COMPUTING RESEARCH NEWS

The News Journal of the Computing Research Association

November 1995 *Vol. 7/No. 5*

Table 1. 1993 NAS Quality Ratings of CS Ph.D. Programs

1	Stanford University	4.97
2	Massachusetts Institute of Technology	4.91
3	University of California, Berkeley	4.88
4	Carnegie Mellon University	4.76
5	Cornell University	4.64
6	Princeton University	4.31
7	University of Texas, Austin	4.18
8	University of Illinois, Urbana-Champaign	4.09
9	University of Washington	4.04
10	University of Wisconsin, Madison	4.00
11	Harvard University	3.94
12	California Institute of Technology	3.93
13	Brown University	3.86
14.5	Yale University	3.73
14.5	University of California, Los Angeles	3.73
16	University of Maryland, College Park	3.69
17	New York University	3.60
18	University of Massachusetts, Amherst	3.59
19	Rice University	3.55
20	University of Southern California	3.52
21	University of Michigan	3.49
22.5	University of California, San Diego	3.45
22.5	Columbia University	3.45
24.5	U. of Pennsylvania Program in Decision Sciences	3.31
24.5	University of Chicago	3.31
26	Purdue University	3.28
27	Rutgers State University, New Brunswick	3.25
28	Duke University	3.17
29	University of North Carolina, Chapel Hill	3.16
30	University of Rochester	3.13
31	State University of New York, Stony Brook	3.12
32	Georgia Institute of Technology	3.10
33	University of Arizona	3.05
34	University of California, Irvine	3.03
35	University of Virginia	3.02
36	Indiana University	3.00

Inside CRN

PAGE 2: *Expanding the Pipeline*
PAGE 3: *Association News*
PAGES 4-5: *Policy News*
PAGE 6: *Conference News*
PAGES 7-11: *Professional Opportunities*
PAGE 12: *People in the News*

NRC releases data on CS program rankings

By Juan Antonio Osuna
CRA Staff

The Computing Research Association has extracted data about computer science Ph.D. programs from a recent National Research Council (NRC) study and assembled an interactive database on its Web server. From this database, users can rank up to 108 Ph.D. programs based on any of 20 characteristics, such as female or minority representation, that were reported in the study. Background information and links to the database can be found at http://cra.org/NRCStudy/.

Released Sept. 12, the NRC report offers the most comprehensive assessment of research doctorate programs ever, examining the quality of scholars, teaching effectiveness and other characteristics of more than 3,600 doctoral programs in 41 fields at 27 universities nationwide.

In 1982, the NRC conducted a similar study. However, the latest one incorporates new fields and programs, uses refined techniques and provides a benchmark for future studies.

Ratings of CS programs extracted from the September report were based on data collected in 1993 from 221 computer science researchers considered to be knowledgeable about other programs in their field. Ratings on scholarly quality and teaching effectiveness were based solely on reputation as measured by the 1993 survey.

The report also tabulates other data—from 1986 to 1992—on faculty and Ph.D. production, with specific information on women, minorities, publications and financial support. Unlike the CRA Taulbee Survey, the study focuses on comparative characteristics among the 108 CS programs rather than on growth trends. Although the ratings data were juxtaposed with other information, the various data were gathered independently from different sources at various federal agencies.

CRA traditionally has used the NRC's 1982 rankings of Ph.D. programs as a basis for tabulating various statistics for the annual CRA Taulbee Survey. CRA plans to incorporate the recent rankings into this year's Taulbee analysis.

Because the NRC study may have methodological weaknesses that could render unfair comparisons among some programs, CRA urges its

Continued on Page 5

Report library offers many benefits

(The Computing Research Association strongly endorses the concept of unified electronic access to computer science technical report literature and encourages member institutions to catalog their reports using the Networked Computer Science Technical Report Library [NCSTRL] system. At its July meeting, the CRA Board passed a motion supporting NCSTRL).

By Alan L. Selman

The Networked Computer Science Technical Report Library (NCSTRL) is a digital library for technical reports from computer science departments and research laboratories. This library will benefit the departments that contribute to it, researchers who consult it, students who access the library for their course work and authors whose work makes up the corpus.

Currently, 29 Computer Science Departments and research laboratories contribute their department technical reports to NCSTRL. To provide the level of service that is intended, all Ph.D.-granting departments and research laboratories need to join. This article represents the start of a campaign to urge your department to contribute your technical reports to this digital library. You will find that NCSTRL is stable and provides convenient, quality access. Minimal effort is required of departments, and the cost is far less than the cost of managing a paper collection.

It is becoming more difficult for departments to manage their technical report collections. An increasing number of high-quality reports are being produced at more research organizations, yet department operating budgets are decreasing. By contributing to NCSTRL, departments will eliminate the cost of printing, storing and distributing paper technical reports. Charging for reports would merely escalate costs throughout the research community.

Similarly, researchers need greater access to research materials. Young researchers, for example, who hold faculty positions at colleges and universities that do not have strong research traditions will depend on NCSTRL for access to the latest research results. Authors will receive the widest exposure of their works, which will be searchable worldwide. Students at the undergraduate and graduate levels will have easy access to research results not yet available in journals and conference proceedings. New and prospective graduate students can find out about the work of faculty electronically, with minimal guidance. Thesis students can use NCSTRL to familiarize themselves with current research in their chosen area.

NCSTRL has a World Wide Web interface. The interface supports searching by author, title or abstract, and results may be browsed by table of contents or thumbnail images, read on the screen or printed.

From a user's point of view, NCSTRL appears as a single collection, even though physically, the repositories containing the collection and the search engines for it are distributed over the Internet. A user wanting to find a document in the distributed collection follows a simple procedure:

1) Use a standard WWW browser to open a connection to one of the user interface gateways to the NCSTRL collection. The gateway returns a simple form for searching the collection.

2) Complete the search form with criteria for a search of the collection—for example "author = hopcroft"—and submit the search. The gateway processes the search and presents a *hit list* to the user.

Continued on Page 12

Non-Profit
Organization
US Postage
PAID
Washington, DC
Permit No. 3778

Time-Sensitive Material

CRA
1875 Connecticut Ave. NW
Suite 718
Washington, DC 20009

Computing Research Association

Board Officers
David A. Patterson
Chair
University of California, Berkeley

Mary Jane Irwin
Vice Chair
Pennsylvania State University

Nancy G. Leveson
Secretary
University of Washington

Michael R. Garey
Treasurer
AT&T Bell Laboratories

Board Members
W. Richards Adrion
University of Massachusetts, Amherst

Alfred V. Aho
Columbia University

Frances E. Allen
IBM T.J. Watson Research Center

Gregory R. Andrews
University of Arizona

Ruzena Bajcsy
University of Pennsylvania

Sandra Johnson Baylor
IBM T.J. Watson Research Center

Barry Boehm
University of Southern California

Anita Borg
DEC Network Systems Laboratory

Robert Cartwright
Rice University

Thomas L. Dean
Brown University

Stuart I. Feldman
IBM T.J. Watson Research Center

Peter Freeman
Georgia Institute of Technology

C. William Gear
NEC Research Institute Inc.

Irene Greif
Lotus Development Corp.

John V. Guttag
MIT

Maria Klawe
University of British Columbia

Duncan Lawrie
Univ. of Illinois, Urbana-Champaign

Edward D. Lazowska
University of Washington

Jill P. Mesirov
Boston University

Robert W. Ritchie
Hewlett-Packard Co.

John E. Savage
Brown University

Bruce D. Shriver
Genesis 2 Inc.

