NSF division slightly changes portfolio of research priorities

By Richard B. Kieburtz

The National Science Foundation’s research sponsorship programs in the Division of Computer and Information Research (CCCR) have undergone a facelift, making room for a new program in experimental software systems. From fiscal 1997, the portfolio of research areas supported by the division will not change radically, although there are some shifts in priorities. The new program is intended to enable researchers to conduct significant experimental investigations, supporting projects of larger size than have been typical in the past.

The impetus for change has come from a review of research in the Computer and Information Science and Engineering Directorate, conducted by its external advisory committee last fall. The review team observed that as programs tried to stretch their budgets to support a rapidly increasing number of outstanding younger investigators, the average award had atrophied, losing about one-third of its spending power over a 10-year period. A consequence has been a subtle shift. The kind of research that NSF grants have enabled, a shift away from experimental investigations toward less costly theoretical studies. The committee recommended that NSF should provide ways to support top-quality experimental projects requiring more than average resources. It further recommended that team-oriented approaches, in which multiple investigators can bring complementary expertise to a complex research activity, should be encouraged and supported.

The new program will address this need. It is intended to support teams of investigators planning to undertake important investigations that cannot easily be done in small fragments and to improve the quality of experimental research in software systems and software engineering. A word of caution is in order, however. No new funds are available in the

HPC Act about to expire; renewals not expected

By Fred W. Weingarten

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Contrary to myth, CS&E doing well

By David Patterson

The following is an edited excerpt of a talk David Patterson gave at the CRA Conference at Snowbird in July. (AKA: We need a TV show titled “Computing News”.)

Myth #1: Compared to other fields, computer science and engineering (CS&E) is disadvantaged in attracting the best and brightest. (AKA:“cure” the complex in case it is inherent to our field by our peers in engineering and science.)

Surely the pervasiveness of PCs and the World Wide Web will inspire all of us to come to having a North American Computer Science & Engineering field by our peers in engineering and science. (AKA: Any field with the word “science” in the title is inherently bad for computing research, instead reflect the continued broadening and maturing of the program. Second, any special initiative of this sort has a natural trajectory of support. The public and politicians become bored with the same old thing, and political interest in HPC, which is different from the last one (they all are, of course). Four years ago the Clinton/Gore campaign was trying to

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Opinions

Electronic publishing plan a must

By Peter J. Denning

In the May issue of CRN (Page 2) Jeff Ulman wrote that the Internet is changing the role of printed journals because the Web—not the journals—is becoming the medium of research communication. He suggested that home page hits (HPH) become a measure of research impact, replacing publications in prestigious journals (PPJs). He also suggested that there is no excuse for a publisher to ask for copyright and that publishers who do so inhibit dissemination of research.

In the same issue (Page 3), Franco Preparata and John Savage urged caution on a headlong rush toward eliminating printed journals. They want to retain the good parts (peer review) and make new distinctions that facilitate Web journals (disclosure versus publication, conference versus journal review and focusing copyright rules on cases where actual monetary value is at stake). They cited the A association for Computing Machinery copyright policy as a model for other publishers to follow.

This is a good opportunity to discuss the electronic publishing plan and new copyright policies being developed and implemented by the ACM Publications Board, which I chair. The principles of our plan fulfill most, if not all, of Ulman’s wish and preserve most, if not all, of what Preparata and Savage want to preserve. ACM has, over the past 40 years, developed a reputation as a leading publisher of research journals in computing. This has been accomplished with your volunteer help—as editors and reviewers you have insisted on high scientific standards. Despite this fine reputation, subscriptions to ACM journals have been declining by an average of 6% for each of the past five years. (ACM has fared much better than most scientific publishers—10% or more annual loss in other societies is not unusual.) From surveys and focus groups we learned everyone has a reason for finding the print journals less valuable.

Researchers are finding less value in them because of the long delay to publication, often 18-24 months—most of which is spent in the review and revision process. They see conferences as more responsive and, in many cases, of equal quality. Many authors have asked, “Why do I have to pay for the journals in which their papers appear, a fact that has led to the famous quip about “write-only journals.”

Some authors ask, “What value is generated for me in transferring copyright to a publisher?” We have sought to design the ACM copyright policy so that there is value for authors; ACM works for their interests in fast, maximum and continuing dissemination and recognition of research. They want rapid insights into changing technology. ACM is repositioning its journals to produce new value for these clients.

The electronic publishing plan is the vehicle that will transport us to this destination. To generate value for the researchers, the following steps will be taken:

- Printed research journals will be replaced with dissemination from a database, which we call the ACM digital library. The ACM DL is the centerpiece of the ACM strategy. It will contain documents and their components, citations, references, links, citation records, commentary, reviews, criticisms and the like. It will support alert, brokerage and repackaging services.
- ACM DL will accommodate a method of early disclosure (the preprint practice) and a method for readers to attach comments to disclosed documents (community review).
- The existing editorial and review structures of journals will be preserved, but they will lead to publication in the database rather than in paper. Thus, a subset of the research documents in ACM DL will be marked as “published,” as certification that they have passed a peer review.
- ACM will guarantee the authenticity, integrity and indefinite preservation of all comments and the whole document, and will not make all the research public.
- ACM will protect its authors from copyright infringements. In short, ACM will extend its research publication process with ACM DL, providing new services for research dissemination. ACM will offer print and CD-ROM versions of journals as long as there is a market for them. To generate new value for the remaining ACM members (developers, analysts and technicians), we will:
  - Offer every ACM member low-cost access to ACM DL and the ability to download individual items for personal use without an additional fee. ACM DL will notify each member when a new item is added that matches a profile created by the member.
  - Develop more magazines, print and electronic, that are attuned to their everyday concerns. We are operating in a market of researchers who think increasingly that printed journal publication is slow and redundant compared with Web publication, of developers with many demands on their time, of educators and students who want easy access to materials and of end-users who want rapid insights into changing technology. ACM DL is repositioning its journals to produce new value for these clients.

