field (or imminent completion of degree,) outstanding academic credentials, an ability to teach effectively at both the graduate and undergraduate levels. Salary open — based on qualifications. Starting date: August 21, 1999. To ensure full consideration, applications must be received by December 12, 1998, although a search will continue until positions have been filled. Send resume including names of three references to: Daniel A. Reed, Head, Department of Computer Science, 1304 W. Springfield Avenue, Urbana, IL 61801.

The UIUC is an AA-EOE. Minorities, women, and other designated class members are encouraged to apply.

University of Minnesota - Twin Cities
Department of Computer Science and Engineering

The Department of Computer Science and Engineering at the University of Minnesota invites applications for up to four open positions. These positions are primarily at the assistant professor level, but highly qualified applicants at higher ranks will also be considered. Specialists from all areas of computer science and engineering are encouraged to apply. Requirements include a Ph.D. in computer science or a closely related discipline,

a commitment to quality teaching, and the potential for carrying out outstanding research. Senior candidates must possess a distinguished record of teaching, research, and service.

The Department of Computer Science and Engineering encompasses a wide range of research areas, including software engineering, networking and distributed multimedia, databases, computer architecture, artificial intelligence, robotics and computer vision, algorithms and complexity theory, computational geometry, human-computer interaction, parallel computing, and scientific computing. Its faculty members have access to outstanding computing facilities both within the department and at the various research centers on campus, including the Minnesota Supercomputing Institute, the Institute for Mathematics and its Applications, and the Army High Performance Computing Research Center. For more information about the department, its facilities, and faculty, please view our World Wide Web homepage at http://www.cs.umn.edu. The Minneapolis-St. Paul area is a major center for advanced technology and computer industry, and the Department of Computer Science and Engineering enjoys strong interactions with local companies.

Applicants should submit a curriculum vitae, a research summary, and the names of at least three references to:

Chair, Faculty Recruiting Committee
Department of Computer Science and Engineering
4-192 EE/CS Building
University of Minnesota
200 Union St. S. E.
Minneapolis, MN 55455.

Electronic submissions of applications material are welcome and may be sent via e-mail to applications@cs.umn.edu. (Electronic submissions in standard postscript are preferred.) Review of completed applications will begin January 15, 1999, but the search will remain open until all positions are filled.

The University of Minnesota is an equal opportunity educator and employer.

University of Nebraska - Lincoln
Computer Science & Engineering Department

The UNL CSE Department invites applications for two assistant professor tenure-track positions to begin January or August 1999. Applicants should have promise for innovative research and teaching in:

* VLSI design or design automation,
* Software engineering of enterprise systems, (including electronic commerce,)
* Distributed object technologies,
* Human-computer interaction,
* Database and information systems,
* Computer and communications security, or
* Theory and algorithms

and hold or be completing a Ph.D. in computer science, computer engineering, or related field. Exceptional candidates in other areas will be considered.

The CSE Department offers both computer science and computer engineering programs leading to BS, MS, and Ph.D. degrees and has 20 tenure faculty lines, over 500 undergraduates, and 100 graduate students. UNL is Nebraska's comprehensive research university with Carnegie I standing and membership in the American Association of Universities. In 1998, UNL received the largest gift in its history to establish the J. D. Edwards Honors Program in Computer Science and Management.

Review of applications begins October 15, 1998, and will continue until all positions are filled. A resume, statement of research and teaching interests, and three reference letters should be sent to:

Dr. A. J. Surkan, CSE Search Committee Chair
Computer Science and Engineering Department
University of Nebraska - Lincoln
Lincoln, Nebraska 68588-0115
See www.cse.unl.edu
e-mail: search@cse.unl.edu
Tel. 402-472-2401
Fax: 402-472-7767

UNL is committed to a pluralistic campus community through AA/EO, and is responsive to dual-career couples. We assure reasonable accommodation under the Americans for Disabilities Act; contact Deb Heckens 402-472-2401 for assistance.