Jeffrey Ullman
Stanford University

Mary K. Vernon
University of Wisconsin, Madison

John Werth
University of Texas, Austin

John R. White
Xerox Palo Alto Research Center

Acting Executive Director
Fred W. Weingarten

LETTERS TO THE EDITOR
Joan Bass
1875 Connecticut Ave. NW
Suite 718
Washington, DC 20009

Tel: 202-234-2111
Fax: 202-667-1066
E-mail: jbass@cra.org

Letters may be edited for space and clarity.

Expanding the Pipeline

CS gender gap still a problem

BY Clark Thomborson

Like Mary Jane Irwin of Pennsylvania State University and many others, I am dissatisfied with the number of women in academic computer science. That's an understatement; I am increasingly alarmed. Over the past decade, gender balance at the undergraduate level in computer science has steadily deteriorated in the United States. I don't like the current situation in the undergraduate classroom, and I am afraid of what it portends for gender balance at the faculty level in the future. My motivation: I don't want to work in a gender-segregated workplace for the rest of my life.

When I first started teaching at the University of California at Berkeley in 1979, there weren't many female students in my undergraduate classes. In a class of 30, there might be five women. The gender mix, or rather the lack thereof, was even more noticeable at the graduate level. In a seminar of 10 students, it was rare to see more than a couple of women. And there were very few female faculty members. This was far from a gender-balanced workplace, but at least the situation seemed to be improving.

According to a statistical series on undergraduate degree conferrals collected by the Department of Education's National Center for Education Statistics (NCES), the gender ratio among CS undergraduates improved from 20% to nearly 40% from 1975 to 1984. Since then there has been a steady decline. According to the latest data in my possession, in the class of 1993 only 28% of the computer science BS degree recipients in the United States were female. This is a national average.

At major research universities, there are even fewer women in CS undergraduate programs than suggested by the national averages discussed above. The Massachusetts Institute of Technology Planning Office performed a detailed analysis of the NCES data for the class of 1990. The percentage of females among the CS undergraduate degree recipients that year at the top 12 schools, as ranked in the CRA Taulbee Survey, was 22% at Stanford University, 21% at MIT, 24% at Carnegie Mellon University, 31% at the University of California at Berkeley, 13% at Cornell University, 12% at the University of Illinois at Urbana-Champaign, 19% at the University of Washington, 21% at the University of Texas at Austin, 30% at the University of Wisconsin at Madison and 25% at the University of Southern California. NCES had no data for 1990 CS undergraduate degrees from the University of California at Los Angeles or the University of Toronto. Note that only Berkeley and Madison approached the 1990 national average (30%) gender ratio for undergraduate CS degree recipients.

A third data series, recently added to the annual CRA Taulbee Survey, showed that only 18% of the undergraduate CS degree recipients in 1994 were female. This 18% figure is a close match to the "top 12 schools" data quoted in the previous paragraph. I don't think the CRA Taulbee data is directly comparable to the NCES data quoted above; the percentages are too far apart.

I don't have 1994 data from NCES, nor do I have 1993 data from the CRA Taulbee Survey because none was collected for undergraduate conferrals. Still, it is worrisome to compare the 30% gender ratio for CS bachelor's degrees in the United States in 1993 (NCES data) with the 18% gender ratio among CS bachelor's degrees for CRA Taulbee reportants in 1994. My rough estimate is that only half the difference is due to a difference in survey methodology and scope, i.e., that the NCES data for 1994 will show a dramatic drop in the gender ratio for CS bachelor's degree recipients in the United States.

The recent downward trend in undergraduate female participation in computer science will almost surely result, soon, in a downward trend in female CS Ph.D. conferrals. Historically, gender ratios for master's degrees in computer science are lower than those for bachelor's degrees, and gender ratios for CS Ph.D. recipients are lower still. As we follow an age cohort through the pipeline of advancement in academic computer science, we see fewer females.

You might believe that at present no downward trend exists in undergraduate female CS ratios. Perhaps the gender ratio for CS bachelor's degrees in 1995 will be higher than 1994, and 1996 will be even higher. However, I disagree. The gender ratio at the high school level is still dropping, judging from data collected by the College Board. (I believe Nancy Griffeth of Bellcore was the first to study this data for its relevance to the CS pipeline.)

Before high school students take the graded portion of an SAT exam, they indicate their areas of highest interest among a list of "College Majors by Academic Area." The College Board publishes a yearly

Continued on Page 3

Figure 1. Intended Majors of Females in Science and Engineering

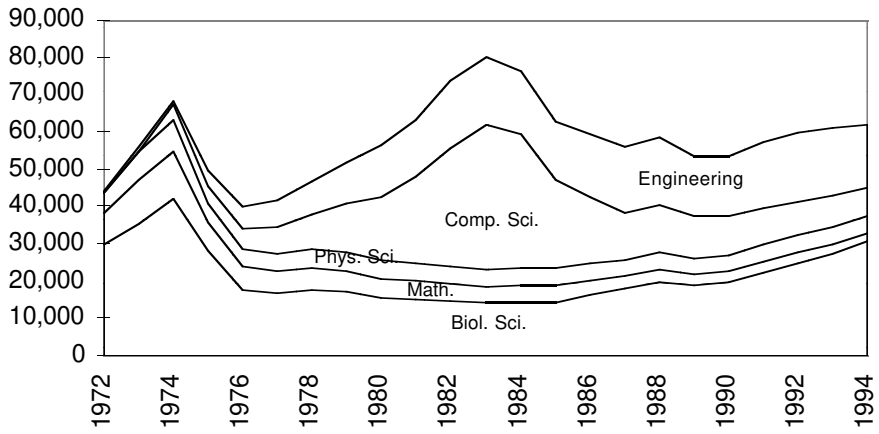


Figure 2. Intended Majors of Males in Science and Engineering

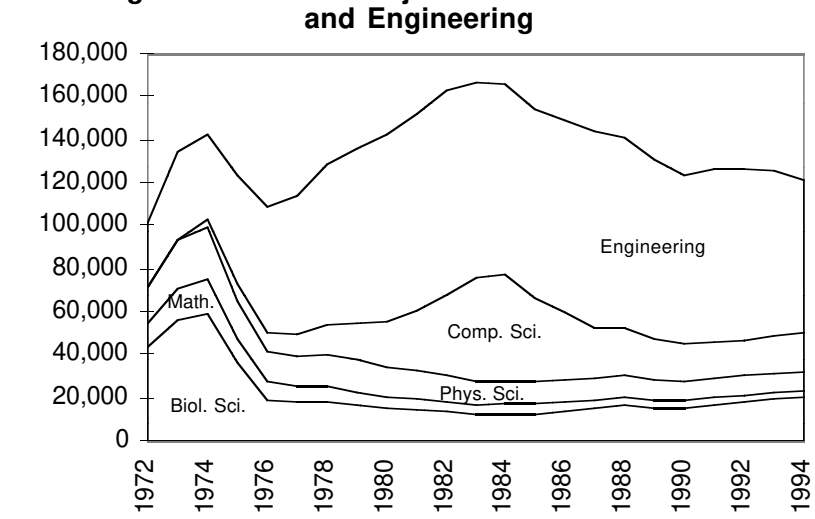
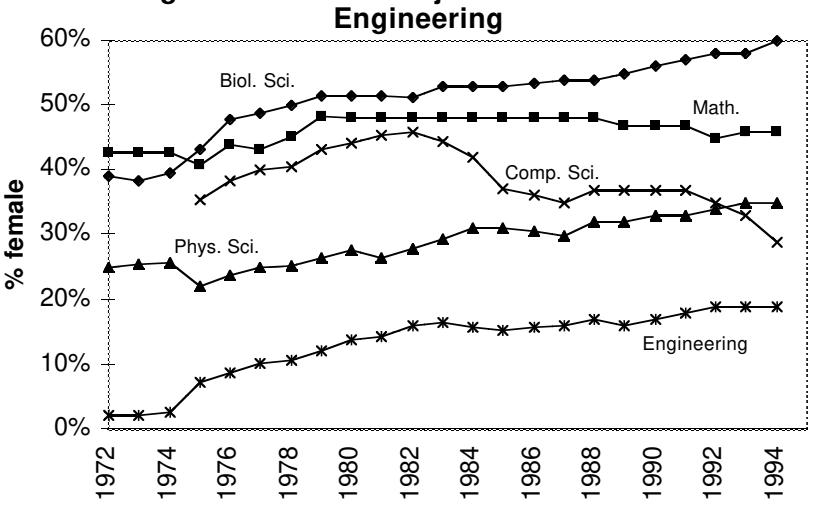


