How will election results affect science policy?

By Fred W. Weingarten

CRA Staff

The November elections are over, and the science policy community, gearing up for another year of intense budget battles, is speculating about the effects on science policy in the next Congress. Although last year's final numbers turned out to be better than expected—at least for the budgets of the National Institutes of Health (NIH) and the National Science Foundation (NSF)—the coming year is likely to be much tougher.

The political balance to date has continued, both in the administration and in Congress, and there are not many places left to cut in the discretionary portion of the budget.

Most initial attention is on the House. The Senate has been relatively indifferent to science policy in recent years, and that attitude is not likely to change. By contrast, the House has a full committee—the Science Committee—exclusively devoted to science policy. If science policy is to be dealt with substantively in the 105th Congress, that committee will have to lead the way. Whether it will be interested and equipped to do so will depend on how the elections affect its makeup, agenda and working style.

Committee composition

The election did not create major changes, at least directly. As was true in general, the election was kind to incumbents. But many races were very close, and a few results could still change with recounts or other challenges. At press time, one race involving a Science Committee member, Stockman (R-TX), was to go to a runoff.

Only four incumbent members lost their seats. Two of them, A. Spacestrand (R-CA) and M. Wood (D-KY), were first-term members. The most senior incumbent to lose his seat, had served for 20 years. Including the retirement of committee chair, Robert Walker (R-PA), only five of 50 members of last year's Science Committee will be departing the House.

However, in reshuffling committee assignments, more changes are likely to be made. For many members, the Science Committee is not a highly rewarding post, and many leave as soon as they can. The committee has little influence beyond a narrow set of special issues, and NSF is not one of the larger government agencies.

Consequently, membership of the committee attracts little political action committee (PAC) money, unlike major House committees such as Commerce and Ways and Means (the committee that deals with taxation). Furthermore, the scientific community is notoriously stingy with political contributions. If basic research PACs exist, they have not attracted much attention or been very influential either inside or outside Congress. An exception may be strong the industry support of NIH research, but NIH is not under the purview of the Science Committee.

As a result, the committee usually experiences substantial turnover in the junior ranks and nearly always winds up with a higher than average proportion of first-term members. This year is likely to be no different.

Leadership at the top has already been settled. F. James Sensenbrenner (R-WI), second in seniority on the committee to Walker in the last Congress, has been selected to chair the committee. He is a fiscal conservative who has represented the 9th District in Wisconsin, a district in the suburbs of Milwaukee, for 18 years. Although the University of Wisconsin is not in his district, reports are that he has visited the campus several times, is interested in basic science and is a strong supporter of academic research.

The ranking Democrat on the full committee once again is George Brown (D-CA), who won another very close race in his Riverside district. Chair-hangers have been the

Changes in copyright policy debated

By Louise Arneim

Special to CRN

Warning If you are reading this item electronically, you may be in violation of federal copyright law.

That—or a similar caution—is what Internet users might see if, as certain groups suggest, proposed changes to copyright law come to pass.

These groups—which include consumers, educators, librarians, scholars of intellectual property and members of the computer and communications industries—are reacting to a proposal raised in Congress last year that would have broadened copyright owners' rights to control distribution of their work.

The proposal would have included "transmission" as part of that right, making the act of browsing on the Internet a possible copyright infringement.

The "transmission right" is one of the changes being talked about in Washington. For the past three years, the Clinton administration, through its national Information Infrastructure Task Force (IITF), has been reviewing how well a law intended to protect the economic rights of authors functions in an environment that enables readers to download and send original works to colleagues anywhere, anytime. At the same time, the administration and Congress have been weighing those rights with a democratic society's need to access information and the ability of institutions (libraries, universities) to meet that need.

The ongoing copyright debate is one with a long list of players: the information industry, which sees the digital environment as one which significantly decreases its ability to recoup investment in an author's work and substantially increase instances of copyright piracy; educational institutions and businesses that distribute limited amounts of copyrighted material to students and colleagues, based on what is acceptable under the fair use doctrine; libraries, which depend on doctrines such as first sale to lend material; and service providers, to avoid liability, might be required to monitor their subscribers' Internet browsing habits.

Two coalitions have been particularly active in the copyright policy debate. One is the Creative Incentive Coalition (CIC), which represents producers, publishers and distributors of copyrighted audio, music, software, text and video. A mother is the Digital Future Coalition (DFC), a group of 25 organizations, including the Computer and Communications Industry Association; several of the major library associations, including the American Library Association; educational interests such as the National Education Association; consumer groups such as the Consumer Federation of America; and cyberspace rights groups such as the Electronic Frontier Foundation and the Electronic Privacy Information Center.

The current debate began in 1993 with the Clinton administration's blueprint for an information infrastructure, a agenda for a nation. Among the nine principles set forth in the agenda was this directive: "The administration will investigate how to strengthen domestic copyright laws and international intellectual property treaties to prevent piracy and to protect the integrity of intellectual property." The agenda also established the IITF and, within that overall structure, several working groups. One of those groups was the Working Group on Intellectual Property Rights, headed by Bruce Lehman, Commissioner of
Expanding the Pipeline

By Margaret M. Fleck

A few years ago, recruiting for computer science jobs was done primarily using hard-copy journal ads and mail. Over the past few years, Internet distribution has become increasingly important, to where many job candidates now view the Internet as their primary source for job ads. Properly used, the Internet could save the community substantial time and money and allow us to better implement the intent of equal employment opportunity laws.

Currently, however, we have a hybrid system. Much of the information is distributed across the Internet using outdated procedures copied from the hard-copy system. Hard-copy means are still in use, even where the Internet would be more effective. We are failing to exploit the Internet’s potential for coordinating job information and making it widely accessible. And moreover, we are failing our obligation to give all qualified applicants an equal chance to compete for jobs.

Poor use of resources

Currently, job ads for Ph.D.-level positions [1] are posted on any one of several Internet sites. The most prominent official ones belong to the Computing Research Association (CRA). The CRA site, ads disappear after an unacceptably short period of time. As a result, job seekers must monitor multiple listing services, copy ads before they disappear, and use Internet search methods to locate unlisted jobs or whose listings have disappeared. It is particularly difficult to find ads for positions in teaching colleges (usually posted on the CRA site). These ads, which remain for only a week as well as industrial and postdoctoral jobs, some of which are apparently not posted in any well-known place. This process was time that could be more productively spent on the job seeker’s research projects, their advisor’s research projects or their teaching assignments.

Communication between an applicant and many hiring committee members is also inefficient. Many ads do not include an e-mail contact address or the site’s Web home page. Many departments use physical mail to gather letters of recommendation, confirm receipt of applications and provide information about their status. It is not uncommon to receive a form rejection letter from the hiring committee. What has been filled. Community communication through e-mail or Web pages is fast and clearly accessible.

Finally, countless pages of hard-copy listings are distributed to all people who subscribe to Communications of the ACM and IEEE Computer, most of whom are not seeking jobs. These listings are printed on expensive archival journal paper. This wastes paper, mailing costs and shelf space in university libraries.

Equal opportunities

Many US sites, including all those holding government contracts, are governed by federal equal employment opportunity laws [3]. These laws not only prohibit discrimination but also require that we take active steps to ensure that women and minorities are able to compete for jobs on an equal footing. In particular, job ads must be posted in a way that ensures they are found by the full range of qualified applicants. The obstacle to the recruitment of women in computer science is the difficult problem of locating suitable jobs for a married (or otherwise

Continued on Page 7

SIAM focuses on student diversity

By Cristina Villalobos

(The following article ran in the December 1995 issue of SIAM News and is reprinted with permission.)

A S A M EXCITING arrangement. For me, a graduate student, to speak to a national meeting, especially a well known one, is a great honor. The SIAM annual meeting this year was particularly important, being a national meeting, especially a well known one, is a great honor. The SIAM annual meeting this year was particularly important, being

Continued on Page 3

LETTERS TO THE EDITOR

Joan Bass

1875 Connecticut Ave. NW

Suite 718

Washington, D.C. 20009-5728

Tel.: 202-234-2111

Fax: 202-667-1066

E-mail: crn@cra.org

Letters may be edited for space and clarity.
Outstanding undergraduate women are provided with a window on research and graduate life and with a mentoring relationship with a successful professor.

Project evaluation
A third-party evaluation of the project is being undertaken by the Learning through Evaluation, Adaptation and Dissemination (LEAD) Center at the University of Wisconsin. Two principal methods are used to assess the project's impact: structured, open-ended interviews of a cross-section of the participants to obtain a rich understanding of the experience and a written survey of nearly all the participants to test the experiences and knowledge gained. This was intended to help participants to gain a more complete understanding of graduate school and no experience with graduate school, the research process, and the graduate student experience, and their mentors were interviewed in fall 1995. A third, 10 of the 1995 participants were interviewed before and after their summer research experience, and their mentors were interviewed in fall 1995. Additionally, in fall 1995 all the 1995 students received the written survey. The principal questions were: What if, any, kinds of qualitative effects are experienced by mentor-project students, and can patterns of mentor/mentee interactions be ascertained and associated with measurable effects of the program? What if, at any special problems or satisfactions do faculty members experience as mentors in this program? What if, any, significant changes in guidance of a female professor and mentor interactions during the past year? What if, any, real problems are experienced by faculty members and their students in this program? What if, any, real problems are experienced by the students? What if, any, real problems are experienced by the students? What if, any, significant changes in the students' understanding of graduate school and no experience with graduate school, the research process, and the graduate student experience?

The preliminary report, which is more than 100 pages long, found that "students are utilizing the program in accordance with its goal of encouraging undergraduate women to consider and pursue graduate studies in CS & E." The report further notes "Most students entered in the program with little understanding of graduate school and no experience with research. These students expressed that 'living the life' of a graduate student helped them... because they developed a more complete understanding of graduate school, the research process and the faculty role within the university. Many students stated that... they gained 'strategic' information for applying to graduate schools... were able to relate to and identify with the graduate student experience... and developed confidence in their abilities to succeed in graduate school or in a research career."

Regarding the findings from interviewing mentors, the report states, "If of the mentors that we interviewed commented that the DMP provided an excellent opportunity to both encourage women to consider graduate school in CS & E and prepare them for a career in CS & E." The report also says, "M any mentors stated that they were impressed with their students' abilities, initiative, but cautioned that they needed to spend time introducing their DMP student to the research topic."

Some mentors recommended that the program only support junior-level students who have taken upper-division classes that "would give them the background and sophistication to do meaningful research." The report provides additional information on strategies for creating a successful mentoring experience.

Follow-up interviews
Since January 1996, LEAD staff members have conducted follow-up interviews and a follow-up survey of the 1995 participants (in spring 1996). They also conducted a survey of two control groups of students who had not participated in the program. Of the 1995 participants, while the other was matched with 1996 participants. A cross-section of 1996 student participants were interviewed before and after participating in the DMP.
CRA invites nominations for service-related awards

The Computing Research Association invites nominations for the 1997 CRA Distinguished Service Award and the A. Nico Habermann Award. Nominations should be no longer than two pages and describe the contribution that is the basis of the nomination.