Pertaining to a given subject area or interest. This plan accomplishes the objectives Ulman, Preparata and Savage discuss by moving toward all-electronic research publication and dissemination without losing the valuable features of the current system that produce value for researchers. We have developed a set of new copyright policies for cyberspace. We designed these policies to facilitate and enhance dissemination and recognize emerging practices on the Web. The policy permits people using ACM materials to make copies for personal and classroom use without additional permissions from ACM. It gives authors liberal retained rights, including rights to post all versions except the definitive (ACM-published) version on their personal Web pages. It offers guidelines for linking all the versions of a research document together. It also encourages unlimited browsing and dissemination of pointers (URLs) to ACM documents. Other scientific societies are imitating the ACM policy. We are pleased others find it so useful.

Some authors have asked, “Why not make all the research publications free?” They claim this would maximize dissemination. We are experimenting with electronic journals that have very low operating costs by relying completely on volunteer editing and reviewing services and by accepting and disseminating the documents in non-copyrighted formats. But even these costs are not zero. Moreover, given the glut of mediocre material on the Internet, it is not clear to us that making the cost zero would maximize readership; more readers may be willing to pay a small fee to guarantee the quality of the material they receive.

A full-service ACM DL—full text searching, usage profiles, alert services, brokerage services, editing to ensure readability of documents from non-English-speaking authors and technology transfer services—is not going to be significantly less expensive than the current print-based publication operation. It will, however, be significantly more valuable.

The ACM Electronic Publishing Plan and Copyright Policy can be found at http://acmdl.org. Dening is chair of the ACM Publications Board. He is associate dean for computing at the School of Information Technology and Engineering at George Mason University.
dropping steadily since 1984. In the late computer science has been the percentage of females in undergraduates. The goal of this article is to give you an overview of what CRA-W has accomplished over the last three years and to provide a snapshot of potential future activities. Resources and funding for the committee have been provided by the National Science Foundation and by CRA. CRA-W is an action-based committee that has initiated numerous projects that seek to improve the participation and status of women, students, professors and researchers in computer science and engineering. Members of the committee represent academic and industrial research, Ph.D. and non-Ph.D. granting departments, and a cross section of the major research areas in the CS&E field. Each committee member takes responsibility for guiding a project from its inception to its completion and evaluation. Thus, committee membership rotates depending on active projects; membership has ranged from 10 to 17 members.

Why is such a committee necessary? A according to data from the Education Department’s National Center for Education Statistics, the percentage of women receiving doctorates in the undergraduate CS&E major has remained within the range of 10% to 14% from 1983 to 1995. This trend reversed itself in 1984, and in 1990 the ratio had fallen to 30%. In 1995 it decreased to only 18% in computer science and computer engineering combined. Why is this trend particularly disturbing? Because these women are at the front end of a CS&E pipeline that narrows dangerously.

The myriad of problems facing women in CS&E and education and research is significant. And the situation is expected to get worse.

By Mary Jane Irwin and Francine Berman

The CRA Committee on the Status of Women in Computer Science and Engineering Research (CRA-W) was formed in the spring of 1991 under the very able direction of the first co-chairs Nancy Leveson of the University of Washington in Seattle and Maria Klawe of the University of British Columbia. We assumed the co-chair duties in the summer of 1993 and thereby established a three-year rotation schedule for CRA-W co-chairs. Thus, we are delighted to report that in July the leadership of CRA-W was turned over to the capable hands of Janice Cuny of the University of Oregon and Lesbian jamierson of Purdue University.

CRA-W’s goal is to give you an overview of what CRA-W has accomplished over the last three years and to provide a snapshot of potential future activities. Resources and funding for the committee have been provided by the National Science Foundation and by CRA. CRA-W is an action-based committee that has initiated numerous projects that seek to improve the participation and status of women, students, professors and researchers in computer science and engineering. Members of the committee represent academic and industrial research, Ph.D. and non-Ph.D. granting departments, and a cross section of the major research areas in the CS&E field. Each committee member takes responsibility for guiding a project from its inception to its completion and evaluation. Thus, committee membership rotates depending on active projects; membership has ranged from 10 to 17 members.

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The myriad of problems facing women in CS&E and education and research is significant. And the situation is expected to get worse.
Expanding the Pipeline

Wardle helps open doors for women in CS&E

"NSF provides an excellent environment for scientists and engineers and has been very supportive by being a spokeswoman for the funding of activities for women in computer science and engineering," said Caroline E. Wardle, the 1996 recipient of the Computing Research Association's A. Nico Habermann Award.

CRA cited her enthusiasm for spreading the word that the National Science Foundation cares about women's concerns in the computing disciplines. She also was praised as the driving force behind the formation of the Committee on the Status of Women in Computer Science and Engineering (CRA-W). "Her guidance, encouragement and willingness to consider proposals from CRA-W in its efforts to recruit, retain and advance women in computer science and engineering," CRA-W committee co-chair Leah Jamieson said. "She has also been a strong advocate for greater representation of women in higher positions at NSF and in other organizations." CRA-W was also targeted for applicants from underrepresented groups. This booklet is designed to provide guidance to senior women, Ph.D. workshop are designed to provide opportunities available for women in the computer and information science and engineering (CISE) disciplines.