Figure 3. Intended Majors in Science and Engineering



Association News

NSF renews funding for mentor program

The National Science Foundation (NSF) has awarded the Computing Research Association (CRA) $530,000 for continued support of a Distributed Mentor Project for undergraduate females in computer science and computer engineering (CS&E). The intent of the program is to increase the number of women entering graduate school in CS&E by involving them in research at a university with a female mentor. Because of the limited number of female researchers in CS&E who can serve as role models and mentors, we believe the undergraduates should be brought directly to the professors for a summer of research. Students will be involved in research and will also learn how a research university operates, meet graduate students and professors and get a chance to observe a successful female researcher up close.

Basic structure

Students and professors apply to CRA. The deadline for applications is February 1, 1996. A committee will examine the applications and select at least 20 student/professor matches for funding. Students and mentors will be notified by March 15, 1996.

Funding consists of up to $5,000 per match. Some of this money is given directly to the student to pay a stipend and cover lodging (lodging costs vary, typically about $1,000-$1,500). CRA reimburses travel expenses. A student's funding is intended to cover up to 10 weeks of research in the summer of 1996, but alternative arrangements are possible. Mentors and their universities receive no funding for the summer of research, but limited funds will be available to cover conference travel for selected students and mentors after the summer of research.

Mentors and students will be given training packages on mentoring and will be expected to participate in an electronic discussion group. This will provide additional mentoring opportunities while distributing the load among mentors, and it will establish cohesiveness among all participants. It is intended to be a source of support for mentors and students.

One aspect of the continuing project is a longitudinal evaluation, covering all five years of the project (1994-98). This third-party evaluation is intended to provide formative feedback and to assess the long-term impact of the project. The evaluation is *not* intended to check on the performance of individuals participating in the project, and participants' anonymity will be maintained as far as possible. All participants are expected to take part in the evaluation; the time involved will be minimal.

Copies of the application form and other useful information can be accessed on the Web at http://cs.wisc.edu/~condon/cra-mentor, by anonymous FTP at ftp.cs.wisc.edu:/cra-mentor/ and from the AFS file system at /p/ftp/cra-mentor. An interim evaluation report will be available at these electronic locations by mid-January.

To request a hard copy of the application, send your request to Distributed Mentor Project, Computing Research Association, 1875 Connecticut Ave. NW, Suite 718, Washington, DC 20009. Fax: 202-667-1066.

All materials are due February 1, 1996. Electronic submissions are encouraged; send e-mail to cra-mentor@cs.wisc.edu. Non-electronic information should be sent to Anne Condon, Computer Sciences Department, University of Wisconsin, Madison, WI 73706. Tel. 608-262-3158; fax: 608-262-9777.

Student criteria

Applicants should be female undergraduates (US citizens or permanent residents) who are attending a US college or university and who are seriously considering graduate studies in CS&E. First consideration will be given to sophomores and juniors (completing two or three years by summer 1996). However, first-year students with the skills needed for research and seniors considering graduate school later than September 1996 also may apply.

Primary criteria for selection are:

1) The student's experience and skills must match the needs of some professor's research project.

2) The student's record and recommendations should give some indication of the student's potential for success in graduate school.

3) The student's circumstances are such that she stands to gain the most from the experience—for example, students at institutions unable to offer research opportunities with female professors.

Professor criteria

Potential mentors should be female CS&E professors at US universities with active research programs into which the students may be integrated. The primary criteria for selection are:

1) The professor should have a research project suitable for undergraduates that matches the skills of some student applicants.

2) The professor's university environment should be conducive to the goals of the mentoring project. For example, an active graduate summer research population provides the protege with a window on future graduate life.

3) The professor should have demonstrated some skill in the delicate task of mentoring undergraduates.

Professors who already have funds to support undergraduates (e.g. through an REU supplement to an NSF grant) may still apply to be matched with a student. In such cases, CRA funding would be applied toward those students' travel expenses.

Mentors may request more than one student, especially if a single student would be isolated. However, we expect to limit awards to two students per mentor. Two or more mentors may submit a single application to jointly supervise one or more students.

Along with basic information (such as name and address), a curriculum vitae and a one-page research proposal, professors will be asked to provide information on the following:

• *Special requirements:* The basic skills students will be required to have, either in courses taken or other proficiencies. Highly specific and advanced skills requirements reduce the likelihood of a match. Let us know if you have particular students with whom you would like to work.

• *Mentoring skills:* Include information on your mentoring skills and experience. Indicate specific topics on which you can provide good advice. Are you willing to participate in an electronic discussion group involving other students and mentors?

• *Working environment and lodging information:* If possible, comment on the expected working environment for the student. Useful information includes opportunities for technical and social interaction with graduate students, and institutional commitment (office and computer facilities, access to institutional recreational facilities). To estimate costs, we need to know lodging costs per student. We encourage mentors to help students obtain low-cost lodging

COMPUTING RESEARCH NEWS

Vol. 7/No. 5/November 1995

Computing Research News (ISSN 1069-384X) is published five times per year: in January, March, May, September and November. Copyright 1995, all rights reserved, by the Computing Research Association (CRA), 1875 Connecticut Ave. NW, Suite 718, Washington, DC 20009. Tel. 202-234-2111; fax: 202-667-1066; e-mail: jbass@cra.org. Material in *CRN* is not endorsed by CRA nor intended to reflect any official positions of CRA or its board.

Change of Address: Please allow four weeks for an address change to become effective. Change of address notice should include old and new addresses with ZIP codes (please use ZIP+4 if available).

Postmaster: Send Form 3579 to CRA, 1875 Connecticut Ave. NW, Suite 718, Washington, DC 20009. Postage paid at Washington, DC.

Computing Research News Staff

Fred W. Weingarten, *Editorial Director*

Joan Bass, *Editor*

Juan Antonio Osuna, *Staff Reporter*

Computing Research News Editorial Board

John E. Savage, Board Chair, *Brown University*

Laszlo A. Belady, *Mitsubishi Electric Research Laboratories Inc.*

Ashok K. Chandra, *IBM Almaden Research Center*

Dorothy E. Denning, *Georgetown University*

Jim Foley, *Georgia Institute of Technology*

John Gannon, *University of Maryland*

Leah Jamieson, *Purdue University*

James Varah, *University of British Columbia*

Helen Wood, *National Oceanic and Atmospheric Administration*

Pipeline from Page 2

digest of their answers, broken down by gender and broad major field.

I've plotted the absolute numbers of high school students expressing interest in computer science separately for females and males, in Figures 1 and 2. These are area charts, so each line indicates the cumulative total of the majors mentioned below it. For example, Figure 1 shows that in 1994, about 60,000 high school females declared an intention to major in science and engineering (reading from the top line); about half of these females planned to major in the biological sciences. In Figure 2, we see that about 120,000 males intended to major in science and engineering in 1994; the majority of these males planned to major in engineering.