CRA Distinguished Service Award

CRA makes an award, usually annually, to a person who has made an outstanding service contribution to the computing research community. This award recognizes work in areas of government affairs, educational programs, professional societies, public awareness and leadership that has had a major impact on computing research.

Letters in support of the nomination are welcome but not required.

Deadline: Nominations must be received by Feb. 14, 1997.

A. Nico Habermann Award

CRA makes an award, usually annually, 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 that has had a major impact on advancing these groups in the computing research community.

Letters in support of the nomination are welcome but not required.

Deadline: Nominations must be received by Feb. 14, 1997.

Send nominations for both awards to:

CRA Service Awards
Computing Research Association
1875 Connecticut Ave. N.W., Suite 718
Washington, D.C. 20009-5728
Tel. 202-234-2113; fax: 202-667-1066
E-mail: info@cra.org

Association News

Board nominees sought

The Computing Research Association is seeking nominations for its Board of Directors.

Each spring CRA’s member organizations select about one-third of the association’s board members. Candidates are not required to be CRA members. It is important that the CRA Board represents the interests of the entire computing research community, and it is our policy to solicit a broad range of candidates.

Please contact the person you are nominating before submitting his or her name. Nominees will receive information about CRA and its activities and will be required to write a brief (100-word limit) statement supporting their nomination.

Our board is a working board, and all members are expected to actively participate. Although CRA has a small professional staff, board members are involved in all our major projects. Recent and current projects include:

- Planning the biennial CRA Conference at Snowbird.
- Conducting the annual CRA Taubee Survey.
- Developing workshops on critical policy issues for computing research.

- At the invitation of the White House, defining an executive and legislative branch technology policy internship program for CS faculty members.
- Increasing the participation of women in computing research, with the help of the National Science Foundation grants.
- In addition to actively participating in board projects, board members are asked to attend at least two board meetings per year and pay their travel costs to the meetings.

These time demands can be daunting to overburdened researchers. However, research in computer science and computer engineering is facing major challenges as the political environment for government support changes. In the United States, Canada and many other countries, computing has been identified as a technology of critical social importance. This increased political attention places new demands on our field and offers new opportunities.

To receive a nomination form, send your request to Joan Bass of CRA at jbass@cra.org. The deadline for submitting nominations is March 3, 1997.

CRA AWARD FOR OUTSTANDING UNDERGRADUATES

The Computing Research Association is pleased to announce the third annual CRA Undergraduate Award program, which recognizes undergraduate students who show exceptional promise in an area of importance to computing research. The 1996-97 award is made possible by the generous support of Microsoft Corp.

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 a similar program. Several other outstanding candidates will be recognized. The awards will be presented at one of the major computing research conferences sponsored by CRA, ACM, the IEEE Computer Society, SIAM or AAAI. The two first-prize winners will receive financial assistance toward their travel to the conferences. CRA encourages home departments to provide similar assistance to other students who are recognized.

Because this is a relatively new award, many faculty and students have not yet heard about it. We encourage you to make it widely known in your department. The award is an outstanding 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 transcripts of academic record.
4) Nomination letter by department chair (two-page maximum).
5) Letter of support from one other supporting nominator (two-page maximum).
6) One-page description of student’s research or other achievements.

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 talent, excellence or commitment to computer science and engineering, including industrial experience, participation in CRA Board of Directors, or college in the United States or Canada. For more information see http://www.cra.org/awards/97gradinfo.html.

Four copies of the nomination package should be sent to:

CRA Undergraduate Awards
Computing Research Association
1875 Connecticut Ave. N.W., Suite 718
Washington, D.C. 20009-5728

CRA Award for Outstanding Undergraduates

1996-97 Nomination Form

Name of nominee:

Sex:

Program of study:

Year in program:

Department:

University:

Academic year address, telephone:

Permanent home address, telephone:

E-mail address:

Name of department chair:

Department chair’s e-mail:

Name of supporting nominator:

Supporting nominator’s e-mail:

Dates:

Supporting nominator’s date:

Department chair’s date:

CRA has a small professional staff, and all members are expected to actively participate. Although CRA has a small professional staff, board members are involved in all our major projects. Recent and current projects include:

- Planning the biennial CRA Conference at Snowbird.
- Conducting the annual CRA Taubee Survey.
- Developing workshops on critical policy issues for computing research.

The Computing Research Association is seeking nominations for its Board of Directors.

Each spring CRA’s member organizations select about one-third of the association’s board members. Candidates are not required to be CRA members. It is important that the CRA Board represents the interests of the entire computing research community, and it is our policy to solicit a broad range of candidates.

Please contact the person you are nominating before submitting his or her name. Nominees will receive information about CRA and its activities and will be required to write a brief (100-word limit) statement supporting their nomination.

Our board is a working board, and all members are expected to actively participate. Although CRA has a small professional staff, board members are involved in all our major projects. Recent and current projects include:

- Planning the biennial CRA Conference at Snowbird.
- Conducting the annual CRA Taubee Survey.
- Developing workshops on critical policy issues for computing research.

The Computing Research Association has a small professional staff, and all members are expected to actively participate. Although CRA has a small professional staff, board members are involved in all our major projects. Recent and current projects include:

- Planning the biennial CRA Conference at Snowbird.
- Conducting the annual CRA Taubee Survey.
- Developing workshops on critical policy issues for computing research.
CRA Ad Hoc Committees
Snowbird Reassessment
- Sandra Johnson Baylor, IBM T.J. Watson Research Center
- John Guttag, MIT
- Maryland Institute for Technology and Innovation

CRA Ad Hoc Committees
- Nancy Lennson, Uniof Washington
- John Werth, University of Texas at Austin
- William A spray, CRA
- William A spray, CRA

CRA/CRA-W Fundraising Coordination
- Mary Jane Irwin, Penn State University
- William A spray, CRA

CRA undertaking historical research and writing project
The Computing Research Association is undertaking a historical research and writing project on the formation of the academic discipline of computer science and engineering in the United States. It will cover the period from 1945, when the first electronic, digital computer was completed, until 1980, by which time most of the graduate degree programs had been established.

Topics in the project will include:
1. Development and growth of courses, programs and departments. Attention will be paid not only to content, but also to the backgrounds of students and faculty and them, and to the politics and social construction of decision making and change.
2. National, universitywide and departmental debates over curriculum development. Tese debates include the role played by educational groups such as EDU-COM, professional societies such as the Association for Computing Machinery and the IEEE Computer Society, and funding agencies such as the National Science Foundation and the Defense Advanced Research Projects Agency (DARPA).
3. The roles of external funders. Tese include corporate funders, most notably IBM, that influenced the formation of the discipline through cooperative work-study programs, joint research projects, faculty funding for research and educational discounts for computing equipment; and private foundations. Of special interest is the role played by mission-oriented and research-oriented federal agencies, notably NSF and DARPA.
4. Tensions between computing as a servant to scientific, engineering and other disciplines versus computing as an autonomous scientific discipline. Tese tensions are manifest in course offerings, relationships between computer science departments and university computing centers, relationships between computer science departments and university departments, and educational and funding opportunities for researchers in computing.
5. Tensions between theoretical and experimental research. T e differences in the nature of empirical versus theoretical studies with regard to authority and verifiability of results, size of research team, size of research budgets, time to completion of study, ability to separate individual from team effort and the differing standards of judgment and reward in the scientific and engineering disciplines.
6. Change over time in the population of the computer science and engineering profession by gender, race, ethnicity and nationality, and the differences in how the two disciplines have changed over time.

William A spray will be principal investigator. He will be assisted by Tim Bergin, professor of computer science at American University, and by a graduate research assistant. Work is just beginning, and it will take two to three years to complete the project. The following computer scientists and

CRN Subscription Form
Please check one:

☐ I want to subscribe or renew my subscription to CRN. I qualify for a free subscription.

☐ I want a year’s subscription to CRN. I do not qualify for a free subscription. My check, made payable to the Computing Research Association, is enclosed. Subscriptions are $30. Foreign subscriptions are $45 (US) in Canada and $54 (US) elsewhere.

☐ This is a change of address. I have included my address label or a copy of the old address.

☐ Check here if you do not want your name given to organizations that ask to send information to CRN subscribers. CRN screens all such requests.

Free Subscription Policy: CRN is mailed free to all faculty members, administrators and full-time researchers in college and university computing departments; 2) research staff members and administrators of nonprofit, for-profit and government laboratories involved in computing research; and 3) persons who affect policies related to computing research.

Free subscriptions are only available in the United States and Canada.

Please note: We cannot process your subscription unless you include a complete street address or a post office box. To request an electronic subscription form, send your request to crn@cra.org.

Name:
Title/Position:
Phone:
E-mail:
Organization:
Type of Organization:
Department:
Address:
City: State: ZIP+4:

Mail this form to:
CRN Subscription Department
Computing Research Association
1875 Connecticut Ave. NW, Suite 718
Washington, DC 20009
Fax: 202-667-1066; e-mail: crn@cra.org
1996 CRA Taulbee Survey

Preliminary faculty salaries from survey

Salary information from the 1996 CRA Taulbee Survey on the Production and Employment of Ph.D.s and Faculty in Computer Science and Computer Engineering

For 26 years, the Computing Research Association and its predecessors have been charting the growth of Ph.D. production and the employment of computer scientists and computer engineers in the United States and Canada. Each September, this survey is mailed to all organizations included on the CRA Forsythe List of departments that offer a Ph.D. in computing--computer science (CS) and computer engineering (CE). It is maintained by the Computing Research Association. This is the tenth year computer engineering departments have been included.

The following tables provide preliminary data (as of December 1996) on salaries in US and Canadian departments. This part of the survey data is provided in this issue as a service to our members; moreover, we have enough responses to make the data statistically valid. The full survey, including updated salary information and an analysis of trends, will be published in the March issue of CRN.

Rankings
For Tables 1-8, which group computer science departments by the rank of 1-12, 13-24 and 25-36, we based our ranking on information from a 1995 assessment of research-doctorate programs in the United States done under the auspices of the National Research Council. Our top 12 schools are Stanford University, Massachusetts Institute of Technology, University of California at Berkeley, Carnegie Mellon University, Cornell University, Princeton University, University of Texas at Austin, University of Illinois at Urbana-Champaign, University of Washington, University of Wisconsin at Madison, Harvard University and the California Institute of Technology. The departments ranked 13-24 are Brown University, Yale University, University of California at Los Angeles, University of Maryland at College Park, New York University, University of Massachusetts at Amherst, Rice University, University of Southern California, University of Michigan, University of California at San Diego, Columbia University and the University of Pennsylvania.