Wardle received the award July 14 at CRA's Conference at Snowbird in Utah.

The A. Nico Habermann award honors the late Dr. Habermann, who headed NSF's CISE Directorate until his death in 1993. He was deeply committed to increasing the participation of women and underrepresented groups in the computer science and engineering community. This award recognizes work in the areas of government affairs, educational programs, professional societies, public awareness and leadership that has a major impact on advancing these groups in the computing research community.

Past A. Nico Habermann award winners:
1995 - Eugene Lawler (posthumous award), University of California at Berkeley
1994 - Richard Tapia, Rice University

CRA's A. Nico Habermann Award

The Computing Research Association is pleased to name Caroline Wardle as recipient of the 1996 A. Nico Habermann Award. This award is presented to Wardle for the outstanding contributions she has made to improving opportunities available for women in the computer and information science and engineering (CISE) disciplines.

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The first ever in the Nebraska Physics Department," she said. "I was also awarded a doctorate in atomic physics from London University. She had already joined Hunter College of the City University of New York in 1969 as the first computer science faculty member in the math department. While at Hunter, she assumed the first of many academic leadership roles by becoming the prime architect of a bachelor's degree program in computer science.

"Before Hunter became part of CUNY," Wardle said, "it had been a top-ranked women's school. Athough it was now coeducational, many students and faculty were women, and the atmosphere encouraged women to excel in all fields." Wardle quickly got into teaching new CS courses, quickly gaining a reputation as one of the best teachers in the department. She also started working on new research areas: computer graphics and programming languages.

In 1975 Wardle moved to Boston University Metropolitan College, where she designed the bachelor's and master's degree programs in computer science and information systems. She later founded and chaired the Department of Computer Science. "The environment at BU was quite different from Hunter," Wardle recalled. "There were few women in senior positions, and thus I felt called on to be a role model for women students."

In 1980 Wardle took a leave of absence from BU to become associate dean and, later, dean of the Wang Institute of Graduate Studies, where she continued her role as an academic leader. "I had built bachelor's programs, master's programs, and a computer science department, and now I was offered the opportunity to build an institute. How could I resist the challenge?" she laughed.

She did everything from obtaining degree-granting authority from Massachusetts to designing organizational structures, participating in computer facilities management, seeking equipment donations, writing the catalog copy, public relations.

In 1995 Wardle received the NSF Director's AWARD of Excellence for outstanding achievements in CISE administration and management. For the past year, she has served as deputy division director in the Division of Computer and Computational Research. She recently returned to CRA as deputy, where her new responsibilities include managing a cross-disciplinary program focused on integration of research and education and being CISE's representative for women's activities.

If NSF has funded a number of professional women's organizations in the computing disciplines, she said, "CRA-W is one of the most successful I have seen. Each committee member assumes responsibility for a project, and the results have been truly impressive."
Aspray: CRA to focus on its mission, leveraging efforts
By William Aspray
CRA Staff
The following is an edited excerpt of a talk CRA’s executive director gave at the CRA Conference at Snowbird.
Five principles will govern my direction of the association:
Focus: Strong organizations are ones that clearly understand their missions and know how to keep their activities focused on their principal objectives. CRA is a small organization with a very clear purpose: to strengthen research and advanced education in computing and allied fields.
CRA is not a general-purpose computing organization, such as the A Association for Computing Machinery or the Computer Society, and it should not try to be. We must constantly ask ourselves whether our actions will advance our primary purpose.
Leverage: CRA is small; it has a staff of fewer than 10 people and a modest budget. If CRA is to make a difference, it must find a way to leverage its efforts. Fortunately, through our board and our staff, we have excellent connections with our affiliated computing societies, the academic computer science and engineering departments, the industrial research labs of our profession and the major federal and private funding agencies. It is my intention to have CRA leverage its resources by partnering, as much as possible, with these other organizations on issues of mutual concern.
Building board structure: Like many association boards, the CRA Board meets only a couple of times a year. It is not possible for any board meeting to infrequently to carry out ongoing programs. But not taking advantage of the talents of the leading members of the profession who sit on our board is a terrible waste of human resources. The CRA Committee on the Status of Women in Computer Science and Engineering Research has provided an excellent model for our committee structure: a strong and activist committee on which every member is expected to have her or his own project that is moved forward between committee meetings.
T his structure has resulted in a remarkably successful program—one that has received much-deserved recognition throughout the scientific and engineering professional communities. My goal is to develop several

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Intellectual property rights and CS&E workshop in December
By Randy Katz
At the recent CRA Conference at Snowbird ’96, it became clear to many participants of a panel session on university-industry interactions that the current university policies with respect to intellectual property rights and licensing are having a chilling effect on this very important form of collaboration for the university and industrial research communities.
Because of the interest in this subject, CRA is planning a workshop in Washington, D.C., in early December, held in conjunction with the CRA Board meeting. The workshop will discuss the practical issues of intellectual property rights from the viewpoint of how they can best support our desires for enhanced university-industry interactions rather than limiting them. Participants will include department chairs, managers of industrial research laboratories and selected heads of campus technology licensing organizations.
Financial pressures at the nation’s universities have caused university administrators to look toward new methods of more aggressively leveraging the financial and intellectual assets of the university. The result has been increased emphasis on university intellectual property through associated patent and licensing policies, with the hope that this can yield substantial additional campus income.
A through fields like biotechnology may yield fundamental new techniques, with substantial licensing fees, this does not appear to be the case for software and many other engineering technologies.
A aggressive pursuit of licensing fees may actually inhibit university-industry interaction and may yield substantially reduced industrial support for university research in the future. Sponsoring companies often feel they have a double indemnity; they must pay licensing fees in addition to the financial support they originally provided to a project.
For example, for the entire University of California system, only two patents in the field of microelectronics—for switched capacitor filters—have yielded significant licensing income in the last 20 years. While these may have yielded a few million dollars for the university, one wonders how many industrial collaborations were lost because of the university’s restrictive licensing policies. Can this be fixed?