Among academic disciplines within science and engineering, computer science stands out as the only field with a downward trend in interest among high school females (see Figure 3). I'm particularly concerned by a sharp downward trend in 1991 through 1994, from 37% to 29%. I fear this eight-point drop in gender ratio among intended majors in 1991-94 portends an eight point drop in the gender ratio among CS bachelor's degree recipients in 1994-98. Note that the 1982-85 drop in gender ratio among intended CS majors occurred just before the 1985-88 drop in gender ratio among CS bachelor's degree recipients.

My intent in writing this column is to spark discussion of why computer science is becoming more gender-segregated at the undergraduate level. More importantly, what can we do about it? I hope you are inspired to discuss these questions with your friends and colleagues, send me e-mail at cthombor@cs.umn.edu, write something for publication or get involved in a mentoring or outreach program.

Clark Thomborson is a visiting professor at the University of Minnesota at Twin Cities. In early 1996 he will become a chaired professor of computer science at Auckland University in New Zealand.

Policy News

Need for supercomputer centers still exists

NEWS ANALYSIS

By Fred W. Weingarten
CRA Staff

The Task Force on the Future of the National Science Foundation Supercomputer Centers, chaired by Edward Hayes of Ohio State University, has been circulating a draft report guiding NSF on the renewal of grants for the centers.

The draft report was circulated for discussion, but reaction was fairly muted. *Science* magazine carried an article on it, and several researchers in the community commented on the document, which is still being refined. At press time, a final version still had not been presented for approval by the National Science Board (NSB). However, unless a crisis strikes, the report could well be approved by the time you read this article. The basic outline of the analysis and recommendations are clear, however, and unlikely to change significantly

The purpose of the report is to guide NSF in dealing with the upcoming expiration of the current set of agreements with the four national centers. The centers have been operating for nearly 10 years and are costly investments. Even in the best of times, NSF—in particular NSB—has been uncomfortable with large, open-ended commitments. And these are not the best of times. NSF's budget is likely to be flat or even shrink somewhat over the next five years. Congress has told the agency it should feel lucky to have

CS&E is hardly mentioned in the task force's draft report. So what does it have to do with our community? Plenty.

done as well as that. In that environment, any programmatic response by NSF to National Supercomputer Center renewal will be carefully scrutinized. That usually means several studies and reports will be done.

In this case, the task force comes about two years after the Blue Ribbon Committee chaired by Lewis Branscomb of Harvard University. Although it may seem redundant to keep studying such questions as the renewal of the supercomputer centers, it is quite typical for major government policy decisions to be based on a sequence of such efforts. This is how decisions get made and how agencies can be protected from undue political second-guessing.

A lot of money and institutional prestige are at stake. Although NSF decisions have been relatively immune from political considerations, there will no doubt be pressure brought to bear on any actions regarding either a recompetition or a renewal of funding. Many decision makers in government have to be convinced to go down a particular path, and because public money is being spent, a solid rationale and a careful record of deliberation has to be established. It is hoped that in the process, some consensus of the community can be found. I believe this report captures this with three commonsense observations:

• The supercomputer centers are still valuable resources.

• Given 10 years of change in the computational research environment since the first centers were established, the program needs to be refocused to reflect current realities.

• There needs to be a recompetition because of the refocus and because no research program should be automatically renewed without having to undergo an occasional peer-review competition.

As requested in the NSF director's charter for the task force, the report focuses much of its attention on defining the missions of the supercomputer centers. Their missions, at least in congressional eyes, always have been a blur of possibilities, drifting with the political climate. Missions have ranged from providing test beds for the supercomputer industry to developing software for Internet applications, from research in computer graphics to serving as cycle centers for scientific users.

The task force redefined the centers around research in computational science and research in support of the evolution of the National Information Infrastructure (NII), with some service for very high-end users still provided. The report also emphasized the need to move away from focusing on providing classical vector-processor cycles and toward access to alternative architectures, especially scalable parallel systems.

In recommending recompetition of the centers, the task force stood in contrast with the Branscomb report, which recommended renewal without recompetition. NSB rejected that recommendation, which likely was never politically salable for reasons stated above.

The task force did recommend that the recompetition be conducted under a revised format that stresses linkages among the centers and other smaller specialized centers of research in computational science and NII-related issues. The grants should be for five years, renewable for another five years.

Computer science and engineering is hardly mentioned in the task force report. This is not unexpected because it is, after all, a report about computer centers and computational science. So what does this have to do with computer science and engineering? Plenty

There are broad implications and

Continued on Page 5

CRN Subscription Form

Please check one:

❒ I want to subscribe 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 $25. Foreign subscriptions are $37.50 (US) in Canada and $47.50 (US) elsewhere.

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

Free Subscription Policy: *CRN* is mailed free to **1)** faculty members, administrators and full-time researchers in college and university computing departments; **2)** research staff members and administrators of non-profit and for-profit laboratories involved in computing research; and **3)** persons who affect policies related to computing research. Subscriptions are only available in the United States and Canada.

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: info@cra.org

CRA's Lazowska to testify at HPCC renewal hearing

Ed Lazowska, a CRA Board member and chair of the Committee on Government Affairs, was scheduled to testify for CRA on the High-Performance Computing and Communications Act at an October 31 hearing of the House Science Subcommittee on Basic Research. Lazowska is chair of the Department of Computer Science and Engineering at the University of Washington.

The HPCC Act is now four years into its five-year term, and the subcommittee is looking in to whether the law has been successful and if it should be reauthorized.

CRA has been active in the HPCC legislative debate for several years. It advised the (then) Committee on Science and Technology on the drafting of the original bill, including testimony by Paul Young, then chair of CRA. At that time, CRA strongly urged that the bill specifically establish support of basic research and human resources as one of the main program objectives.

Two years ago when a follow-on bill (HR 1757) was being considered by Congress, CRA again testified and participated in discussions on the shape of the legislation. That legislation was passed by both houses in different forms but never got out of a conference to reconcile the two. The problems arose not with the HPCC bill but with unrelated legislation in the Senate version.

Lazowska's testimony will be posted on CRA's Web page (http://cra.org).

The members of CRA's Government Affairs Committee are Lazowska, John Guttag of the Massachusetts Institute of Technology, Jeff Ullman of Stanford University, Robert Cartwright of Rice University, John White of the Xerox Palo Alto Research Center, William Wulf of the University of Virginia and Randy Katz of the University of California at Berkeley.

Weingarten joins advisory board

Rick Weingarten, CRA's director of government affairs, has been appointed by Secretary of Commerce Ron Brown to a four-year term on the Computer System Security and Privacy Advisory Board. The board was established by the Computer Security Act of 1987 to provide the Secretary of Commerce with advice on civilian computer security matters.

Policy News

NSF bill passes in Senate

The Senate passed a bill in late September containing appropriations for the National Science Foundation's 1996 budget.

The Senate bill would provide NSF with an overall $3.2 billion, topping the House version by $40 million. This difference is reflected only in the NSF research activities component, as all other accounts are identically funded by the House and Senate versions.

At press time, a House and Senate conference committee was expected to meet to reconcile any differences between the two bills.

The extra $40 million for research activities proposed by the Senate would bring 1996 funding for this account to $14 million more than the 1995 level.