The departments ranked 25-36 are the University of Chicago, Purdue University, Rutgers—The State University of New Jersey, Duke University, University of North Carolina at Chapel Hill, University of Rochester, State University of New York at Stony Brook, Georgia Institute of Technology, University of California at Irvine, University of Virginia and Indiana University.

Salary tables
For Tables 1-9, each department was asked for the minimum, mean and maximum salary for each category of professor. Because tables show the means of the minimums and maximums of the minimums and maximums reported by each department, these figures reflect salaries of individual professors. A list shown are the means of the minimums and maximums reported by each department. Finally, the average of all salaries is the average of the means reported by each department. If a department gave only a partial answer for a category of professor, it was discounted. All Canadian salaries are in Canadian dollars.

We did not receive enough responses from Canadian departments regarding salaries for newly appointed faculty, but we hope to include this information in the March issue of CRN.

### Table 1. Nine-Month Salaries, 90 Responses of 131 CS Departments

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Reporting Salary Data</th>
<th>Reported Salary Minimums</th>
<th>Avg. of all Salaries</th>
<th>Reported Salary Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>384</td>
<td>$40,833</td>
<td>$55,653</td>
<td>$68,000</td>
</tr>
<tr>
<td>Associate</td>
<td>614</td>
<td>$37,871</td>
<td>$64,665</td>
<td>$88,049</td>
</tr>
<tr>
<td>Full</td>
<td>775</td>
<td>$39,300</td>
<td>$58,814</td>
<td>$95,050</td>
</tr>
</tbody>
</table>

### Table 2. Nine-Month Salaries, 12 Responses of 12 CS Departments Ranked 1-12

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Reporting Salary Data</th>
<th>Reported Salary Minimums</th>
<th>Avg. of all Salaries</th>
<th>Reported Salary Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>63</td>
<td>$50,500</td>
<td>$59,459</td>
<td>$64,700</td>
</tr>
<tr>
<td>Associate</td>
<td>75</td>
<td>$55,690</td>
<td>$68,400</td>
<td>$80,000</td>
</tr>
<tr>
<td>Full</td>
<td>165</td>
<td>$39,300</td>
<td>$95,957</td>
<td>$100,000</td>
</tr>
</tbody>
</table>

### Table 3. Nine-Month Salaries, 10 Responses of 12 CS Departments Ranked 13-24

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Reporting Salary Data</th>
<th>Reported Salary Minimums</th>
<th>Avg. of all Salaries</th>
<th>Reported Salary Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>40</td>
<td>$54,000</td>
<td>$58,557</td>
<td>$63,650</td>
</tr>
<tr>
<td>Associate</td>
<td>70</td>
<td>$54,247</td>
<td>$69,072</td>
<td>$72,450</td>
</tr>
<tr>
<td>Full</td>
<td>129</td>
<td>$61,911</td>
<td>$97,508</td>
<td>$110,600</td>
</tr>
</tbody>
</table>

### Table 4. Nine-Month Salaries, 8 Responses of 12 CS Departments Ranked 25-36

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Reporting Salary Data</th>
<th>Reported Salary Minimums</th>
<th>Avg. of all Salaries</th>
<th>Reported Salary Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>44</td>
<td>$53,000</td>
<td>$57,287</td>
<td>$57,770</td>
</tr>
<tr>
<td>Associate</td>
<td>55</td>
<td>$57,948</td>
<td>$67,024</td>
<td>$69,000</td>
</tr>
<tr>
<td>Full</td>
<td>80</td>
<td>$66,632</td>
<td>$91,879</td>
<td>$90,300</td>
</tr>
</tbody>
</table>

### Table 5. Nine-Month Salaries, 63 Responses of 95 CS Departments Ranked Higher than 36 or Unranked

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Reporting Salary Data</th>
<th>Reported Salary Minimums</th>
<th>Avg. of all Salaries</th>
<th>Reported Salary Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>237</td>
<td>$40,833</td>
<td>$54,401</td>
<td>$68,000</td>
</tr>
<tr>
<td>Associate</td>
<td>414</td>
<td>$37,871</td>
<td>$63,228</td>
<td>$82,500</td>
</tr>
<tr>
<td>Full</td>
<td>401</td>
<td>$50,296</td>
<td>$84,906</td>
<td>$95,000</td>
</tr>
</tbody>
</table>

### Table 6. Nine-Month Salaries, 4 Responses of 13 CE Departments

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Reporting Salary Data</th>
<th>Reported Salary Minimums</th>
<th>Avg. of all Salaries</th>
<th>Reported Salary Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>13</td>
<td>$49,396</td>
<td>$55,915</td>
<td>$58,976</td>
</tr>
<tr>
<td>Associate</td>
<td>20</td>
<td>$60,000</td>
<td>$66,783</td>
<td>$67,673</td>
</tr>
<tr>
<td>Full</td>
<td>25</td>
<td>$65,537</td>
<td>$89,437</td>
<td>$80,900</td>
</tr>
</tbody>
</table>
January 1997

### 1996 CRA Tauilee Survey

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Reporting Salary Data</th>
<th>Reported Salary Minimums</th>
<th>Reported Salary Maximums</th>
<th>Avg. of all Salaries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>Assistant</td>
<td>$42,000</td>
<td>$51,591</td>
<td>$60,000</td>
<td>$55,782</td>
</tr>
<tr>
<td>Associate</td>
<td>$49,432</td>
<td>$60,196</td>
<td>$76,086</td>
<td>$70,133</td>
</tr>
<tr>
<td>Full</td>
<td>$62,664</td>
<td>$76,424</td>
<td>$92,607</td>
<td>$90,501</td>
</tr>
<tr>
<td>Assistant</td>
<td>$397</td>
<td>$53,752</td>
<td>$68,000</td>
<td>$55,664</td>
</tr>
<tr>
<td>Associate</td>
<td>$37,871</td>
<td>$58,953</td>
<td>$82,500</td>
<td>$64,753</td>
</tr>
<tr>
<td>Full</td>
<td>$39,300</td>
<td>$71,397</td>
<td>$95,000</td>
<td>$88,120</td>
</tr>
</tbody>
</table>

### Table 7. 12-Month Salaries, 8 Responses of 16 Canadian CS Departments (Canadian Dollars)

### Table 8. Nine-Month Salaries, 95 Responses of 144 US CS and CE Departments

### Table 9. Salaries for Newly Appointed Faculty, 15 Responding US CS and CE Departments

---

**Recruiting from Page 2**

Recruiting from Page 2 permanently attached pair of researchers. This affects many female job candidates because of the tendency for female scientists to marry other scientists or professionals [4]. Therefore, to achieve equal opportunity, we must ensure that such couples have an equal chance to compete for jobs [5].

Our chaotic online job listing service fails to achieve these goals. First, qualified applicants may fail to apply for jobs because they never see the ad. Personal connections have a significant impact on one’s ability to find job ads. This violates the intent of equal employment opportunity laws.

Second, research couples may fail to apply for appropriate pairs of jobs. They may never see the ad for another job. They may not notice that two job sites are close to one another, due to poor geographical indexing in the job listings. Finally, computer science faculty application deadlines vary over a four-month range. Thus, a couple may not apply to, or may fail to accept, the most suitable pair of jobs because the two searches are on incompatible schedules.

Under the old hard-copy system, we might have been able to argue that it was too costly to distribute ads to all qualified applicants and too difficult to coordinate deadlines. The speed and accessibility of the World Wide Web now make that excuse seem flimsy.

**More effective methods**

A computer scientist, we should be leading the transition to Internet-based hiring. A variety of improvements should be made to the system, some of which I have identified and some by the central societies. The following suggestions are based largely on techniques I have seen in use at the better-organized sites.

First and foremost, there should be a single, centralized Web page for listing Ph.D.-level jobs. A site should be linked to indexes (e.g., geographically, by rank, by specialty area, and by type of site), and each ad should remain available until the position has been filled or the search abandoned. The Web page should be mirrored at several geographically diverse locations. Centralizing job listings would save time and frustration and would undoubtedly result in more reliable indexing by qualified applicants to suitable jobs.

Paper-copy job ads should be distributed only to those who request them. Centralization and electronic distribution would eliminate much of the expense of the current listing system (some Internet sites allow you to point to the department’s Web page should contain information about its job openings (staff as well as faculty). A link to an index of postings is a single electronic site would be very simple and inexpensive to run.

Electronic ads could appear almost instantly, without the long delays typical of the paper-copy system. It would be straightforward to offer a paper-copy service (at cost) to the small number of computer science job seekers who do not have effective Internet access. A paper-copy service would be made more consistent. A career departments with extreme deadlines (for example, November 1 or March 1) should try to move them closer to the norm. For consistency with the other sciences (important in recruit-

In addition to evaluating the principal questions of the program’s impact on students’ career decisions (as compared with the control group) and the significance of having a female role model and mentor, the report contains additional, unanticipated findings regarding the effect on students’ confidence in approaching faculty and asking questions in class when they return to their undergraduate institutions. You are encouraged to read the report for more information about the findings.

A application for the 1997 program is available on the Web at http://www.cs.wisc.edu/~condon/mentors.html. Send your request to CRA, Distributed Mentor Project, 1875 Connecticut Ave NW, Suite 71B, Washington, DC 20009-5728. Fax: 202-667-1006; e-mail: info@cra.org.

For more information about the mentor program, contact Condod at the Department of Computer Science and Engineering, University of Washington, Box 352350, Seattle, WA 98195-2350. E-mail: condon@cs.washington.edu.

---

**Notes**

[1] This article focuses on Ph.D.-level ads for simplicity of exposition, but similar arguments also apply to M.S.- and B.S.-level internships and undergraduate internships.


[3] For example, Executive Order 11246, which exists in various other countries.


[5] If hiring committees rate such applications, compared with those from single applicants, is a separate and much more contentious issue.

[6] E-mail can be forged, but so can physical signatures and letterhead. The writing style of a recommendation letter may be a better guarantee of authenticity than one’s signature, as it is more likely to be well known to one’s colleagues.

Fleck received her B.A. from Yale University and her M.S. and Ph.D. from the Massachusetts Institute of Technology. After working as a postdoc at Oxford University, she moved to the University of Iowa, where she is now an associate professor of computer science. E-mail: mfleck@cs.uiowa.edu; URL: http://www.cs.uiowa.edu/~mfleck.
A post once wrote: “Time is too slow for those who wait.” No matter how fast the connection or how proficient one’s searching abilities, cull the vast resources of the Internet can be seen slow and time-consuming. And many times, even the most efficient search does not yield optimal results. And this is a logical and personal time.” Internet time has joined the time-management issues challenging Americans in the 1990s.

Over the past decade, a growing family of information technologies has come to the aid of busy Internet users. The newest of these technologies are recommender systems (also known as collaborative filtering or social filtering systems). At the heart of this new technology is a very old concept: individuals seek the recommendations of friends and colleagues in making choices about what to read, listen to or buy.