Continued on Page 7
Seven new directors recently were elected to serve on the Computing Research Association Board. One director was re-elected.

CRA’s new board members, who joined the board July 1 and will serve three-year terms, are James D. Foley, Randy Katz, James Morris, Kenneth Sevick, Lawrence Snyder, Mary Lou Soffa and John Stankovic. Mary Vernon was re-elected.

CRA appreciates the time and effort contributed by its retiring board members: Rick Ardon of the University of Massachusetts at Amherst, Ruzena Bajcsy of the University of Massachusetts at Amherst, and Maria Klawe of the University of British Columbia, Duncan Lawrie of the University of Illinois at Urbana-Champaign, Robert Ritchie of Hewlett-Packard Co. and John Savage of Brown University.

The CRA Election Committee, chaired this year by Ana Itza Borg of Digital Equipment Corp., put together a slate of candidates from nominations made by members of the computing research community. In preparing the slate, the committee seeks reputable computer researchers and research administrators who are willing to devote time and energy to CRA. The committee looks for a varied slate in terms of research field, organization type, gender, ethnic background and geography.

**James D. Foley**
Director, MERL; Executive vice president, Mitsubishi Electric Information Technology Center America.
Foley has a doctorate in computer science and information control engineering from the University of Michigan at Ann Arbor. His research interests are computer graphics and human-computer interface.

**Relevant experience:** Chair, Computing Research Association Board of Directors, 1996-present. Chair, Department of Electrical Engineering and Computer Science, George Washington University; organized technology transfer session at the 1992 CRA Conference at Snowbird; Editorial Board member.


**Kenneth C. Sevick**
Professor of the Computer Systems Research Institute, University of Toronto.
Sevick has a doctorate in information sciences from the University of Chicago. His research interests are performance evaluation of computer and communication systems, information structures, and parallel and distributed database systems.


**Lawrence Snyder**
Professor of computer science and engineering, University of Washington.
Snyder has a doctorate in computer science and engineering from Carnegie Mellon University. His research interest is parallel computing.


**Mary Lou Soffa**
Professor of computer science, University of Pittsburgh.
Soffa has a doctorate in computer science from the University of Pittsburgh. Her research interests are program analysis, programming language implementation, parallelizing compilers and software tools.


**John A. Stankovic**
Professor of computer science, University of Massachusetts at Amherst.
Stankovic has a doctorate in computer science from Brown University. His research interests are real-time systems, operating systems, distributed systems, database systems and multimedia.


**Mary H. Vernon**
Professor of computer science, University of Wisconsin at Madison.
Vernon has a doctorate in computer science from the University of California at Los Angeles. Her research interests are computer systems performance modeling and analysis, parallel computer architectures and distributed systems.


**Kenneth C. Sevick**
Professor and director of the Computer Systems Research Institute, University of Toronto.
Sevick has a doctorate in information sciences from the University of Chicago. His research interests are performance evaluation of computer and communication systems, information structures, and parallel and distributed database systems.


**Previous involvement with CRA:** Participated in four CRA Conferences at Snowbird, 1984-92.

**Stankovic**
Professor of computer science, University of Wisconsin at Madison.
Vernon has a doctorate in computer science from the University of California at Los Angeles. Her research interests are computer systems performance modeling and analysis, parallel computer architectures and distributed systems.


The number of computing research association members continues to grow. In 1995-96, the Computing Research Association (CRA) grew to include 91 member institutions. CRA is a forum for computing research leaders to discuss issues that affect the future of computing research and education. The membership includes representatives from universities, research laboratories, and industry. The association's goals are to promote the progress of computing research and to encourage the academic and industrial communities to work together for the benefit of society.

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Distinguished Service Award

The Computing Research Association is pleased to name Paul Young as recipient of the 1996 CRA Distinguished Service Award. This award is made in recognition of the numerous and significant contributions Young has made to the computing research community. Young received the award July 14 at CRA's Conference at Snowbird in Utah.

Young has served as assistant director of the National Science Foundation's Directorate for Computer and Information Science and Engineering. He has provided outstanding representation and leadership for the computing research community during a period of critical changes in our nation's approach to research and education. His association with an eminent researcher and academic leader with an international reputation, and his vision extends beyond his own discipline.

Young's many accomplishments include overseeing the privatization of the NSFnet and the transition of the NSFnet to the Internet, charting a task force to examine the reorganization of the supercomputer centers contracts, and co-chairing a committee that constructed a strategic plan for the next generation of multiagency cooperation in computing research. As chair of the CRA Board of Directors during the association's formative years, Young helped the computing research field develop a presence in science and technology policy making.

Before his NSF appointment, Young was professor of computer science and engineering and associate dean of engineering at the University of Washington, where he had served as chair of the Department of Computer Science from 1983-88. He joined the University of Washington in 1983, after 17 years at Purdue University. Young graduated from Amherst College and received his Ph.D. from the Massachusetts Institute of Technology in 1963.