Table 1. NSF Appropriations (in millions of dollars)

	1996 Request	House Approp.	Senate Approp.
Research & Related Activities	2,454	2,254	2,294
Education & Human Resources	599	599	599
Academic Research Infrastructure	100	100	100
Major Research Equipment	70	70	70
Salaries and Expenses	127	127	127
NSF Headquarters Relocation	5	5	5
Office of Inspector General	5	5	5
Total NSF Budget	**3,360**	**3,160**	**3,200**

Clinton threatens to veto 1995 omnibus science act

The House passed an amended version of the Omnibus Civilian Science Authorization Act of 1995 by a vote of 248-161 on October 12. President Clinton has threatened to veto the legislation if Congress passes it.

House Science Committee Chair Robert S. Walker (R-PA) introduced HR 2405 in late September. The bill authorizes fiscal 1996 and 1997 appropriations for the National Science Foundation, NASA, the Department of Energy, the National Institute of Standards and Technology, the National Oceanographic and Atmospheric Administration, the Environmental Protection Agency and the US Fire Administration. Total spending authorized for 1996 is $21.5 billion, $3 billion less than what was budgeted for those agencies in 1995 and about $3.3 billion less than the president's 1996 budget request for those agencies.

The seven separate authorization bills should be considered as a package "to make the point that science is a national issue deserving of major national attention…; to consider civilian science R&D as a whole, in order to set better priorities…; [and] to make it clear that science is vital to our long-term economic interests," Walker said in a press release. "With HR 2405, we are attempting to elevate science to the same kind of consideration that our defense priorities have always had."

The Clinton administration opposes the legislation. In a statement released by the White House in October, Vice President Al Gore said the legislation, which "seeks to eliminate critical investments in civilian technology, is unwarranted, unwise and unnecessary."

"Congress, through this bill, is taking direct aim at federal investments in high-risk, long-term research and development," Gore said. "This bill effectively eliminates those merit-based, cost-shared efforts, such as the Commerce Department's Advanced Technology Program and the Manufacturing Extension Partnership, that bridge the gap between basic research and commercial development of products."

A statement of administration policy said cuts in NSF's budget would mean that "investments in basic research and education will have to be curtailed." NASA's budget for High-Performance Computing and Communications would be decreased 50%, the statement said.

"The appropriation authorization levels for the Commerce Department's civilian technology programs are unacceptable. The fiscal 1996 authorization of appropriations for the entire National Institute of Standards and Technology of $338 million is $685 million less than the president's budget," the policy statement said. "Such a drastic cut will undermine the NIST labs' ability to provide the scientific and industrial community with the measurement base essential to industrial competitiveness and public health and safety."

Centers from Page 4

challenges for the S&E community, especially if the recommendations as presented in the draft are accepted by NSB and implemented by NSF. There is an interdependence of interests between the computational science and the CS&E communities. Further, computer science and engineering will play a major role in creating the NII, not just in advancing the fundamental underpinnings of high-speed data communication, but in pushing the fundamental science underlying major social applications such as educational technology and digital libraries.

I believe that, should NSB approve the task force recommendations, an immediate competition for renewal of the centers will begin. Inevitably, it will be a lengthy evaluation process, and time is running out before the existing grants expire. The competition would most likely be around the framework provided by the report: national supercomputer centers with a stronger research agenda and links with smaller, specialized research centers, some of which could have a strong computer science or computer engineering focus.

If this occurs, this will present an opportunity for the S&E and computational science communities to begin searching for some common ground and new collaborations that will benefit both communities.

NRC from Page 1

Web readers to read the background information carefully. One notable weakness has been documented by CRA Board Member Ed Lazowska of the University of Washington. This information also is on CRA's Web server.

Lazowska found pitfalls with a data field labeled "Median Years to Doctorate." According to the NRC's hard-copy report, one might think this number represents the number of years it takes to earn a Ph.D. However, it actually represents a time period that begins when a person enters any educational institution after getting a B.A. or B.S. degree. This means it includes the time it takes to get a master's degree—even if in an unrelated field at another school—as well as any interim time spent working between earning a master's degree and earning a Ph.D.

Using this definition, the average student takes 8.68 years to obtain a Ph.D. in computer science, far more than most researchers would expect. These numbers have drawn numerous inquiries from the community and serve to remind us of the pitfalls of misinterpreting survey results.

Despite these weaknesses, CRA believes the NRC data to be useful and unique enough to warrant attention. We, with the help of the community, will continue to serve as a gateway for such information while remaining aware of potential pitfalls.

The study was sponsored by the Conference Board of Associated Councils and funded by the Ford, Andrew W. Mellon, Alfred P. Sloan and the William and Flora Hewlett foundations and the National Academy of Sciences. The co-chairs of the Committee for the Study of Research-Doctorate Programs in the United States are Marvin L. Goldberger of the University of California at San Diego and Brendan Maher of Harvard University.

Copies of *Research-Doctorate Programs in the United States: Continuity and Change* are available from the National Academy Press at 2101 Constitution Ave. NW, Washington, DC 20418; tel. 202-334-3313 or 800-624-6242. The cost of the report is $59.95 (prepaid) plus shipping charges of $4 for the first copy and 50 cents for each additional copy.

OTA closes after 24 years

The Office of Technology Assessment closed Sept. 29 after serving for 24 years as the nonpartisan analytical agency that assisted Congress with complex technical issues.

Congress withdrew OTA's funding, leaving only a few staff members to assist with the closing. The telephone will be answered until Jan. 31, 1996 (tel. 202-224-3695).

To receive copies of OTA publications, contact Superintendent of Documents, PO Box 371954, Pittsburgh, PA 15250-7974; tel. 202-512-1800; fax: 202-512-2250. Publications are available on paper or microfiche from the National Technical Information Service. To confirm prices or to order, call tel. 703-487-4650; for rush orders, call tel. 800-553-NTIS.

OTA reports and background papers will be available for study at the University of Maryland at College Park, George Mason University in Virginia and the University of California at Santa Barbara.

Electronic versions of 1994 and 1995 reports are available at the agency's World Wide Web site (http://www.ota.gov). The site will be mirrored by the Government Printing Office (http://www.access.gpo.gov/ota), the National Academy of Sciences (http://www.nas.edu) and the Woodrow Wilson School of Public and International Affairs at Princeton University (http://www.wws.princeton.edu).

Strawn new NSF division head

George O. Strawn is the new head of the Division of Networking and Communications Research and Infrastructure within the National Science Foundation's Computer and Information Science and Engineering directorate.

He served previously as the NSFnet program director and comes from the Iowa State University Department of Computer Science and Computation Center, where he spearheaded the development of distributed computing facilities for research and education and has led several statewide networking initiatives.

In 1969 Strawn earned a Ph.D. in mathematics from Iowa State, where he remained for most of his career. His professional research interests include programming languages, library automation and the management of academic computing organizations.

Conference News

Hopper conference tapes now available

As general chair of the 1994 Grace Hopper Celebration of Women in Computing, I want to personally urge you to purchase for your department this set of 15 conference videolectures by leading women in computer science.

Although the technical quality of the materials is extraordinarily high and appropriate for both male and female audiences, the tapes provide inspiration for women. I wish such tapes, presenting senior role models in the field, had been available when I was in graduate school.

I believe every computer science department, library and guidance center should have this collection readily available to recruit women and inspire them to stay in the computer science field.

—*Anita Borg*

Conference Information

The First Grace Hopper Celebration of Women in Computing was held in Washington, DC, June 9-11, 1994. Its purpose was to celebrate the continuing achievements and contributions of women in computing.

The conference featured 17 leading women in computer science, each offering videolectures of 15 presentations. Due to technical difficulties, we are unable to offer the presentations by Irene Greif of Lotus Development Corp. and Elaine Cohen of the University of Utah.