While existing search, filtering and retrieval tools are useful in quickly identifying potential sources of information, these technologies do not involve the human, and more personal, act of recommendation. A well-known example of a recommender system is GroupLens. Based at the U of Minnesota, GroupLens is a repository of articles in Usenet newsgroups with the views of others who have read the same articles. Using those ratings, GroupLens then employs various algorithms to predict how likely it is that reader will read a Usenet article yet to be read. (Notably, to produce a result, the reader will like a Usenet article not involve the human, and more personal, act of recommendation.

Experts in the field generally agree that the first recommender system was described in a 1992 article in Communications of the ACM (CACM) by David Goldberg, David Nichols, Brian Oki and Douglas Terry (“Collaborative Filtering to Weave an Information Tapestry”). Created by the Xerox Palo Alto Research Center, Tapestry enables users to filter e-mail as well as receive selected documents from chosen newsgroups.

Additional recommender systems serving a more casual purpose, Firefly and EachMovi provide resources and products other than the local television critic in finding new releases they are likely to enjoy (see http://www.fireflynet.com or http://www.eachmovi.com). Firefly provides recommendations regarding CDs.

The term “recommender system” was first used by Resnick of AT&T Public Policy Research, is more appropriate than collaborative or social filtering for many reasons. First, those participating in such systems may not be explicitly collaborating. Second, the recommendations are used to find good material, not just filter out the bad, he said. And, finally, the term recommender system is a play on words that accurately describes what the technology is actually doing: taking in recommendations as input and producing recommendations as output.

One of the principal researchers in this field is Paul Resnick of AT&T Public Policy Research. He has written about the topic in a number of recent articles. Among them is “Recommender Systems” (in GroupLens, for example, the system is actually doing: taking in recommendations as input and producing recommendations as output.

The term “recommender system” was first used by Resnick of AT&T Public Policy Research, is more appropriate than collaborative or social filtering for many reasons. First, those participating in such systems may not be explicitly collaborating. Second, the recommendations are used to find good material, not just filter out the bad, he said. And, finally, the term recommender system is a play on words that accurately describes what the technology is actually doing: taking in recommendations as input and producing recommendations as output.

Experts in the field generally agree that the first recommender system was described in a 1992 article in Communications of the ACM (CACM) by David Goldberg, David Nichols, Brian Oki and Douglas Terry (“Collaborative Filtering to Weave an Information Tapestry”). Created by the Xerox Palo Alto Research Center, Tapestry enables users to filter e-mail as well as receive selected documents from chosen newsgroups.

In addition to work being conducted in both the academic and corporate worlds, there is considerable activity in the federal government. A report calls for the National Science Foundation to set up a programmatic basis and as part of its digital library project (see http://www.cise.nsf.gov/rl)."But is the improved ability to find recommendations by one’s peers an entirely positive social outcome?” Erik Brynjolfsson, the Douglas Drane Professor of Information Technology at M.I.T., asked at the Sloan School of Management, and M. Arshad Van A’Dyne, a Ph.D. candidate at Sloan, think that such activity might lead to "cyberbalkanization.”

Mr. Brynjolfsson and Van A’Dyne contend that “just as separation in physical space, or basic balkanization, can divide geographic groups, we find that separation in virtual space, or ‘cyberbalkanization,’ can divide special interest groups.” For example, they said, the more one chooses to associate with one’s colleagues online, the less one is associated with one’s neighbors—a group of folks more likely to be different. “Geography,” they write, “imposes an unavoidable heterogeneity” (a coined version of their paper appeared in the November 29 issue of Science; see http://www.sciencemag.org).
January 1997  COMPUTING  RESEARCH NEWS

Policy Update

WIPO and electronic databases

At press time, delegates to the United Nations World Intellectual Property Organization (WIPO) were meeting in Geneva, Switzerland, to discuss a highly controversial proposal on electronic databases. If accepted, the proposal would have a significant impact on the ability of Internet users (from the casual user looking up baseball scores to researchers seeking government data) to use data otherwise thought to be in the public domain.

If approved, the proposal would give database owners the right to control "utilization and extraction" of their material. Currently, copyright protection is extended only to databases where the developer has exerted a creative effort, either through selection or the compilation of the data in question.

In October the US Patent and Trademark Office published a notice in the Federal Register seeking public comment that included this change to international law as well as other proposed amendments. Similar wording was proposed in a House bill (HR 3353), the Database Investment and Intellectual Property Anti-Piracy Act of 1996 during the 104th Congress. However, no hearings were held.

The proposal's content--as well as its rapid march to Geneva without full congressional debate--generated a significant amount of activity in Washington this past fall. For example, in an October letter to the White House, several major library associations cited the "...lack of consultation with affected constituencies in the public and private sectors regarding the impact of such a proposal" as a major reason for writing the letter. These associations included the Association of Research Libraries, the American Library Association, the American Association of Law Libraries, the Medical Library Association and the Special Libraries Association.

A nother appeal to reconsider the issues and postpone ratification came from the National Academy of Sciences, the National Academy of Engineering and the Institute of Medicine. In a joint letter to Secretary of Commerce Michael Kantor, these institutions cautioned that the proposed changes "...would seriously undermine the ability of researchers and educators to access and use scientific data and would have a deleterious long-term impact on our nation's research capability. Moreover, the proposed changes are broadly antithetical to the principle of full and open exchange of scientific data espoused by the US government and academic science communities internationally." In late November the American Library Association also sponsored a one-day seminar on the issue.

If approved, the proposal would be retroactive, applying to databases already in existence.

-- L. A. Heim

Education from Page 8

cost/performance ratio for most computer technology has been improving rapidly (doubling about every two years), it can still take several years for these applications coming out of the laboratory to become affordable.

Thus, computing researchers are, in essence, working with time machines, exploring applications that will become cost effective only in the medium-term future. Educators' expectations for the short term may have been uninformed by these realities and, thus, in all likelihood went unfulfilled.

The second, and perhaps even more difficult, problem is that successfully adopting technology in a deep way means adapting both institutions and the technology in a deep way. The former is not new; significant organizational adaption has accompanied nearly every major application of computer technology. Nor is this problem independent of the inertia of the educational establishment.

Then, the purpose of an institution is to be compatible with the educational and institutional goals of any given educational system. Substantial research into learning processes and problems in the computing field is needed to meet that design goal.

It is time for such a major research initiative in education technology, particularly one that is broadly based and that focuses on the use of communications and computer technology.

The convergence of digital technology with its rapidly changing content and the structure and growing political and societal demands for effective, relevant and affordable education is creating an idea and a need for a fundamental transformation of education.

Future of CS in education

Many of the research issues raised in this report, such as creating models for new teaching practices and defining new teacher education curricula, are already being addressed through educational research.

Education researchers are well aware of the dramatic changes that technologies are bringing to traditional educational systems. These efforts should be encouraged and supported.

Many of the other research issues mentioned above lie in the realm of traditional computer science research or are on the boundary where the two research fields converge.

For the vision described herein to be supported and guided, efforts must be made to increase the number of researchers working in the field of education and computer science. The breadth and depth of research identified in

Continued on Page 10

Copyright from Page 1

Patients and Trademarks.

A year's inquiry, the working group circulated a draft for comment in July 1994, (intellectual property and the National Information Infrastructure). Known more popularly around Washington as "the green paper," the draft was criticized both for what it said and the way it said it. Critics charged it was written by lawyers for lawyers and that it alienated some of those whose interests were primarily at stake. A year a round, a final version—referred to as "the white paper"—was published in fall 1995.

At about the same time, legislation to implement many of the proposed changes was introduced in the House and Senate (HR 2441 and S 1284, both titled the National Intellectual Property Act). Hearings were held before the House Judiciary Subcommittees on Courts and Intellectual Property in February 1996 and in the Senate judiciary committee three months later, but no further action was taken.

With the proposal legislation failing to make it further in the 104th Congress, NCF argued that it took a decade to pass major telecommunications reform legislation, Carrier Risher, vice president of the Association of American Publishers, observed that changes in copyright law would not occur overnight. The NII legislation proposed last Congress was "premature," she said; it didn't "fully appreciate" the Internet.

With the 105th Congress convening, NCF had other changes being proposed, and what would they mean to the computing research community? Below is a point-by-point/counterpoint to three key activities that might be affected: browsing, making a copy of an electronic document for classroom or business use and forwarding an electronic document.

Browsing: Under current law, copyright owners have the exclusive right to distribute copies of their material to the public by sale or transfer of ownership, or rental, lease or lending. As noted above, Congress proposed adding transmission to that right.

In written testimony before the Senate judiciary committee, NCF argued that the courts, in interpreting this "new" right, might apply the statute to any temporary copy, including copies stored in a computer's memory or digital storage, as DFC contended, transcribed the user's immediate activity of browsing and raised serious liability concerns for online service providers.

The Senate bill did not include "fair use" concepts. DFC suggested a countervail: making transmission part of the fair use doctrine. In other words, electronic reproductions would not constitute infringements.

First sale: Under current copyright law, a copyright owner's work is sold exclusively—example, an author's first sale—an institution is not permitted to resell the work. After a round of comment, a Senate committee, CIC argued that the courts, in interpreting this "new" right, might apply the statute to any temporary copy, including copies stored in a computer's RAM or cache (in fact, the administration had made an argument to this effect in its white paper). As a consequence, browsing could become an infringement.

In its written testimony before the Senate judiciary committee, CIC argued that copyright owners already permitted a "great deal" of browsing by copyright owners already permitted a "great deal" of browsing by extending the doctrine to include copies stored in a computer's memory or digital storage, as DFC contended, transcoded the user's immediate activity of browsing and raised serious liability concerns for online service providers be expected to monitor their subscribers' activities, and if so, would not constitute an invasion of privacy.

Fair use: In 1976 Congress amended the copyright act to include the "first sale" doctrine, allowing second-hand commerce of books as a significant organizational adaption has accompanied nearly every major application of computer technology. Nor is this problem independent of the inertia of the educational establishment.

Thus, computing researchers are, in essence, working with time machines, exploring applications that will become cost effective only in the medium-term future. Educators' expectations for the short term may have been uninformed by these realities and, thus, in all likelihood went unfulfilled.

The second, and perhaps even more difficult, problem is that successfully adopting technology in a deep way means adapting both institutions and the technology in a deep way. The former is not new; significant organizational adaption has accompanied nearly every major application of computer technology. Nor is this problem independent of the inertia of the educational establishment.

Thus, computing researchers are, in essence, working with time machines, exploring applications that will become cost effective only in the medium-term future. Educators' expectations for the short term may have been uninformed by these realities and, thus, in all likelihood went unfulfilled.