CRA makes an award, usually annually, to a person who has made an outstanding service contribution to the computing research community. The CRA Distinguished Service Award recognizes service in the areas of government, professional societies, publications, or conferences, and leadership that has a major impact on computing research.

Past CRA Distinguished Service Award winners
1986 - William A. Wulf, University of Wisconsin
1987 - Kent Curtis, University of California at Berkeley
1988 - William A. Wulf, University of Virginia
1989 - Not awarded
1990 - Joseph Traub, Columbia University
1991 - David Gries, Cornell University
1992 - Robert Kahn, NCR
1993 - Peter Denning, George Mason University
1994 - Kent C. Orts, National Science Foundation

Donald Knuth wins Kyoto Prize

The Inamori Foundation has selected Donald Evin Knuth as the winner of the 1996 Kyoto Prize in the category of Advanced Technology. At a November awards ceremony in Japan, he and the other laureates each receive a diploma, a gold medal and a cash gift of 50 million yen (about $460,000).

Knuth, a Professor Emeritus at Stanford University, is being honored as "A merica's foremost computer programmer, whom Byte magazine recently recognized... as one of the 20 M ost Important People Who Have had the greatest impact on the technology of our time," an Inamori Foundation press release said.

"Dr. Knuth's development of information processing technology made a great contribution to the arrival of our present information-based society." 

Knuth's achievements include:
• Publication of the three-volume work, The Art of Computer Programming, referred to by scientists as "the bible and encyclopedia for computer science" and the research of important algorithms.
• Development of the TExE m typesetting system and the Metafont font design system. These systems were the first to make computers capable of doing document publishing and professional-quality typesetting.
• Development of LR parser and attribute grammar, which established a new method of language analysis and made a basic contribution to compiler technologies used in computer programming.

Through these contributions, Dr. Donald Ervin Knuth has helped support the rapid development of the information sciences and entire associated industries throughout the last 25 years, providing firm directions and concrete technologies for further development," the release said. "It is enormous contributions to these fields have established him as a giant in the field of information sciences.

The Kyoto Prizes, Japan's highest private awards for lifetime achievement, are presented annually by the nonprofit Inamori Foundation to recognize individuals and groups worldwide that have made significant contributions to the betterment of humankind.

Guggenheim Fellow appointed

Stephen A. Vavasis, an associate professor at Cornell University, has received a 1996 Guggenheim Fellowship.

Guggenheim Fellows are appointed on the basis of unusually distinguished achievement and exceptional promise for future accomplishment. The recipient of Vavasis' Guggenheim grant is "Geometry and Scientific Computing." The goals of the proposed research are to develop algorithms for handling complex geometry in scientific computing, to gain understanding of the impact of complex geometry on accuracy and convergence rates of numerical methods and to explore the role of optimization in inverse geometric problems.

Outstanding undergrads

The Computing Research Association is pleased to announce the results of the second annual CRA Outstanding Undergraduate Awards competition. We would like to acknowledge the support of Hewlett-Packard Co., the NEC Research Institute Inc. and Xerox Corp. as this year's sponsors.

Awards are presented in two categories: Outstanding Female Undergraduate and Outstanding Male Undergraduate. Candidates were nominated by their departments, which were allowed to nominate no more than one student in each category. Nominations had to be majoring in computer science, computer engineering or an equivalent program. A total of 12 female and 27 male candidates were nominated. The two winners each receive a cash prize of $1,000.

The Selection Committee consisted of Ruzaa Baijou of the University of Pennsylvania (committee chair), Daniel Huttenlocher of Cornell University and Jeff Ullman of Stanford University. In addition to choosing an overall winner in each category, the committee recognized a small number of runners-up.

Outstanding Female Undergraduate

Winner
• Jennifer N. olan, North Carolina State University, Computer Science

Runners-up
• M Iwana Wai Sum, Ko, University of British Columbia, Computer Science
• Jennifer Sun, Harvard University, Mathematics-Applications Sciences
• Stephanie Weich, Rice University, Computer Science
• Bin Song, Dartmouth College, Computer Science and Mathematics

Outstanding Male Undergraduate

Winner
• A mit Saha, University of California at Berkeley, Mathematics with minor in Computer Science

Runners-up
• Corin Anderson, University of Washington, Computer Science and Engineering
• Jeremy Buhrer, Rice University, Computer Science
• Regis Colwell, University of Pittsburgh, Computer Science
• Dan Goldberg, Brandeis University, Computer Science
• Jeffrey Gosman, University of Toronto, Computer Science and Mathematics
• David Knol, Northwestern University, Electrical Engineering and Computer Science
• Alex Mandel, University of Pennsylvania, Computer Science and Engineering
• Robert Runser, University of Kansas, Electrical Engineering and Computer Science
• Peter Sloan, University of Utah, Computer Science
• M chic W itman, Purdue University, Computer Science
• Kap Ping Yeung, University of Waterloo, Electrical and Computer Engineering

About the Winners

Jennifer N olan is in her junior year as an undergraduate in computer science at North Carolina State University. For her research project as part of the CRA Distributed Memory Program, she conceived and implemented innovative recurrences and algorithms in the areas of basis and graphical integer partitions. This work resulted in two papers submitted for publication on which she is a co-author; Jennifer also has excelled in research projects at Burroughs-Wellcome (now Glaxo-Wellcome) and IBM. A member of the University Scholars Program, Jennifer carries a 4.0 grade point average and is a recipient of a Barry M. Goldwater Scholarship, among many others honors and awards. Her interests outside of academia include creative writing and playing violin and viola for the Raleigh Civic Symphony.