University of Oklahoma
School of Computer Science
Director, School of Computer Science

Continuing its search for a Director, the School of Computer Science at The University of Oklahoma in Norman invites applications and nominations for the position of Director. Applicants must hold a doctorate in computer science or a related discipline, with sufficient academic accomplishments or significant industrial experience for appointment as full professor with tenure. Candidates with an excellent research record and demonstrated leadership and managerial skills in promoting excellence in scholarship, teaching, and funded research programs are encouraged to apply.

Nominations and applications with a list of 5 references must be submitted to:

Professional Opportunities

K. Thulasiraman, Chair, Director Search Committee
School of Computer Science
The University of Oklahoma
200 Felgar Street, Room 114
Norman, OK 73019-6151
E-mail: thulasi@cs.ou.edu; Tel. 405-325-0566; Fax: 405-325-4044

The search will continue until the position is filled. The University of Oklahoma is an equal opportunity/affirmative action employer. Women and minorities are especially encouraged to apply. OU is responsive to the needs of dual-career couples. More information about the position can be found at http://www.cs.ou.edu/director-search.

University of Utah
Department of Computer Science

The University of Utah's Department of Computer Science seeks applicants for tenure track faculty positions at either the assistant or associate professor level. The department places a strong emphasis on interdisciplinary, multi-investigator research activities addressing large-scale problems of significant impact. Both research areas and course offerings benefit from the quality and breadth of our faculty and emphasize a balance of theoretical foundations and practical engineering. Candidates are sought who will complement the current mix of faculty within the department: in the areas of computer graphics/scientific visualization/ scientific computing, systems/networking/languages, artificial intelligence, and databases. Applicants should have earned a Ph.D. in Computer Science or a closely related field.

The University of Utah is located in Salt Lake City, the hub of a large metropolitan area with excellent cultural facilities and unsurpassed opportunities for outdoor recreation only a few minutes drive away. Additional information about the department can be found at http://www.cs.utah.edu.

Please send curriculum vitae and names and addresses of at least four references to: Faculty Recruiting Committee, c/o Shawn Darby, Department of Computer Science, 50 So. Central Campus Drive, Rm 3190 MEB, University of Utah, Salt Lake City, UT 84112-9205

The University of Utah is an Equal Opportunity, Affirmative Action Employer and encourages nominations and applications from women and minorities, and provides reasonable accommodation to the known disabilities of applicants and employees.

University of Wisconsin, Madison
Computer Sciences Department
Assistant Faculty Associate Position

Applications are invited for the position of Faculty Associate. The position is for an outstanding teacher to collaborate with current faculty and instructional staff in teaching and developing materials for undergraduate computer science courses (primarily an introductory two-course programming and data structures sequence,) and to train and supervise teaching assistants assigned to these courses. Duties also include service on departmental committees associated with undergraduate education and coordination with the systems lab for facilities management. Candidates should have an exceptional record of classroom instruction and curricular innovation in Computer Science that can further enhance our undergraduate offerings. A graduate degree in Computer Science, experience in teaching Computer Science, and objected-oriented programming skills are required.

The position is available starting in January 1999 but can be deferred until August 1999. Please send a letter of application, a resume, and the names of at least three references to: Chair, Faculty Recruiting Committee, Computer Sciences Department, University of Wisconsin-Madison, 1210 West Dayton St., Madison, WI 53706.

To ensure consideration, applications should arrive by September 30, 1998.

The University of Wisconsin is an Equal Opportunity/Affirmative Action employer and encourages women and minorities to apply. Unless confidentiality is requested in writing, information regarding the applicants must be released on request. Finalists cannot be guaranteed confidentiality.

Washington University in St. Louis
Department of Computer Science
Computer Visualization Laboratory
Director

The Department of Computer Science at Washington University invites applications for a tenure-track faculty appointment from individuals qualified to fill the position of Director of the Computer Visualization Laboratory. Applicants should hold a doctorate in Computer Science, have a strong commitment to teaching, and a record of accomplishment in research. The Department seeks outstanding candidates whose research is directed towards solving important problems in the general area of multimedia communication, computer graphics, human interfaces or visualization. Leadership, vision, intellectual ambition, and a collaborative style are the kinds of traits required for this position.