The second, and perhaps even more difficult, problem is that successfully adopting technology in a deep way means adapting both institutions and the technology in a deep way. The former is not new; significant organizational adaption has accompanied nearly every major application of computer technology. Nor is this problem independent of the inertia of the educational establishment.

Thus, computing researchers are, in essence, working with time machines, exploring applications that will become cost effective only in the medium-term future. Educators' expectations for the short term may have been uninformed by these realities and, thus, in all likelihood went unfulfilled.

The second, and perhaps even more difficult, problem is that successfully adopting technology in a deep way means adapting both institutions and the technology in a deep way. The former is not new; significant organizational adaption has accompanied nearly every major application of computer technology. Nor is this problem independent of the inertia of the educational establishment.

Thus, computing researchers are, in essence, working with time machines, exploring applications that will become cost effective only in the medium-term future. Educators' expectations for the short term may have been uninformed by these realities and, thus, in all likelihood went unfulfilled.
Decision near for renewal of NSF supercomputer centers

By Fred W. Weingarten
CRA Staff

The end of a nearly two-year process is in sight as the National Science Foundation approaches the final stages of its review of the supercomputer center renewal proposals. The process has been complicated. The grants will commit hundreds of millions of dollars over the multiyear terms of the grants, and more than 100 universities and research centers reportedly are involved in the competition.

The existing program started in the mid-1980s, with grants to create five national supercomputer centers (later, that number shrank to four, with the closing of the center at Princeton University). That support continued through two five-year agreements, the second of which expires later this year. Two years ago, anticipating the expiration of the second round of agreements, NSF began reassessing the needs of research in light of the current state of scientific computing. Sometime later the foundation announced a newly structured program and a recompetition for support of the centers.

Last month NSF finished all site visits and convened a plenary panel of the site visitors. The foundation is expected to submit its recommendations to the National Science Board in March. A assuming the board approves the recommendation, negotiations will begin with the successful centers (at least one and no more than four), and the renewal is anticipated to be in place by September.

The size and importance of these grants have made the process messy and will likely continue to create problems. So many universities are substantially involved with the proposals that it has been hard to find reviewers—or, for that matter, NSF officials and NSF members—without conflicts of interest. It was for that reason that Paul Young, who recently stepped down as head of NSF’s Office of Computer and Information Science and Engineering Directorate, was invited back to help with the final decision processes.

Political attention is also focused on the decision. Whether NSF decides, some congressional wanderers will likely be buffeted. It’s almost certain that any proposal will be controversial. The government’s commitment surely will be held. NSF has been successful in the past in protecting its supercomputing dollars. But it will be a frustrating and time-consuming process.

New reports related to research

Advancing the Frontiers of Information Technology: This report is the latest in a series published by the National Science and Technology Council’s Committee on Computing, Information and Communications describing the work of the high-Performance Computing and Communications program. To receive a copy, contact the National Coordination Office for Computing, Information and Communications or see the Web page at http://www.nap.edu.


Lessons Learned from the Telecommunications and Information Infrastructure Assistance Program: The Internet connections program, run by the Commerce Department’s National Telecommunications and Information Administration, has, for the last two years, offered grants for innovative projects that connect schools, libraries and other community organizations to the Internet. This is a report on that program with some recommendations. See http://www.ntia.doc.gov/itap/lessons.html for an online order form.

Cryptography’s Role in Securing the Information Society: This report, released by the National Research Council’s Computer Science and Telecommunications Board, is the official printed version of the study report released by the committee. To receive a copy, contact the Defense Technical Information Center. Tel. 703-767-8274; URL: http://www.hpcm.dren.dod.gov.

Washington Update

Congress from Page 1

norm for Brown, who represents a predominantly agricultural area in southern California. For many years, Brown has been a thoughtful and influential voice in science policy in the Congress, and many in the research community are glad to see him return.

The subcommittee structure, extensively reshaped by Walker, will look much the same under Sensenbrenner, with a minor tinker, and with jurisdiction. Two past chairs will retain their positions. Two seats are open.

Steve Schiff (R-NM), who chaired the Basic Research Subcommittee, will continue in that position. He represents the Albuquerque area, and, although Los Alamos is not in his district, the laboratory—where much basic laboratory complex located there is of interest to the entire state. This subcommittee has jurisdiction over the national laboratories.

Connie Morella (R-MD), who chaired the Technology Subcommittee, easily won her election and will keep that post. The National Institute of Standards and Technology, which is in her district, and Morella, a moderate Republican, has resisted the House Republican attack on NIST civilian technology programs.

Dana Rohrabacher (R-CA), who chaired the Energy and Environment Subcommittee and used it as a forum to sharply criticize Environmental Protection Aency research, is likely to become a subcommittee chair for another committee, leaving this seat open.

Sensenbrenner had been chair of the Space and Aeronautics Subcommittee, so this seat also is open. It is not clear yet who will take over.

Working together?

Since the elections, both the president and congressional leadership have been talking about a more constructive mood in Washington. Both are promising to work together to solve particularly contentious issues, such as balanced budget and Medicare, and promising that Congress will adopt a more bipartisan and civil tone.

Such soothing talk has also been heard in the Senate Committee. A cording to press reports, Sensenbrenner already has met with Brown over dinner to talk about operating the committee in a more collegial style. This would be quite a contract to the previous two years under Walker, which saw frequent, sharp exchanges between Walker and the Democrats, including Brown and presidential science adviser Jack Gibbons.

Many political commentators predict the cozy mood on the Hill will not last. First, there are strong post-election ill feelings on the part of some Republicans who think the Democrats treated them unfairly, particularly on Medicare. Second, when certain issues are debated, strong partisan differences often will emerge.

According to polls, the constituencies that the two parties represent in Congress are sharply polarized in a number of ways that may make compromise difficult. Finally, any of the current or pending investigations of alleged White House misbehavior could erupt in a way that brings the majority in Congress into a hostile confrontation with the administration.

Despite these warnings for the Congress as a whole, the outlook for smoother waters within the Science Committee seems more promising. The committee has a long-standing bipartisan operating style before the 104th Congress. It was under that agreement that the House Science Committee had a seat; the committee and its subcommittees have redoubled efforts since the first release early last year. This printed version is about 700 pages, is fully indexed and has several informative appendices. URL: http://www.nap.edu.

Contributions to DOD Mission Success from High-Performance Computing: This report is the latest in a series published by the National Science and Technology Council’s Committee on Computing, Information and Communications describing the work of the high-Performance Computing and Communications program. To receive a copy, contact the National Coordination Office for Computing, Information and Communications or see the Web page at http://www.nap.edu.

This report, released by the National Research Council’s Computer Science and Telecommunications Board, is the official printed version of the study report released by the committee. To receive a copy of the report, contact the Defense Technical Information Center. Tel. 703-767-8274; URL: http://www.hpcm.dren.dod.gov.

Lessons Learned from the Telecommunications and Information Infrastructure Assistance Program: The Internet connections program, run by the Commerce Department’s National Telecommunications and Information Administration, has, for the last two years, offered grants for innovative projects that connect schools, libraries and other community organizations to the Internet. This is a report on that program with some recommendations. See http://www.ntia.doc.gov/itap/lessons.html for an online order form.

Cryptography’s Role in Securing the Information Society: This report, released by the National Research Council’s Computer Science and Telecommunications Board, is the official printed version of the study report released by the committee. To receive a copy, contact the Defense Technical Information Center. Tel. 703-767-8274; URL: http://www.hpcm.dren.dod.gov.

Education from Page 9

this report cannot be undertaken by the relatively small community of researchers currently working within the intersection of education and computer science.

To stimulate the growth of this important work, several steps need to be taken, including, but not limited to: funding programs for postdoctoral studies in the intersection of computer science and education; university administrations provide support to their faculty to develop, evaluate and use advanced educational technology; and the creation of programs that match private sector organizations that want to invest in experimenting with advanced technologies for learning with researchers.

The report is available electronically at http://www.ccr.gatech.edu/educnet/nsf.w.
**Farber, Heilmeier honored**

David J. Farber and George H. Heilmeier have been named as the 1996 recipients of the John Scott Award for scientific achievements. The winners each receive a $10,000 cash prize.

Farber, the A. Fred Filter M. ore Professor of Telecommunication Systems at the University of Pennsylvania, is being honored for his seminal contributions to the field of computer networks and distributed computer systems. He was involved in the creation of the DEC System and Ethernet, forerunners of the Internet.

Heilmeier, the president and chief executive officer of Bellcore Inc., is being honored for his pioneering work in the development of CD's. This work has influenced mankind through its applications in computers and consumer goods.

The prestigious award was founded in the early 1800s by the Scottish druggist John Scott. Earlier recipients have included A. Albert Einstein, Guglielmo Marconi, Marie Curie, Orville and Wilbur Wright, Thomas Edison and Irving Langmuir.

**CRN adding Transitions column**

CRN is starting a new people-in-the-news feature. Let us know if you have changed jobs, been promoted or appointed to a key committee or task force. For example, we are interested in listing the new chairs of computer science, computer engineering or related departments or colleges, new heads of industrial or government research laboratories or key changes in government agency personnel. Send your announcements to Editor, CRA, 1875 Connecticut Ave. NW, Suite 718, Washington, DC 20009-5728. E-mail: crn@cra.org.

**SIAM from Page 3**

Times was the importance of a solid background in mathematics, which involves taking classes beyond the undergraduate degree requirements, because this is crucial to preparation for graduate school. I believe the discussion made during the undergraduate aware of the importance one can make in their education now in order to keep the option of graduate school open.

The choice of a graduate school is a critical issue for minority groups. To many, the right school means a school that has support groups at the university level. Few students from underrepresented groups enroll in college, yet alone graduate school, especially in the mathematical sciences. And as we all know, graduate school is a tough environment, one that involves not only studying but also maturing; learning and evaluating one's self and others throughout the process. It is demanding, and some students even consider dropping out. What helps us all come through is the support groups we have or create.

Several participants suggested that students look for a graduate department that has a certain number of minority students, that is sensitive to minority issues and that has support faculty. Others argued that the student's motivation is the decisive factor in a successful graduate career. I disagree with this opinion and believe that the student has to have the desire, determination, perseverance and assertiveness to succeed in graduate school. Support can come not only from groups within a student's department (as at Rice, where Tapi and Kline and several faculty and students have made graduate school a friendly environment), but also from other departments, from families, nonlocal friends and from within our discipline.

Finally, we discussed the recurring theme that the No. 1 thing that motivates us to pursue a graduate career and, later, a career in the mathematical sciences is that we love and enjoy our work. The graduate students and scientists in the audience seemed to be in universal agreement on this notion.