A mit Saha is in his senior year as an undergraduate in mathematics with a minor in computer science at the University of California at Berkeley. Two of his many accomplishments stand out. During an internship at the Xerox Palo Alto Research Center, Amit worked on the problem of finding the minimal DNA sequence that worked on the problem of finding the minimal DNA sequence that contains all subsequences possible DNA sequence of a given length and, using combinatorial methods, found a recursive formula for these minimum distances. Amit plays a major leadership role in Eta Kappa Nu, the electrical engineering society, and is a member of Berkeley's Programming Team, which was recently declared the 1996 ACM International Collegiate Programming Contest World Champion.
Table 1. NSF Funding by Program (in millions of dollars)

<table>
<thead>
<tr>
<th>Directorate</th>
<th>1995 Actual</th>
<th>1996 Planned</th>
<th>1997 Request</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research &amp; Related Activities</td>
<td>301</td>
<td>300</td>
<td>326</td>
</tr>
<tr>
<td>Biological Sciences</td>
<td>258</td>
<td>255</td>
<td>277</td>
</tr>
<tr>
<td>CISE</td>
<td>323</td>
<td>316</td>
<td>354</td>
</tr>
<tr>
<td>Geosciences</td>
<td>420</td>
<td>418</td>
<td></td>
</tr>
<tr>
<td>Mathematical &amp; Physical Science</td>
<td>645</td>
<td>651</td>
<td>708</td>
</tr>
<tr>
<td>Social, Behavioral &amp; Econ. Science</td>
<td>110</td>
<td>117</td>
<td>124</td>
</tr>
<tr>
<td>Other/misc.</td>
<td>224</td>
<td>217</td>
<td>229</td>
</tr>
<tr>
<td><strong>Subtotal: Research &amp; Rel. Activities</strong></td>
<td><strong>2,281</strong></td>
<td><strong>2,274</strong></td>
<td><strong>2,472</strong></td>
</tr>
<tr>
<td>Education &amp; Human Resources</td>
<td>612</td>
<td>599</td>
<td>619</td>
</tr>
<tr>
<td>Academic Research Initiative</td>
<td>117</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Mathematical &amp; Physical Equipment</td>
<td>226</td>
<td>70</td>
<td>95</td>
</tr>
<tr>
<td>Salaries &amp; Expenses</td>
<td>129</td>
<td>133</td>
<td>134</td>
</tr>
<tr>
<td>Office of Inspector General</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total NSF Budget</strong></td>
<td><strong>3,270</strong></td>
<td><strong>3,180</strong></td>
<td><strong>3,325</strong></td>
</tr>
</tbody>
</table>

Correction: Due to an editing error in Table 1 on Page 1 of the May issue, the 1997 budget requests for Biological Sciences and Geosciences were incorrect. The correct numbers are $326 million and $229 million, respectively.

Karp awarded Medal of Science

Fred W. Weingarten, CRA’s director of government affairs, testified at a May hearing on National Science Foundation appropriations before the House Appropriations Subcommittee on Veterans Affairs, HUD and Independent Agencies. Members of this committee have helped protect research in the face of excruciating budget pressures. That you have done as well as you have up to now is testimony to your leadership and understanding that our research establishment is one of the nation’s critical resources.

Clearly those budget pressures are not getting any easier. I am here representing the computing research community. I urge you to continue the strong support this Congress has shown for NSF by appropriating the full amount requested, a 4.5% increase overall. This amount includes an 8.6% increase in funding for the Computer and Information Science and Engineering (CISE) Directorate, which supports fundamental research in computing and communications. This research will be important to our nation’s future economic development and international leadership well into the 21st century.

I want to focus on three key points:

1. We are in a particularly critical window of opportunity with respect to information systems, in which continued investment in fundamental research promises to have enormous payoff.
2. The programs of the CISE Directorate are a key component of the government’s R&D portfolio in computing research.
3. Reaping the social benefits of R&D requires a complex and close relationship among fundamental research (mainly at universities), industrial R&D and government.

Weingarten’s testimony is available at http://www.cra.org/~rick/g/documents/apptest-96.html.

Committee urged to support NSF

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Richard Tapia appointed to National Science Board

Richard A. Tapia, the Noah Harding Professor of Computational and Applied Mathematics at Rice University, has been named to the National Science Board (NSB), an oversight and advisory body to the National Science Foundation. He joins John Hopcroft of Cornell University as the second computing researcher serving on the current board. In addition to his substantial research contributions, Tapia has received numerous awards for his significant contributions to minority education and his public service.

In 1994 he received CRA’s S. Nicolet Award, for his outstanding contribution to aiding members of underrepresented groups within the computing research community. Tapia formerly served on the National Board of Directors of the Society for Advancement of Chicanos and Native Americans in Sciences, and he is a member of the National Academy of Engineering.

Eamon M. Kelly, professor of physics at the University of California at Los Angeles. He earned his Ph.D. from the University of California at Los Angeles. He is president of California Polytechnic State University; and Casimir Skrzypczak, Nynex.

HPCC from Page 9

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NSB, established by the NSF Act of 1950, has 25 members appointed by the president and confirmed by the consent of the Senate. Members, who serve six-year rotating terms, are drawn from industry and academia and represent a variety of science and engineering disciplines.