Conference sponsors: CRA, ACM, IEEE Computer Society, Office of Naval Research, National Science Foundation, Digital Equipment Corp., Microsoft Corp., Motorola Corp., Sun Microsystems Inc., Unisys Corp., AT&T, Intel Foundation, Lotus Development Corp., Silicon Graphics Inc., Hewlett-Packard Co., Leonard X. Bosack & Bette M. Kruger Charitable Foundation, Xerox Corp., AAAI, Autodesk Corp. and Amy Pearl.

Videolecture Topics

Topic Category: Women in Computer Science (4 tapes, #1-4)

1) Women in Computer Science
Mildred Dresselhaus, Massachusetts Institute of Technology
Order #GMH-Dresselhaus — 55 minutes

2) Making Electronic Learning Environments Succeed for Girls and Boys
Maria Klawe, University of British Columbia
Order #GMH-Klawe — 38 minutes

3) Strategic Defense Research
Anita Jones, Defense Department
Order #GMH-Jones — 52 minutes

4) The Management Option
Panel Discussion. Moderator: Bronwyn Fryer, *Working Woman* magazine
Order #GMH-Panel-2 — 81 minutes

Topic Category: Object Technology (1 tape, #5)

5) The Structure of Distributed Programs
Barbara Liskov, Massachusetts Institute of Technology
Order #GMH-Liskov — 47 minutes

Topic Category: Software Engineering & Programming (3 tapes, #6-8)

6) Computers and Risk
Nancy Leveson, University of Washington
Order #GMH-Leveson — 39 minutes

7) Abstraction and Codification in Software Engineering
Mary Shaw, Carnegie Mellon University
Order #GMH-Shaw — 45 minutes

8) Language Implementation
Susan Graham, University of California at Berkeley
Order #GMH-Graham — 44 minutes

Topic Category: Information Superhighway (2 tapes, #9-10)

9) Encryption—A Sword That Cuts Two Ways
Dorothy Denning, Georgetown University
Order #GMH-Denning — 42 minutes

10) Information Highway: Computers and Policy Issues
Panel Discussion. Moderator: Barbara Simons, IBM Corp.
Order #GMH-Panel-1 — 80 minutes

Topic Category: Human-Computer Interaction (2 tapes, #11-12)

11) Cooperative Agents: Man and Human
Ruzena Bajcsy, University of Pennsylvania
Order #GMH-Bajcsy — 46 minutes

12) Collaborative Plans and Dialogue Participation
Barbara Grosz, Harvard University
Order #GMH-Grosz — 38 minutes

Topic Category: Natural Language (1 tape, #13)

13) Finding the Information Wood in the Natural Language Trees
Karen Sparck Jones, Cambridge University
Order #GMH-Sparck-Jones — 41 minutes

Topic Category: Parallelism (1 tape, #14)

14) Design Challenges in Massively Parallel, Fine-Grain Architectures
Mary Jane Irwin, Pennsylvania State University
Order #GMH-Irwin — 40 minutes

Topic Category: Compilers (1 tape, #15)

15) Compilers—New Challenges and New Directions
Fran Allen, IBM T.J. Watson Research Laboratory
Order #GMH-Allen — 41 minutes

University Video Communications Videolecture Order Form

E-mail Orders: uvc.lemon@forsythe.stanford.edu
Fax Orders: 415-813-0315
Telephone Orders: 800-900-1510
Mail Orders: PO Box 5129, Stanford, CA 94309

TAPE USER/VIEWER INFORMATION: (We cannot ship to PO boxes)
Name:_____
Title:_____
Department:_____
Organization:_____
Address:_____
Zip, Country:_____
Telephone:_____ Fax:_____
E-mail Address:_____

SHIPPING ADDRESS: (if different)
Name:_____
Department:_____
Organization:_____
Address:_____
_____

BILLING ADDRESS: (if different)
Name:_____
Department:_____
Organization:_____
Address:_____
_____

PAYMENT INFORMATION:
Please charge my credit card:
VISA:____ MasterCard:____
(We cannot accept American Express or Discover cards)
Name:_____
Card Number:_____
Signature_____(constitutes authorized signature)
Expiration Date:___/___

Please send invoice:_____
Purchase order number (not required):_____

****

1 tape: $29.99; 2 -14 tapes: $24.99/tape

Special UVC offer: For a limited time, you can order the full set (15 tapes) for $299.99 ($19.99/tape).

****

Format: NTSC (standard for USA, Japan, etc.): _____
PAL (Europe, Australia, etc.): _____

****

I WOULD LIKE TO ORDER THE FOLLOWING TAPES:
(Fill in the titles, prices and order numbers)

Title:	*Price:*	*Order Number:*
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Total cost of tapes: _____ ($US)

CALCULATE GRAND TOTAL USING SHIPPING COSTS BELOW.
ALLOW 30 DAYS FOR DELIVERY.

USA regular:	$6.99 for orders up to $50
(via UPS Ground)	$7.99 for orders up to $100
	$8.99 for orders up to $150
	$9.99 for orders up to $200
	(Plus $1 for each additional $50)
International:	$19.99 for orders up to $50
	$24.99 for orders up to $100
	(Plus $5 for each additional $50)

Total cost of tapes: _____
California residents add 7.75% tax _____
Total cost of shipping: Regular _____
Grand Total _____ ($US)

For more information, contact Anna Gloukhov.
E-mail: lemon@hera.eecs.berkeley.edu.

Professional Opportunities

CRN Advertising Policy

Send copy and payment for Professional Opportunities advertisements to Advertising Coordinator, *Computing Research News*, 1875 Connecticut Ave. NW, Suite 718, Washington, DC 20009. Tel. 202-234-2111; fax: 202-667-1066; e-mail: jbass@cra.org. E-mail submissions are preferred.

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

The rate is $2 (US) per word. Purchase orders, money orders and checks are acceptable (*please do not send cash*). All CRA members receive at least 200 free words per dues year. Advertisers may also request that their Professional Opportunities ads be posted to CRA's jobs@cra.org mailing list and the Jobs Index on CRA's home page. This service is free to our advertisers.

Professional Opportunities display ads cost $30 (US) per column inch. Ads must be submitted in camera-ready, offset (positives or negatives) or mechanical form. Please call for information on placing display ads for products or services.

Computing Research News is published five times per year: in January, March, May, September and November. Professional Opportunities ads with application deadlines falling within the month of publication will not be accepted unless the ad says applications will be accepted until the position is filled. Advertising copy must be received at least one month before publication. The deadline for the January issue is December 1.

Rensselaer Polytechnic Institute
Department of Computer Science

The Department of Computer Science invites applications for a tenure-track position at the level of assistant or associate professor. Postdoctoral and visiting appointments may also be available. Preference will be given to applicants in experimental computer science, particularly in databases, distributed systems, networking, parallel processing and software engineering. However, exceptional candidates in all areas will be considered. Applicants should have a doctorate in computer science (or a related area) and a commitment to excellence in research and teaching.

The department offers B.S., M.S. and Ph.D. degrees in computer science, has a multimillion-dollar research program and excellent computing facilities. Currently there are 16 full-time faculty members, approximately 250 undergraduate students, 60 master's students and 60 Ph.D. students.

Send resumes and at least three references to Professor Boleslaw Szymanski, Chair of New Staff Committee, Department of Computer Science, Rensselaer Polytechnic Institute, Troy, NY 12180-3590.

Rensselaer is an equal opportunity, affirmative action employer.