All in all, the organizers and participants in the workshop agreed that the event should be continued at SIAM meetings. This event was specifically created for undergraduate students, to expose them to talented graduate students in applied mathematics doctoral programs and to make them aware of the possibility of pursuing a graduate career. I know we accomplished this goal—many of the undergraduates left the workshop with more enthusiasm and knowledge about graduate school and applied mathematics than they had before. Most importantly, I believe they left with more confidence, knowing that people like them from minority groups and women—can succeed. The many role models at the workshop included not only the scientists but also the graduate students—the people who the undergraduates were most likely to relate to.

I, too, left the workshop energized and excited, knowing that the conference had benefited everyone in one way or another. Events like this, in making people aware of opportunities they would not have considered otherwise, are beneficial for all who organize and attend them. As an undergraduate, I participated in summer mathematics programs, and it was in those programs that I first learned about graduate school and applied mathematics. I consider myself fortunate to have learned about graduate school and even more fortunate to be pursuing a graduate career; I am happy to have had the opportunity to give something to the next generation of students by participating in the Graduate Student Focus on Diversity Workshop.

At the time this article appeared in SIAM News, Villalobos was a second-year graduate student at Rice.

**Leadership awards given**

The 1996 recipients of the Computerworld Smithsonian Information Technology Leadership Awards are Don Strodey and John M. McDonell, Vinton Cerf, David Evans and Ivan Sutherland, Robert Kahn, and Virginia Governor Gaston Caperton.

The leadership awards are given annually to individuals or teams (depending on the award) who have made unique and lasting technological contributions to society.

Cray Research Information Technology Leadership Award for Breakthrough Computational Science. Strodey and McDonell were honored for their “virtual surgery” innovation that makes it possible for medical students to practice difficult surgical techniques without a human patient.

MCI Information Technology Leadership Award for Innovation. Cerf was honored for co-developing the TCP/IP computer network protocol.

Price Waterhouse Information Technology Leadership Award for Lifetime Achievement. Evans and Sutherland, founders of the company of the same name, were honored for their breakthrough work in computer graphics.

SAIC Information Technology Leadership Award for Global Integration. Kahn was honored for co-developing the basic protocols that make up the Internet.

Zenith Data Systems Information Technology Leadership Award for Education. Caperton was honored for initiating a national model for computing technology training in elementary schools.

**Congress from Page 10**

and some of its early work will be routine.

For instance, the committee is the principal authorization and oversight committee for NSF.

(A company's money, in theory, comes in two steps. A substantive committee— in this case the Science Committee—specifies in an authorization what a public agency, based on its mission, can and should undertake to do and how much it can spend doing it. The Appropriations Committee then determines how much money is available to use the agency's fund the budget can carry out its mission. That is the theory. As with all things in Congress, reality is much fuzzier.)

NSF has not received a new authorization for some time, and not everyone agrees that one is needed now. If everybody is comfortable with an agency's current mission, and few changes are in store, authorization can be a meaningless and time-consuming process.

However, the committee always tries to hold at least one set of hearings early in the year in order to see if everyone is still comfortable.

This process allows NSF officials to describe how the agency is doing, lay out its future plans and identify problems that it or the research community may be facing. The hearings also are an opportunity for outside observers to comment on NSF.

A area in which the committee is sure to deal with, probably with special hearings, is the upcoming supercomputer center renewal decisions. What will NSF decide, the results are likely to be contentious and politically loaded. Science Committee support of the decision process would be very helpful in protecting the integrity of the peer review process. An initial set of hearings were held last year. Mary Vernon, a Computing Research Association Board member, testified on behalf of CRA.

Beyond those two issues, the computing research community can expect the committee to experiment with some of the new information technology initiatives NSF is working on: the next-generation Internet, knowledge networking, distributed intelligence, learning technologies or some combination of these projects.

The committee may come to play an important role in science policy over the next few years or so. When times were good, some science policy experts tended to discount the role of the authorizing committees in both houses, saying the only thing that really counts is appropriations. Some of that confidence in appropriations began to wane four years ago. The Senate Appropriations Committee, in particular, has turned its attention to GIS' mission, pushing it toward a so-called "strategic" research that focused more on economic development. The full research community then turned to the Science Committee for help in defending NSF's basic science mission, arguing that any shift in NSF's mission should be discussed and decided in the substantive committee of jurisdiction, not by the money people.

This experience illustrates how, as budgets tighten, conflicts over priorities will erupt. The Science Committee may be pressed to exert more influence. Prioritizing becomes more critical when the game becomes zero (or even negative) sum among the research communities. Scientists always complain when Congress sets priorities, arguing that researchers are best qualified to do so.

In contrast, the community and its leadership show little stomach for doing it, and it may be unreasonable to expect it. The most comfortable approach is to allocate cuts or increases more or less evenly over all areas. But, when the cuts get too deep, such an approach becomes untenable. Like it or not, Congress will have a voice.
CRN Advertising

Send copy and payment for Professional Opportunities advertisements to: CRN Advertising, Research News, 575 Connecticut AVE, N.W., Suite 718, Washington, D.C. 20036-5728. Tel: 202-234-2111; fax: 202-687-2066; e-mail: crn@crn.com. E-mail submissions are preferred. The minimum charge is $100.00 per column inch, with a two-inch minimum. Ads must be submitted in camera-ready, offset (postive or negative) mechanical form. If your ad is larger than three inches in length, 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 within the last month of publication of CRN will not be accepted for publication in CRN unless the ads applications will be accepted until the position is filled. If the closing date of a Professional Opportunities ad is at the time of publication of an issue of CRN, advertisers can choose the alternative advertising package, and only have the ad distributed electronically. A advertising copy that is to appear in CRN must be received at least one month before publication. The deadline for submitting copy is the 1st of the month for distribution only may be submitted at any time.

Purdue University

School of Electrical and Computer Engineering

The Department of Computer and Information Science and Engineering is seeking outstanding candidates at all levels. We have a special interest in candidates who have demonstrated excellence in research and teaching potential. The Department of Computer and Information Science and Engineering is committed to increasing diversity in its faculty. Additionally, we have a special interest in candidates who can contribute to diversity in the College of William and Mary. The Department of Computer and Information Science and Engineering offers B.S., M.S., and Ph.D. degrees in computer science and computer engineering.

The position is available at the level of assistant professor. The area of research is in computer science. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

Purdue University is an Affirmative Action/Equitable Employment Opportunity, Affirmative Action/Equal Opportunity Employer.

Northwestern University

Department of Computer Science

A tenure-track position is available at the level of assistant professor. The area of research is in computer science. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

Northwestern University is an Equal Opportunity, Affirmative Action Employer.

Ohio State University

Department of Computer and Information Science

The Department of Computer and Information Science and Engineering at The Ohio State University invites applications for a faculty position at the level of assistant professor. The area of research is in computer science. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

Ohio State University is an Equal Opportunity, Affirmative Action Employer.

Purdue University

School of Electrical and Computer Engineering

The Department of Computer and Information Science and Engineering is seeking outstanding candidates at all levels. We have a special interest in candidates who have demonstrated excellence in research and teaching potential. The Department of Computer and Information Science and Engineering is committed to increasing diversity in its faculty. Additionally, we have a special interest in candidates who can contribute to diversity in the College of William and Mary. The Department of Computer and Information Science and Engineering offers B.S., M.S., and Ph.D. degrees in computer science and computer engineering.

The position is available at the level of assistant professor. The area of research is in computer science. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

Purdue University is an Affirmative Action/Equitable Employment Opportunity, Affirmative Action/Equal Opportunity Employer.

Northwestern University

Department of Mathematics

A tenure-track position is available at the level of assistant professor. The area of research is in mathematics. Candidates should have a Ph.D. in Mathematics and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in Mathematics or a related field. Candidates are encouraged to apply.

Northwestern University is an Equal Opportunity, Affirmative Action Employer.

Purdue University

School of Electrical and Computer Engineering

The Department of Computer and Information Science and Engineering is seeking outstanding candidates at all levels. We have a special interest in candidates who have demonstrated excellence in research and teaching potential. The Department of Computer and Information Science and Engineering is committed to increasing diversity in its faculty. Additionally, we have a special interest in candidates who can contribute to diversity in the College of William and Mary. The Department of Computer and Information Science and Engineering offers B.S., M.S., and Ph.D. degrees in computer science and computer engineering.

The position is available at the level of assistant professor. The area of research is in computer science. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

Purdue University is an Affirmative Action/Equitable Employment Opportunity, Affirmative Action/Equal Opportunity Employer.

University of Arizona

Department of Computer Science

A tenure-track position is available at the level of assistant professor. The area of research is in computer science. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

University of Arizona is an Affirmative Action/Equal Opportunity, Affirmative Action Employer.

University of California, Los Angeles

Department of Computer Science

A tenure-track position is available at the level of assistant professor. The area of research is in computer science. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

University of California, Los Angeles is an Affirmative Action/Equal Opportunity, Affirmative Action Employer.

University of California, Davis

Department of Computer Science

A tenure-track position is available at the level of assistant professor. The area of research is in computer science. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

University of California, Davis is an Affirmative Action/Equal Opportunity, Affirmative Action Employer.

University of Colorado, Boulder

Institute of Cognitive Science

The University of Colorado at Boulder invites applications for a tenure-track position in the Department of Computer Science. Preference will be given to applicants who have demonstrated excellence in research and teaching, with a record of accomplishment in creative work and evidence of strong potential for continued excellence in research. The Department of Computer Science encompasses a wide range of research areas including artificial intelligence, computer networks, computer systems, computer vision, databases, distributed systems, graphics, human-computer interaction, programming languages, software engineering, and theory. Applications are encouraged from candidates who can contribute to the diversity of the University's faculty. To apply, candidates should send a letter of application, curriculum vitae, and the names of three references to: Chair, Search Committee, Department of Computer Science, University of Colorado, Boulder, CO 80309-0430. Applications should be received by January 15, 1998.

University of Colorado at Boulder is an Affirmative Action/Equal Opportunity, Affirmative Action Employer.

University of Illinois at Urbana-Champaign

Department of Computer Science

A tenure-track position is available at the level of assistant professor. The area of research is in computer science. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

University of Illinois at Urbana-Champaign is an Affirmative Action/Equal Opportunity, Affirmative Action Employer.

University of Maryland

Computer Science Department

The Department of Computer Science at the University of Maryland is seeking outstanding candidates at all levels. We have a special interest in candidates who have demonstrated excellence in research and teaching potential. The Department of Computer Science at the University of Maryland offers B.S., M.S., and Ph.D. degrees in computer science.

The position is available at the level of assistant professor. The area of research is in computer science. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

University of Maryland is an Equal Opportunity, Affirmative Action Employer.

University of Michigan

Division of Computer Science and Engineering

A tenure-track position is available at the level of assistant professor. The area of research is in computer science and computer engineering. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

University of Michigan is an Equal Opportunity, Affirmative Action Employer.

University of Pennsylvania

Department of Computer and Information Science

A tenure-track position is available at the level of assistant professor. The area of research is in computer science. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

University of Pennsylvania is an Affirmative Action/Equal Opportunity, Affirmative Action Employer.