President Clinton nominated several new NSB members: John A. Xmstrong of Amherst, MA, is a former vice president of Scientific and Technological Environment of the Corporate Management Board at IBM Corp. His expertise is in quantum electronics and laser physics. Mary K. Gallard of Berkeley, CA, is a professor of physics at the University of California at Berkeley and a faculty senior scientist at the Lawrence Berkeley National Laboratory. Gaillard is an expert in theoretical particle physics. Kelly is a member of the National Academy of Sciences. M. R.C. Greenwood of Davis, CA, is chancellor of the University of California at Santa Cruz. Kelly is the former dean of graduate studies at the University of California at Davis and is an expert in the fields of immunology and nutrition. Greenwood served as associate director for science in the W.hite House Office of Science and Technology Policy from November 1993 to May 1995.

Stanley Vincent Jasakos of Cleveland was named assistant technical vice president of technical management for Eaton Corp. He was a faculty member in the Electrical Engineering and Computer Science Department at M. arquette University for 15 years and served as chair during part of his tenure.

Eamon M. Kelly. John D. Keil is president of Tulane University. Kelly is an economist with national and international recognition in the fields of applied economic and health development. He earned his doctorate from Columbia University. Vera C. Rubin of Washington, D.C., is a research astronomer with the Department of Terrestrial Magnetism of the Carnegie Institution of Washington. She has received numerous awards for her studies of motions of stars and gas within galaxies, and motions of galaxies in the universe. She received the president’s Medal of Science in 1993.

Robert H. Suzuki of Pomona, CA, is president of California Polytechnic University. He has conducted research in engineering and educational sociology, and he had a distinguished career in both fields. A.R.A. in and on the development of token-ring local area network technology.

By the end of the 1990s, he had been involved in two major tasks: the development of the Internet. From 1981-89, he acted as chief protocol architect in this development and chaired the Internet A.C.++ committee.

HPC is the primary research area is protocols and architectures for very large and very-high-speed networks. Specific activities include extensions to the Internet to support real-time traffic, explicit allocation of service, pricing and new network technologies. In the security area, Clark participated in the early development of the multilevel secure Unix operating system. He developed an information security model that stresses integrity of data rather than disclosure control.

Clark has been a CSTB member for the past year. He chaired the committee that produced the CSTB report, Computers at Risk: Safe Computing in the Information Age. He also served on the committees that produced the CSTB reports, Toward a National Research Network; Realizing the Potential Future of the Internet and Beyond; and The Unpredictable Certain; Information Infrastructure T hrough 2000.

Clark also announced changes in committee membership.

Several board members retired on June 30: Henry Fuchs, University of North Carolina; Charles Geschke, Adobe Software Inc.; Donald Simborg, Stanford University; William Press, Harvard University; and Casimir Skrzypczak, Nynex.

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Professional Opportunities

Oregon Graduate Institute of Science and Technology
Department of Computer Science and Engineering

The Oregon Graduate Institute (OGI) is seeking a tenured or tenured-track professor at the associate professor level for the 1997-98 academic year. OGI is an internationally respected, multidisciplinary, academic research center focused on the development of complex systems, software tools, and computer technologies. The GOM consists of approximately 700 students, 40 full-time faculty, and 60 Ph.D. students. The GOM is located 13 miles from the Pacific Ocean near Newport, Oregon, and 20 miles from the University of Oregon campus in Eugene.

Salary:

OGI offers a competitive salary package. Information about appointment salaries can be obtained from the OGI Human Resources Department.

Responsibilities:

The successful candidate will work with the Department Chair to develop an appropriate departmental research and teaching program. The candidate is expected to contribute to the research, teaching, and administration of the Department of Computer Science.

Qualifications:

The successful candidate must have a Ph.D. in Computer Science or a closely related field, and a strong commitment to research and teaching. Experience in both research and teaching is preferred. The successful candidate will be expected to participate in the development of new courses and to engage in high-quality research. The applicant must have a strong record of publication and collaboration with industry and other researchers. The successful candidate will be expected to participate in the development of new courses and to engage in high-quality research. The applicant must have a strong record of publication and collaboration with industry and other researchers.

Applications:

Applicants should submit a letter of interest, a curriculum vitae, a statement of research interests, and three letters of recommendation to the OGI Human Resources Department, Oregon Graduate Institute, P.O. Box 1299, Eugene, OR 97403-1299. Applications received by July 1, 1997, will be given full consideration. Applications will continue to be accepted until the position is filled.

The Oregon Graduate Institute is an Equal Opportunity Affirmative Action/Equal Access Employer. Women,少数民族, persons with disabilities, and members of all other groups are encouraged to apply.

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By Fred Weingarten

The president recently announced that the Energy Department signed a $93 million contract with IBM Corp. to install what is billed as the world’s fastest and largest supercomputer at DOE’s Lawrence Livermore Laboratory in California.

The president said the new supercomputer, scheduled to go online in 1998, will be 300 times more powerful than any in the world. Secretary of Energy Hazel O'Leary, in a joint press conference held with Jack Gibbons, the presidential science adviser, repeated that figure. However, supercomputer experts have expressed some doubts about the accuracy of that estimate, suggesting that a decimal place may have slipped. The new machine, expected to be rated in the 3 teraflop peak-performance range, is a highly parallel system of the Cornell Center’s design based on the RS 6000 architecture. There is at least one RS 6000 SP located at the Cornell Theory Center, rated at more than 130 gigaflop peak performance. (A “flop,” a common rating of supercomputer speed, is one numerical operation per second. A teraflop is one trillion operations per second.)

A according to IBM’s press release, the new computer will use a building-block approach to high-performance computing, in which the system consists of clusters of shared-memory processors. They will be staged delivery of the system, with the initial components due out of Livermore by the end of September 1996. The production model, a 3 teraflop system, is scheduled for demonstration in December 1998. Work support and consulting will be included in another matter. A designers and users of high-performance computers well know, peak performance is an imprecise metric because it refers to the absolute limit on speed. A real performance, particularly with new, experimental architectures, can be significantly less.