The Department is a world leader in networking and multimedia technology and enjoys a strong research reputation in the areas of distributed computing and object-oriented software technologies; graphics, visualization, visual languages, and human interfaces; artificial intelligence; computer architecture and engineering; theoretical computer science; and computational science with emphasis on biomedical applications.

The Computer Visualization Laboratory is a state-of-the-art facility equipped with modern graphics workstations, high-speed ATM communication links, professional video editing capabilities, etc. The Laboratory was founded in 1990 and its equipment was recently upgraded through an NSF Instrumentation Grant. Several faculty members and an energetic cadre of graduate students are associated with the Laboratory. Recent and current projects span the areas of program visualization, computational geometry, computational steering, visual languages, network visualization, etc. The role of the Director is to expand the research agenda of the Computer Visualization Laboratory and its leadership position in the University by leveraging off the research strengths in the department, the extensive set of existing collaborations with other departments, expanding opportunities for partnerships with industry, and outreach efforts to the local community.

Qualified applicants should send a curriculum vitae and the names and addresses of at least three references to: Dr. Catalin Roman, Chairman, Department of Computer Science, Campus Box 1045, Washington University, One Brookings Drive, St. Louis, MO 63130-4899.

Applications will be considered as they are received. Those arriving after October 15, 1998, may not receive full consideration. Washington University is an equal opportunity/affirmative action employer. For more information on our department, see our World Wide Webpage at http://www.cs.wustl.edu.

Wayne State University
Department of Computer Science

The Department of Computer Science of Wayne State University invites applications and nominations for several anticipated tenure-track faculty positions at the assistant/associate professor level. The candidate's education should be in the areas of networking, operating systems, distributed computing, and data management.

Candidates should have a Ph.D. in computer science, engineering, or a closely related field, a strong interest in and commitment to both research and teaching, a publication record in their area, and show potential for obtaining external research funding. Applications from minority and women candidates are especially encouraged.

Wayne State University, located in Detroit's Cultural Center, is an urban comprehensive research university serving 31,000 students. The Department of Computer Science has 15 faculty members, approximately 60 doctoral, 250 masters, and 250 undergraduate students. The faculty have ties to industry leaders such as Ford Motor Company and General Motors Corporation. Several research and instructional projects are currently being funded by these industry leaders plus the Electrical Power Research Institute, the City of Detroit, Philips Research Labs, NSF, and NASA.

Applicants should send a letter of intent, a statement of research and teaching interests, a resume, and the names of at least three references including the reference's address, e-mail, telephone, and fax number. Please send this information to: Dr. William I. Grosky, Chair, Wayne State University, Department of Computer Science, 431 State Hall, Detroit, MI 48202; Tel. 1-313-577-2478; Fax: 1-313-577-6868; E-mail: grosky@cs.wayne.edu

For full consideration, applications should be submitted by November 20, 1998. However, applications will be accepted until the positions are filled.

Wayne State University is an equal opportunity/ affirmative action employer, Wayne State University — People working together to provide quality service All buildings, structures, and vehicles at WSU are smoke-free.

Critical Infrastructure from Page 3

sectors, and corresponding private industry liaisons. CIAO will also facilitate efforts to meet the President's 180-day deadline for developing a schedule for a National Infrastructure Assurance Plan.

Both the House and Senate have held hearings on these recent activities, with the Senate paying particular attention to the NIPC and also the upcoming plan. Says Michelle Van Cleave, Majority Counsel to the Senate Judiciary Subcommittee on Technology, Terrorism, and Government Information, "The PDD leaves a lot of questions open that the national plan is expected to answer." Van Cleave anticipates the subcommittee will again hold hearings following the plan's release.