New York University
Department of Computer Science

The Department of Computer Science expects to have several faculty positions available beginning in September 1996 and invites applications at all levels. This includes both regular and visiting positions; the visiting positions can be for terms of one semester or a full year. Candidates for junior positions need to show evidence of strong research potential, and candidates for senior positions must have an outstanding track record. The department is most interested in candidates in systems areas such as distributed computing, networks, multimedia, operating systems, and real-time and fault-tolerant computing. Successful candidates are expected to pursue an active research program and, in the case of junior candidates, to show potential for leadership; senior candidates must have a proven leadership track record. In addition, successful candidates are expected to participate in teaching core courses at all levels. The department welcomes applications from women and underrepresented minorities.

The department also is interested in junior or senior candidates with a proven track record in interdisciplinary research combining computer science and a science area (e.g., biology, chemistry, physics, medical science) or finance. A senior candidate must have a proven leadership track record.

The Computer Science and Mathematics departments together form the Courant Institute of Mathematical Sciences, a division of New York University. The Computer Science Department has 25 regular faculty and a number of visiting, adjunct and research faculty members. The department maintains a state-of-the-art computing environment consisting of more than 100 workstations. In addition, there are specialized research facilities for graphics, multimedia, parallel and distributed computing and computer vision.

Substantial external funding, at the level of $6 million per year, from AFOSR, ARPA, DOE, NIH, NSF, ONR, New York State and from industry supports research in a broad array of areas, including algorithms, artificial intelligence, compilers, computer graphics, databases, distributed and parallel computation, multimedia, natural languages, numerical analysis, programming languages and computer vision. There are considerable opportunities for collaborative research; presently there are joint projects with industrial laboratories AT&T and IBM and with the following university departments/divisions: Chemistry, Mathematics, Psychology, the Center for Neural Sciences, the Medical School, Stern School of Business and the Tisch School of the Arts.

New York University, the largest private university in the country, is located in Greenwich Village, one of the most attractive residential areas of Manhattan. Applications should be sent to Professor Richard Cole, Chair, Department of Computer Science, New York University, 251 Mercer St., New York, NY 10012-1185.

To ensure full consideration, please submit your application by Jan. 4, 1996. The search will continue until all positions are filled. Early application is encouraged. Please refer to the department's home page (http://cs.nyu.edu) for more information.

The university is an equal opportunity, affirmative action employer.

Duke University
Department of Computer Science

We invite applications and nominations for two positions, starting September 1996: a tenure-track or tenured position in experimental systems and a tenure-track position in artificial intelligence. Areas of primary interest in experimental systems include high-speed networks, software development environments, operating systems, databases and object-oriented systems, multimedia, parallel processing, graphics and algorithm animation, compilers, programming languages, and computer architecture and digital systems design. Areas of primary interest in artificial intelligence include robotics and intelligent systems, natural language processing, planning, knowledge representation, reasoning systems, learning, automatic programming, collaborative agents, multimodal communication, and AI architectures and languages.

The department has major research efforts and funding in the areas of systems and architecture, algorithms, scientific computing and artificial intelligence. Facilities include a CM-5 parallel computer, more than 120 computers and high-performance graphics workstations and access to a variety of supercomputers through MCNC in nearby Research Triangle Park. A newly funded research instrumentation project will bring in networks of workstations for collaborative computing. The department also is connected to the North Carolina Information Highway, the first fully integrated and functioning high-speed statewide network in the United States.

The department relocated in 1994 into spacious new quarters in the $80 million Levine Science Research Center, a state-of-the-art facility devoted to interdisciplinary research in computer science, environmental science, biomedical science and engineering, and medicine.

The Durham, N.C., area, which was rated in recent years by *Money* and *Fortune* magazines as the best place in the United States to live and work, offers a wide variety of professional, cultural and recreational attractions.

Applications should include a curriculum vitae, a list of publications and copies of the most important publications. A Ph.D. in computer science or a related area is required. Applicants also should request at least four letters of reference to be sent directly to the faculty search chair. To guarantee full consideration, applications and letters of reference should be received by Feb. 1, 1996, by Professor Alan Biermann, Faculty Search Chair, Department of Computer Science, Duke University, Durham, NC 27708-0129.

Duke University is an affirmative action, equal opportunity employer.

New York University
Department of Computer Science

The Department of Computer Science expects to have a visiting faculty position available for the spring semester of 1996 and invites applications for this position. The position requires the visiting faculty member to teach two courses. Particular areas of need are M.S.-level courses in computer architecture and/or networks and communications. There are considerable opportunities for interaction with other faculty members and for participation in ongoing research projects.

The Computer Science and Mathematics departments together form the Courant Institute of Mathematical Sciences, a division of New York University. The Computer Science Department has 25 regular faculty and a number of visiting, adjunct and research faculty members. The faculty is engaged in research in a broad array of areas, including algorithms, artificial intelligence, compilers, distributed and parallel computation, databases, graphics, multimedia, natural languages, numerical analysis, programming languages and computer vision.

New York University, the largest private university in the country, is located in Greenwich Village, one of the most attractive residential areas of Manhattan.

Applications should be sent to Professor Richard Cole, Chair, Department of Computer Science, New York University, 251 Mercer St., New York, NY 10012-1185.

To ensure full consideration, please submit your application by Nov. 30, 1995; the search will continue until all positions are filled. Early application is encouraged. Please refer to the department's home page (http://cs.nyu.edu) for further information.

The university is an equal opportunity, affirmative action employer.

Rice University
Department of Computer Science

The Department of Computer Science and the Center for Research on Parallel Computation at Rice University expect to have a number of positions available beginning in the academic year 1996-97 and invite applications for faculty and research staff positions. We are interested in receiving applications for appointments to the tenure-track faculty at the rank of assistant professor (however, appointment as associate or full professor will be considered for exceptionally well-qualified candidates); to the research faculty, which may be at the rank of faculty fellow, senior faculty fellow or distinguished faculty fellow; and to the research staff as a research scientist or postdoctoral research associate.

We are especially interested in candidates with research experience in artificial intelligence, compilers, computer graphics and geometric modeling, computer systems, database management systems, networks, programming languages, parallel computing and theory of computer science. We will consider strong candidates in other areas as well.

Applicants should hold a Ph.D. degree or the equivalent in computer science or a related discipline or expect to complete such requirements prior to assuming an appointment. Strong evidence of a commitment to excellence both in research and teaching is required for a tenured or tenure-track appointment. Preference will be given to early applications.

The Department of Computer Science offers four degrees: Bachelor of Arts, Master of Computer Science, Master of Science and Doctor of Philosophy. NSF Educational Infrastructure, Research Infrastructure and Science and Technology Center grants, along with major grants and contracts from both industrial organizations and government agencies, have enabled the department to build a superb research facility, including parallel and multiprocessor systems, a large network of engineering workstations, extensive local area network, a high-speed-network test bed and access to the scientific communities via NSF, NASA and Department of Energy electronic networks. The Center for Research on Parallel Computation supports several major research projects and provides access to massively parallel computer systems located at several cooperating institutions.

Rice is a well-endowed private university with a strong reputation for academic excellence, particularly in undergraduate teaching. It attracts outstanding students nationally and internationally and provides a stimulating environment for research, teaching and joint projects with industry. Teaching loads are low to accommodate faculty research, and faculty salaries are competitive.

Send a resume, along with the names and addresses of at least three references, to the Faculty Search Committee, Department of Computer Science MS 132, Rice University, 6100 Main St., Houston, TX 77005-1892 before Jan. 15, 1996. Please specify the position for which you are applying. If there are any questions, please call Iva Jean Jorgensen at tel. 713-527-4834 or send e-mail to ivy@rice.edu.

Rice University is an equal opportunity, affirmative action employer.