I impy qualifications do not make for interesting presidential sound bites. But they do, in the words of Bob Borchers, head of the National Science Foundation’s Advanced Scientific Computing Division, “create a real challenge and opportunity for the computing research community.” He pointed out that realizing the potential of these new architectures will require fundamental advances in computer science and engineering.

A accord to DOE, the project is “part of the Department of Energy’s Accelerated Strategic Computing Initiative (A SCI), a 10-, $1 billion program designed to deliver tera-scale...computing capability.” That program began last year with a contract for Intel Corp. to deliver a 1.8 teraflop machine to Sandia Laboratory in N M. This is the fastest system, with a maximum performance of 1.8 teraflop and 250 teraflop machine.

Limerre’s IBM supercomputer is specifically intended to be used for nuclear weapons design and test simulation; however, the president pointed out its wider potential applicability to civilian R & D.

Leary, in her press conference, said the computer could be converted from highly classified applications to fundamental civilian research applications in about an hour. The announcement was reminiscent of the important role the Energy laboratories played in the 1950s and 1960s, when they pioneered the development of supercomputer technology through developmental contracts for custom-designed machines such as the IBM Stretch, the Univac LA RC and the Control Data 6800. Many historians of technology credit the Stretch design with technological advances that formed the basis for the IBM 360 series, which appeared 20 years later. Although some of those early projects were “ground-up” designs, this one is much more focused on commercial applications. Leary said IBM already had a business plan that would have eventually taken their RS 6000 line to this new level in performance, but on a slower schedule. DOE funding, she said, would allow IBM to bring the machine to market much more quickly.

Mising from the announcement was any reference to the High-Performance Computing and Communication program, the coordinated multiagency research program. This raises the question whether these new architectures would be directed mainly at weapons applications. But John Toole, director of the National Coordinator’s Office, said that there has been “high-bandwidth communication” between DOE and the other agencies participating in HPC and its successor program. He also expected these new machines to have a big impact on federal computing research and computational science.

C. R. Leary, president of the supercomputer community. In recognition of this growing mutual interest, NSF’s recompetition notice included the requirement that the center “enable interdisciplinary partnerships among the academic computer science, mathematics and computational science research communities.” Most supercomputer center proposals are expected to include such partnership arrangements with academic computer science programs.


to receive a copy of the report, contact SIAM, 3600 University City Science Center, Philadelphia, PA 19104-2688. Tel. 215-382-9800, e-mail: sim@sim.org URL: http://www.siam.org

CRA-W from Page 4

committees and by CRA-W itself to generate lists of women to be nominated for awards.

Committees on Women...and Work (Mary Vernon, University of Wisconsin at Madison): The first in a series of planned pamphlets discussing issues related to careers and family is a report describing experiences and pointers on combining careers and family.

A computer science program.

Women for A.C.M Fellows, five of which were awarded (nine of 53 A.C.M Fellowships were awarded to women). In the previous year, only two of the 54 A.C.M Fellows were women.

A Web site (A N Redels, San Diego Supercomputer Center; Frank Berman, University of California at San Diego): CRA-W has built a Web site to facilitate communication about committee programs and projects as well as other links of interest for women in science and engineering. A list can also be found on the Web version of the careers booklet. Other CRA-W publications will be added soon.

Berman is a professor of computer science and engineering at the University of California at San Diego. He also is Senior Fellow at the San Diego Supercomputer Center. Irwin is a professor of computer science and engineering at Pennsylvania State University.

The Society for Industrial and Applied Mathematics recently released the SIAM Report on Mathematics in Industry. The following is the report’s conclusions section:

A substantial part of this report has explored the applications of mathematics in industry, business and government as well as many aspects of nonacademic careers for mathematicians. These topics have quite recently received great attention in the mathematics community because of their relationship with two phenomena: the current crisis in the academic job market and the perceived sharpened attention of US funding agencies to work on applications. In some instances, discussion of applications and nonacademic jobs convey a willingness to accept the inevitable and expected career paths.

A. Mathematics in Industry Steering Committee emphatically does not take this view. Even if the academic job market improves and funding pressures ease, we are convinced that mathematicians should not be left out in the cold, Borchers said. A.S. has restructured its program of support for national supercomputer centers (renaming it Partnerships for Advanced Scientific Computing) and is in the middle of a major recompetition among the centers and the restructuring of their missions.

A. Thus, it is a difficult time for NSF staff to plan for the future in much detail. However, Borchers did say it was the specific intent of the partnerships program to provide researchers with access to the best computation capabilities available. Cornwell officials confirmed they would be making the new IBM system available for a key part of their own proposal for renewal. The Cornell Supercomputer Center had before the beginning had a close relationship with IBM and has an RS/6000 SP with IPI processors. At Calos, director of the research center, who stressed the need for more fundamental computer science research aimed at understanding such new, highly sophisticated array architectures. An important trend in high-performance computing identified in NSF’s and Computer Science and Technology Board studies that led up to the recompetition, has been an increased blurring of the boundaries between computer science and engineering and computational science, and a greater need for the supercomputer centers to interact with the broader computing research community. In recognition of this growing mutual interest, NSF’s recompetition notice included the requirement that the center “enable interdisciplinary partnerships among the academic computer science, mathematics and computational science research communities.” Most supercomputer center proposals are expected to include such partnership arrangements with academic computer science programs.

SIAM looks at math applications

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