Public interest groups such as the Electronic Privacy Information Center (EPIC) have also been keeping watch. According to Wayne Madsen, Senior Fellow with EPIC, "many of the new government structures combining the assets of the NSA, CIA, and DoD to conduct domestic monitoring and surveillance are at variance with the Posse Comitatus Act of 1878." The Act, he explains, prohibited the Army (and as amended later, the Air Force) from conducting domestic law enforcement activities, and "was aimed at curbing their enforcement role in reconstruction of the South. It has since been slowly whittled away to allow DoD to become involved in domestic anti-drug activities and border patrolling." Additionally, he notes, "NSA's intrusions into civil government are definitely in contravention of the Computer Security Act." Madsen is the author of EPIC's soon-to-be-released analysis of the PCCIP report.

Federal Funding

In its report, PCCIP proposed doubling the amount of federal funding now spent on information assurance R&D from $250 million to $500 million in FY1999. Ultimately, the Commission hoped for a total of $1 billion to be spent during the five-year period ending in 2004. The earliest funding cycle, however, would be FY2000. Though there's an agreement in principle that such funding is needed, says Hunker, "we don't want simply to throw money at the problem. We need to better understand what's taking place in federal government R&D, as well as private sector R&D."

CRN also asked Hunker about criticism that the PCCIP — in briefly designating six areas of research and development — had given the matter superficial treatment (the six areas were: information assurance; intrusion monitoring and detection; vulnerability assessment and systems analysis; risk management decision support; protection and mitigation; and incident response and recovery). "This is a new issue, a new area," replied Hunker. "It's a legitimate criticism to say the Commission 'scratched the surface' and we recognize that, which is why an R&D subgroup of the newly created CICG has been delving into that issue area." "I'm not saying we know all the answers — exactly the opposite. If people have input, we want to hear from them."

In this regard, Hunker urges the computing research community to contact his office directly, 202-696-9395, and/or participate in one of several upcoming outreach efforts planned for several cities. These efforts, he explains, are designed to educate local communities about critical infrastructure protection and to solicit input. News of upcoming visits and events can be found at the CIAO website, http://www.ciao.gov.

The PCCIP report also called on NSF to direct as much as $10 million annually over the next five years towards increasing the number of faculty knowledgeable in computer security (both in computer science departments as well as at business schools). Hunker agrees: "We profoundly need personnel who are trained in cyber security; we need to create the educational infrastructure" to achieve that objective.

Cryptography

The PCCIP's report, which endorses key recovery and key management, continues to draw criticism from groups like EPIC, the Center for Democracy and Technology (CDT), and leading computer security experts (a group of these experts recently updated their 1997 paper on this issue, see http://www.cdt.org/crypto/risks98). Acknowledging that there are "strong views" on all sides of the issue, Hunker says, "our hope is that the encryption issue will be resolved to everyone's satisfaction." It's an important issue, he says, but it's only a small part of the challenges involved in protecting critical infrastructure. ∎

Role Models from Page 2

role model. However, that is exactly what she was. Through her example and management skills she paved the way for many more women to come. Milly Koss worked for Hopper and remembers her energy, enthusiasm, and willingness to serve as a mentor. In addition, Hopper adopted the ideas of part-time and flex-time which enabled women to have children and maintain their careers at the same time.

In the exciting field of computer science, women have been and still are making substantial contributions to computing. Award ceremonies and workshops such as those mentioned above are crucial in bringing to light the role models that are needed in computer science. It is important that we learn of the accomplishments of our pioneers and pass on the information to others. With this in mind, Kathy Kleiman, an attorney who specializes in Internet law and is developing an ACM-W sponsored documentary on the six original ENIAC Pioneers, says it best; "The ENIAC Programmers show us that women in computing is not a recent event, rather, women have been major contributors for decades. Women and girls can take pride in knowing that they follow in a long line of great contributors in computing — they have every right to be involved in computing and become the major innovators and contributors of today."

Denise Gürer is a research computer scientist at SRI International in Menlo Park, California. She is the chair of ACM-W and a Board member of the IEEE Annals of the History of Computing. ∎