University of Virginia

Department of Computer Science

A tenure-track position is available at the level of assistant professor. The area of research is in computer science. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

University of Virginia is an Equal Opportunity, Affirmative Action Employer.

Virginia Polytechnic Institute and State University

Department of Computer Science

A tenure-track position is available at the level of assistant professor. The area of research is in computer science. Candidates should have a Ph.D. in Computer Science and should have a strong potential for achievement in research and teaching. Applicants should hold or expect to receive the Ph.D. degree in computer science or a related field. Candidates are encouraged to apply.

Virginia Polytechnic Institute and State University is an Affirmative Action/Equal Opportunity, Affirmative Action Employer.
University of North Dakota
Department of Computer Science

The Department of Computer Science, Department of Electrical Engineering, and Department of Information Technology of the University of North Dakota, Grand Forks, ND 58201, invites nominations and applications for an assistant professor position. This position is for a tenure-track junior faculty position. Candidates should have a Ph.D. in computer science or a related field. Demonstrated excellence in both research and teaching is required. Candidates should also be encouraged to apply. Preference will be given to candidates with research in parallel, distributed, and/or real-time computing. The University of North Dakota is an Equal Opportunity Employer and Affirmative Action Employer.

University of California, Santa Barbara
Department of Computer Science

The University of California, Santa Barbara, Department of Computer Science, offers an interdisciplinary program in computer engineering and offers equal employment opportunities to all qualified applicants. Women and minorities are especially encouraged to apply.

University of Oregon

The School of Computing Science, Computer Sciences, has numerous opportunities for government and industrial funding. The school is particularly interested in candidates whose research would be enhanced by the department's existing programs and has a clear research agenda in computational geometry, cryptography and data structures. Applications are invited for a scientist position in the Department of Computer Science, starting in September 1997. Applications should be received by Jan. 31, 1997. The University of Oregon is an Equal Opportunity/Equal Access/Affirmative Action/Protected Veteran employer.

University of California, Berkeley

Applications are invited for a tenure-track assistant professor position in the Department of Electrical Engineering and Computer Sciences at the University of California, Berkeley. The successful candidate will have a Ph.D. and a demonstrated capacity for independent research and teaching. Senior candidates are especially encouraged to apply. Preference will be given to candidates with research interests in computer architecture, VLSI design, computer networking, and parallel computing. The Department, the College of Engineering, and the campus are committed to diversity and to seeking the best qualified candidates to work here. The University of California is an Equal Opportunity, Affirmative Action employer.

University of California, Riverside

The University of California at Riverside invites applications for a tenure-track assistant professor position in the Department of Computer Science and Engineering, starting in the fall semester of 1997. Applicants should have a Ph.D. in computer science or a related field. Demonstrated excellence in both research and teaching is required. The successful candidate will be expected to work closely with the existing faculty and to pursue a vigorous research and teaching agenda. Salary will be competitive. The position includes an appointment as an affiliate faculty member in the Computer Science Department, where the candidate will be expected to participate in the research agenda of the department and in the activities of the College of Letters and Science. The University of California is an Equal Opportunity, Affirmative Action employer.

University of California, Irvine

The Computer Science Department currently has a position available for a senior (associate or full professor) in the area of computer science. This position is in the Department of Computer Science in the School of Physical Sciences at the University of California, Irvine. The successful candidate will be expected to have a Ph.D. in computer science or a related field. Preference will be given to candidates with research interests in VLSI design, parallel computing, or computer architecture. The position includes an appointment as a member of the Computer Science faculty and as a member of the College of Letters and Science. The University of California is an Equal Opportunity, Affirmative Action employer.

University of California, Los Angeles

Applications are invited for a scientist position in the Department of Computer Science. Applicants should hold a doctoral degree in computer science or a related field. Excellent instruction and research programs are available in all areas of computer science and the candidates are expected to contribute to research and teaching in one or more areas of the department. The University of California is an Equal Opportunity, Affirmative Action employer.

University of Southern California

The University of Southern California invites applications for a tenured or tenured-track faculty position at the associate or full professor level. The position is in the Department of Computer Science and Engineering, with an emphasis in computer engineering. More information about the department and the institution can be found at http://www.usc.edu. The University of Southern California is an Equal Opportunity, Affirmative Action employer.

University of Texas at Austin

The University of Texas at Austin invites applications for an assistant professor position in the Department of Computer Science. The position is in the area of design and performance of computer systems. The successful candidate will have a Ph.D. in computer science or a related field. The position includes an appointment as an affiliate faculty member in the College of Letters and Sciences. The University of Texas at Austin is an Equal Opportunity, Affirmative Action employer.

University of Washington

The Department of Computer Science and Engineering at the University of Washington invites applications for a tenure-track assistant professor position in the area of computer science. The position is in the Department of Computer Science and Engineering and the position includes an appointment as a member of the College of Letters and Sciences. The University of Washington is an Equal Opportunity, Affirmative Action employer.

University of Wisconsin-Madison

The Department of Computer Science at the University of Wisconsin-Madison invites applications for a tenure-track faculty position at the assistant professor level. Qualified candidates in all areas of computer science and computer engineering are encouraged to apply. The successful candidate will be expected to contribute to the excellence of our department and university. The successful candidate will be expected to have a Ph.D. in computer science or a related field. The University of Wisconsin-Madison is an Equal Opportunity, Affirmative Action employer. The University of Wisconsin-Madison is an EEO/AA employer.

University of Wisconsin-Milwaukee

The Computer Engineering Department at the University of Wisconsin-Milwaukee seeks qualified applications from candidates who have at least three years of professional experience in computer systems. The University of Wisconsin-Milwaukee is an Affirmative Action/Equal Opportunity Employer.

University of Wyoming

Applications are invited for a tenure-track assistant professor position in the Department of Computer Science at the University of Wyoming. Applicants should have a Ph.D. in computer science or a related field. The University of Wyoming is an Affirmative Action/Equal Opportunity Employer.

Yale University

Yale University, Department of Computer Science, invites applications for one or more tenure-track assistant professor positions in the area of computer engineering. Women and minority candidates are particularly encouraged to apply. The University of Connecticut is an Affirmative Action/Equal Opportunity Employer.

York University

The School of Computer Science at York University invites applications for one or more tenure-track assistant professor positions. Preference will be given to candidates specializing in computer graphics and visualization. Applications are invited from all qualified candidates. The School of Computer Science is an equal opportunity employer.

York University

The School of Computer Science at York University invites applications for one or more tenure-track assistant professor positions. Preference will be given to candidates specializing in computer graphics and visualization. Applications are invited from all qualified candidates. The School of Computer Science is an equal opportunity employer.

York University

The School of Computer Science at York University invites applications for one or more tenure-track assistant professor positions. Preference will be given to candidates specializing in computer graphics and visualization. Applications are invited from all qualified candidates. The School of Computer Science is an equal opportunity employer.

York University

The School of Computer Science at York University invites applications for one or more tenure-track assistant professor positions. Preference will be given to candidates specializing in computer graphics and visualization. Applications are invited from all qualified candidates. The School of Computer Science is an equal opportunity employer.

York University

The School of Computer Science at York University invites applications for one or more tenure-track assistant professor positions. Preference will be given to candidates specializing in computer graphics and visualization. Applications are invited from all qualified candidates. The School of Computer Science is an equal opportunity employer.

York University

The School of Computer Science at York University invites applications for one or more tenure-track assistant professor positions. Preference will be given to candidates specializing in computer graphics and visualization. Applications are invited from all qualified candidates. The School of Computer Science is an equal opportunity employer.

York University

The School of Computer Science at York University invites applications for one or more tenure-track assistant professor positions. Preference will be given to candidates specializing in computer graphics and visualization. Applications are invited from all qualified candidates. The School of Computer Science is an equal opportunity employer.

York University

The School of Computer Science at York University invites applications for one or more tenure-track assistant professor positions. Preference will be given to candidates specializing in computer graphics and visualization. Applications are invited from all qualified candidates. The School of Computer Science is an equal opportunity employer.

York University

The School of Computer Science at York University invites applications for one or more tenure-track assistant professor positions. Preference will be given to candidates specializing in computer graphics and visualization. Applications are invited from all qualified candidates. The School of Computer Science is an equal opportunity employer.
Professional Opportunities

Professional Opportunities ads available on Web

Not all departments and organizations choose to run their Professional Opportunities ads in CRN — their ads are only distributed electronically to the Computing Research Association's Web site and jobs listerv. If you are interested in seeing more Professional Opportunities ads, access the jobs Web page at http://www.cs.brown.edu/cra Jahad.html. You would likely want to subscribe to the mail list located at http://www.cra.org/cra jobs@crca so you can read the announcements before they are published in CRN (or see the ones that don't appear in CRN). Follow the mail list to dp@crca组织 subscribe jobs first time.
networking and distributed operating systems; theoretical computer science; and artificial intelligence and image processing. A detailed informative about the Computer Science Program at KSU is available at http://www.cs.kennesaw.edu.

The State of Ohio recently invited Kent as one of the lead institutions in the CCA-Rx, a state-wide ATR research network for computer science. Equipment purchased for the CCA-Rx project includes ATR switches, a MatchNet; a Wackel-Platform; vertical clusters consisting of C110 class machines, and ten shared-memory multiprocessors. State funding also supports the creation of a 266 megaflop supercomputer. Fiber Channel research network for distributed computation and scientific visualization. The department operates computer laboratories consisting of A-Terminals and Sun and Hewlett-Packard workstations, various VAX and VMS parallel processors and minicomputer systems. A cross to the computers at the Ohio Supercomputing Center in Columbus is also available. The department moved to an new building recently and expects to increase its equipment holdings and staff considerably in the near future as a result of the state initiative.

Applicants should submit a cover letter and a resume and should arrange to have three letters of recommendation sent to the Computer Science Search Committee, Department of Mathematics and Computer Science, Kent State University, Kent, OH 44242. The applications may be submitted via e-mail to cs-pos@mcs.kent.edu. In the latter case applicants should declare which area they are applying. The search committee will begin to consider applications Jan. 27, 1997, and will continue until the position is filled.

Kent State University is an affirmative action, equal opportunity employer.

Vanderbilt University

Department of Computer Science

The Computer Science Department at Vanderbilt University invites applications for two positions: 1) a tenure-track position in computer science and 2) a visiting appointment for teaching and research. The primary target area is algorithms for the analysis of large data sets, parallel and distributed systems, networking and distributed operating systems; theoretical computer science; and artificial intelligence, software engineering research.

The department currently has eight faculty members, of whom five are involved in research. A new research initiative in software systems, artificial intelligence, software-based engineering and distributed systems is being developed. A new system, Vanderbilt University, Nashville, TN 37235. E-mail: cs-search@vanderbilt.edu.

University of California, Berkeley

Department of Electrical Engineering and Computer Sciences

The University of California at Berkeley invites applications for tenure-track positions in the Department of Electrical Engineering and Computer Sciences beginning in fall 1997.

Four faculty positions have been approved. Applications for appointments at the assistant professor level will be given top priority, however, other levels will be considered under exceptional circumstances.

Applicants should have received (or be about to receive) a doctoral degree in computer science, electrical engineering or computer engineering or a related field. A background in research in computer science and electrical engineering will be considered. A principal requirement is demonstrated excellence in research. In addition, potential for excellence in teaching and leadership is required. Successful applicants will be expected to develop a quality research and teaching program both at the undergraduate and graduate level. Applicants should send a resume, a select subset of papers, a cover letter and list of their future research plans and interests, and the names and addresses of at least four references to the above address. The applicant should request their references to be sent directly to the above address. The department will continue to review applications received after this date.

Interested persons should send a resume, a select subset of papers, a cover letter and list of their future research plans and interests, and the names and addresses of at least four references to the above address. The applicant should request their references to be sent directly to the above address. The department will continue to review applications received after this date.

University of Maryland, College Park

Department of Computer Science

The University of Maryland at College Park (UMCP) Department of Computer Science is seeking faculty members at all ranks. Truly outstanding candidates in all areas of computer science, including computer architecture, databases, information systems and software; or candidates with research interests in parallel and distributed computing, artificial intelligence and image processing. Additional areas of interest include: computational biology; software engineering. A candidate must have a Ph.D. or its equivalent in computer science or a related field.

Successful applicants will be expected to have an impact in both research and teaching.

The University of Maryland at College Park Department of Computer Science is an equal opportunity, affirmative action employer.

McGill University

School of Computer Science

The School of Computer Science at McGill University invites applications for tenure-track positions at the assistant professor level. The Department is dedicated to making outstanding contributions to both research and teaching.

Applications should include a current curriculum vitae, copies of at least three representative publications, and names and addresses of at least four references. A Ph.D. in computer science or a related area is required. Review of applications will commence immediately and continue until the position is filled. Please send recommendations and inquiries to Faculty Search Committee, School of Computer Science, Box 116, Station B, Vandenbergh Hall, University of British Columbia, Vancouver, B.C. V6T 1Z4. E-mail: cs-search@ubc.ca.

University of Kentucky

Department of Electrical Engineering

The University of Kentucky in Lexington invites applications for tenure-track positions in electrical engineering.

Interested persons should send a resume, a select subset of papers, a cover letter and list of their future research plans and interests, and the names and addresses of at least four references to Professor Randy Katz, Chair, Department of Electrical Engineering and Computer Sciences, 212 Corby Hall, University of Kentucky, Lexington, KY 40430-0046.

The University of Kentucky is an equal opportunity, affirmative action employer.

Santa Clara University

Department of Computer Engineering

The Department of Computer Engineering seeks applications for a tenure-track faculty position at the assistant professor level. Applicants must have a Ph.D. in computer engineering, computer science or a related discipline with a primary emphasis in software engineering. The teaching load consists of five courses per year and includes teaching and research at both the undergraduate and graduate level.

Santa Clara University is a private Jesuit university located in the heart of Silicon Valley. The University enrolls about 8,000 students at both the undergraduate and graduate level. The Department offers B.S., M.S. and Ph.D. degrees, has more than 150 undergraduate majors and 350 graduate majors. A detailed information on the University and the department is available through http://www.scu.edu.

Please send your inquiries and copies of recent publications and other information about your qualifications to: Chair, Search Committee, Department of Computer Engineering, Santa Clara University, Santa Clara, CA 95051.

Santa Clara University is an equal opportunity, affirmative action employer. It welcomes applications from women, persons of color, members of other historically underrepresented minority groups, persons with disabilities, veterans and Jesuits.

Polytechnic University

Department of Computer and Information Science

Applications are invited for tenure-track positions at all levels. We are particularly interested in candidates in the following areas: compilers, computer architecture, operating systems, parallel and distributed systems, programming languages and software engineering. A Ph.D. degree and a strong research record including significant publications and the ability to secure external funds through grants or contracts. The Department of Computer and Information Science offers B.S., M.S. and Ph.D. degrees. Areas of active research include computational biology, computer security and privacy, computer systems, understanding of large distributed databases; network management; parallel, distributed and fault tolerant systems; randomization algorithms; parallel and distributed systems and architectures; pattern matching and recognition; and software reliability and testing. Polytechnic University, Brooklyn, N.Y., 11201, is located on three campuses in the New York City metropolitan area.

Penn State

University of Central Florida

Department of Computer Science

The University of Central Florida invites applications for one tenure-track position in computer science at the level of assistant professor. We are interested in all strong candidates who have expertise in one or more of the following areas that contribute to the position and are committed to teaching and research: computer systems, computer architecture, software engineering, and computer networks.

Applications will be reviewed beginning Jan. 15, 1997, and will continue until the position is filled. Interested persons should send a resume, a select subset of papers, a cover letter and list of their future research plans and interests, and the names and addresses of at least three references to Department of Computer Science, The University of Central Florida, McConnell Engineering Building, #318, Orlando, Florida 32819-2074. Send letter of application, vita, three letters of recommendation and related materials to Professor Randy Katz, Chair, Computer Science Search Committee, University of Central Florida, Orlando, Florida 32819-2074. E-mail: Katz@cs.ucf.edu.

The University of Central Florida is a young, growing university with a student population of approximately 20,000. The Computer Science Department is one of the largest departments in the college of computer information systems. The Department offers B.S., M.S. and Ph.D. degrees. It currently has 24 full-time faculty members, of whom 8 are Ph.D. graduates and 1 graduate student. The research areas within the department include computer vision, databases, design and analysis of algorithms, computer graphics, digital multimedia, software reliability, and other areas of computer science.

Applications will be reviewed beginning Jan. 15, 1997, and will continue until the position is filled. Interested persons should send a resume, a select subset of papers, a cover letter and list of their future research plans and interests, and the names and addresses of at least three references to: Dr. T. Terry, Professor and Chair, Search Committee, Department of Computer Science, The University of Central Florida, Orlando, Florida 32819-2074. E-mail: terry@cs.ucf.edu.

Ashland University

Department of Mathematical/Computer Science

Computer Science The tenure-track assistant professor position begins Aug. 1997. A Ph.D. is required in computer science. Applicants should be able to teach a wide range of undergraduate courses in software engineering, computer architecture, computer operating systems, and software for the personal computer. The ability to teach courses in computer ethics and legal issues is desirable. Applicants for the position must have completed coursework in computer science and electrical engineering with a Ph.D. in computer science.

Applications should be sent to the Computer Science Office, Ashland University, 1 University Ave., Ashland, OH 44805. Applications must be received by March 1, 1997. The University of Ashland is an Equal Opportunity/Affirmative Action employer.

University of Mississippi

Associate Provost for Information Technologies

The University of Mississippi seeks an associate provost for information technology. The University of Mississippi is a land grant institution and a major public research university. The associate provost for information technology will be expected to increase the University's computing resources and the University's ability to perform research and other scholarly activities.

Applications will be accepted until the position is filled. Please send responses and inquiries to Dr. R. Lindsay, Associate Provost for Information Technology, University of Mississippi, University, MS 38677.

The University of Mississippi is an Equal Opportunity/Affirmative Action Employer.

For full consideration, applications must be received by March 15, 1997. The University of Mississippi is an equal opportunity/affirmative action employer.

For full consideration, applications must be received by March 15, 1997. The University of Mississippi is an Equal Opportunity/Affirmative Action Employer.

For full consideration, applications must be received by March 15, 1997. The University of Mississippi is an equal opportunity/affirmative action employer.

For full consideration, applications must be received by March 15, 1997. The University of Mississippi is an equal opportunity/affirmative action employer.

For full consideration, applications must be received by March 15, 1997. The University of Mississippi is an equal opportunity/affirmative action employer.

For full consideration, applications must be received by March 15, 1997. The University of Mississippi is an equal opportunity/affirmative action employer.

For full consideration, applications must be received by March 15, 1997. The University of Mississippi is an equal opportunity/affirmative action employer.

For full consideration, applications must be received by March 15, 1997. The University of Mississippi is an equal opportunity/affirmative action employer.

For full consideration, applications must be received by March 15, 1997. The University of Mississippi is an equal opportunity/affirmative action employer.

For full consideration, applications must be received by March 15, 1997. The University of Mississippi is an equal opportunity/affirmative action employer.

For full consideration, applications must be received by March 15, 1997. The University of Mississippi is an equal opportunity/affirmative action employer.

For full consideration, applications must be received by March 15, 1997. The University of Mississippi is an equal opportunity/affirmative action employer.

For full consideration, applications must be received by March 15, 1997. The University of Mississippi is an equal opportunity/affirmative action employer.
History from Page 5

History has a tendency not to serve as advisors: Peggy Kidwell (Smithsonian Institution), Michael Mahoney (Princeton University), John McCreary (Stanford University), Arthur Norberg (University of Minnesota), David Patterson (University of California at Berkeley), Bruce Semple (Iowa State University), Joseph Traub (Columbia University).

There are a number of ways in which we address this project:
1. Send Dr. A spray (e-mail: spray@cs.org) the names of living individuals who have played an important role in this history, such as founding chairs of departments, early program officers or longterm computer science faculty who have a good perspective on key events. Please include a few words about each individual, or the backgrounds of these individuals, plus current contact information for them. The project staff will contact as many of these people as possible to fill the gaps in the list of oral historians.
2. Send information about the personal and organizational records that are relevant to this history. Include the records where the records are presently located: in the possession of the individual or the department in the university; in the care of the university; in the care of special archives such as the Sabbage Institute, the Smithsonian, the Hayegy Library or Stanford's Silicon Valley archives.
3. Help with the placement of archival records into your local archives or one of the specialty archives libraries. The records are still in personal hands. (The IEEE Center for the History of Electrical Engineering has prepared a brochure that describes the records placement of placing archival collections. IEEE CHEE, Rutgers University, 39 Union St., New Brunswick, N.J. 08903.)
4. Offer to participate in the interview process by offering to have your staff transcribe the raw tapes and enter corrections made in the editing process.
5. Provide access to your oral history interviews. Dr. A is willing to give you advice on the process— it involves considerably more than taping a telephone recorder and having a conversation with a historical figure.
6. Send copies of, or at least references to, historical studies about your department, funding agency, company’s relationship with the academic community or key figures in this story. These might include departmental histories, university histories with information about the history of your department, studies on your region (such as studies of Route 128 or Silicon Valley), biographies, etc. They might include relevant information.
7. A dive on key topics for the study.
8. A rivival materials generated in the course of this project will be offered to the Charles Babbage Institute for the History of Information Processing at the University of Minnesota.