Allegheny College
Department of Computer Science

The Department of Computer Science is seeking applicants for a tenure-track position beginning in August 1996. Qualifications include a Ph.D. in computer science, demonstrated excellence in teaching and a commitment to a continuing contribution to the discipline. Responsibilities include teaching and advising undergraduates and contributing to the research program for undergraduates. Salary and rank will be commensurate with credentials and experience.

Allegheny College is a selective, private liberal arts college in northwestern Pennsylvania adjacent to lakes and parks, with a climate conducive to winter and summer recreation. The college serves 1,750 residential students with about 160 faculty. The department currently has four faculty members and graduates five to 15 majors each year.

The computer science curriculum consists of basic courses, including discrete mathematics; a four-course core covering the essence of the discipline; elective advanced and applications courses; and a capstone senior thesis. Department facilities include laboratories equipped with a network of workstations, a network of transputers and a connection to the college's campuswide network. More information is available on the World Wide Web at http://www.allegh.edu.

Send a letter of application, a curriculum vitae and applicable transcripts and arrange to have three letters from references—at least one of whom can comment on teaching—sent to Dr. Robert D. Cupper, Professor and Chair, Department of Computer Science, Allegheny College, Meadville, PA 16335. Tel. 814-332-2881; e-mail: cupper@sparc1.allegh.edu.

Review of applications will begin Nov. 15, 1995, and continue until the position is filled.

Allegheny College is an equal opportunity employer. Women and minorities are strongly encouraged to apply.

Stevens Institute of Technology
Department of Electrical Engineering and Computer Science

Applications are invited for tenure-track faculty positions at all professorial ranks. Applicants should have a Ph.D. in computer science or computer engineering and should show a strong commitment to and evidence of exceptional research and teaching. The EECS Department is currently seeking applicants in software engineering, database systems, graphical user interfaces, computer graphics, operating systems and artificial intelligence.

The department offers bachelor's (programs are accredited by ABET and CSAB), master's, engineer's and Ph.D. degrees in electrical engineering, computer engineering and computer science. Stevens is located on the west bank of the Hudson River opposite New York City. There are approximately 1,400 undergraduate and 1,600 graduate students. Information about the EECS Department and Stevens may be found on the World Wide Web at http://mengr.ecs.stevens-tech.edu.

Send your curriculum vitae, with the names of four references, to Professor A. Satyanarayana, Chair, Faculty Search Committee, Department of Electrical Engineering and Computer Science, Stevens Institute of Technology, Castle Point on the Hudson, Hoboken, NJ 07030. E-mail inquiries to asatya@stevens-tech.edu. Review of applications will begin immediately and continue until the search is complete.

Stevens is an equal opportunity, affirmative action employer.

Continued on Page 8

Professional Opportunities

Jobs from Page 7

Washington University, St. Louis
Department of Computer Science

The Department of Computer Science at Washington University is expanding its research program and invites applications for regular (tenure-track) faculty positions. Applicants should hold a Ph.D. or D.Sc. degree in computer science and have a strong commitment to and record of accomplishment in research. The search will focus on candidates at the assistant professor level.

Washington University is a leading national university with about 11,000 students and exceptional professional schools in medicine, engineering, business, law, architecture, social work and fine arts. It has an endowment of $1.7 billion and annual federal research support of approximately $165 million. The Computer Science Department is in the School of Engineering and Applied Science; it has about 200 undergraduate majors, 80 graduate students and 16 faculty and has annual external research funding of approximately $3.5 million. The department plans to grow to about 20 faculty by the end of the decade in order to expand its research and graduate programs while continuing to enhance its already outstanding undergraduate program.

The department and its associated research laboratories have exceptional facilities to support computing research, including more than 150 workstations and file servers and a variety of specialized equipment, including a Sun System 2000 multiprocessor, a Convex supercomputer and a complete computer visualization laboratory. An experimental 11-node ATM network has been constructed to demonstrate multimedia networking applications ranging from full-rate video distribution to electronic radiology. The network supports multimedia networking to every faculty member's office. An NSF research infrastructure grant is providing support to expand this further and to extend the ATM network to collaborating faculty members across the university

The department seeks outstanding candidates whose research is directed toward solving important problems in computer science and technology. A major research focus in the department over the next several years will be distributed multimedia computing and communications systems. Consequently, the department is particularly interested in individuals with an interest in distributed computing, high-speed networks, high-performance computing and advanced user interfaces. The department also has strong research interests in artificial intelligence and the computational sciences. Applications from outstanding candidates in these and other areas are also welcome.

Washington University is located on a pleasant 168-acre suburban campus adjacent to Forest Park, one of the largest municipal parks in the country and home to the St. Louis Zoo, the Art Museum and the Science Center. St. Louis is a delightful place to live, with many fine residential neighborhoods, a minimum of urban hassles and all the amenities one expects of a major metropolitan area, including a world-class symphony orchestra; professional baseball, football and hockey teams; one of the world's most beautiful botanical gardens; and a rich and varied theater community

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

Applications will be considered as they are received. Those received after Dec. 1, 1996, may not receive full consideration.

Washington University is an equal opportunity, affirmative action employer

Worcester Polytechnic Institute
Department of Computer Science

The WPI Department of Computer Science invites applications for one or possibly two tenure-track positions at the assistant or the associate level, beginning August 1996. Preference will be given to candidates with expertise in theoretical computer science, software engineering or operating systems/networks. Excellent candidates in other areas also will be considered. Candidates must have a Ph.D. in computer science or a related field and strong interests in both research and teaching

Worcester Polytechnic Institute, the nation's third oldest college of engineering and science, has approximately 2,700 undergraduate students, 1,000 graduate students and 200 faculty. Its innovative, project-based undergraduate program, the WPI Plan, offers students a flexible, exciting and academically challenging alternative to traditional science and engineering curricula.

Situated west of Boston, Worcester offers access to New England's diverse cultural and recreational resources and provides opportunities for urban, suburban or rural lifestyles.

Please send a resume and the names, addresses and e-mail addresses of three professional references to Dr. Robert Kinicki, Department Head, Computer Science Department, Worcester Polytechnic Institute, 100 Institute Road, Worcester, MA 01609. E-mail: rek@cs.wpi.edu. Application deadline: Dec. 31, 1995.

To enrich education through diversity, WPI is an affirmative action, equal opportunity employer

University of Illinois, Urbana-Champaign
Department of Electrical and Computer Engineering

The Department of Electrical and Computer Engineering anticipates possible tenure and tenure-track faculty appointments in computer engineering, particularly in the area of computer architecture. Applicants must have outstanding academic credentials and an ability to teach effectively at both the graduate and undergraduate levels. Selected candidates will be expected to initiate and carry out independent research and to perform academic duties associated with our B.S., M.S. and Ph.D. programs. A Ph.D. is required. Salary open, based on qualifications. Starting date is negotiable. Applications must be received by Jan. 15, 1996, to receive full consideration.

Send resume, including at least three references, to Dr. Sung-Mo (Steve) Kang, Department Head, Electrical and Computer Engineering Department, 1406 W. Green St., Urbana, IL 61801. Tel. 217-244-0968.

The University of Illinois at Urbana-Champaign is an affirmative action, equal opportunity employer

University of Arizona
Department of Computer Science

Applications are invited for the position of lecturer or senior lecturer beginning in August 1996. Lecturer candidates must hold a graduate degree in computer science or a closely related field, should have a strong commitment to excellence in teaching and must have substantial experience teaching computer science at the university level. Compensation is competitive and depends on experience and qualifications. This is a non-tenured position, with appointments for a fixed term of three years and re-appointment possible at the end of this period.

Duties of this position include teaching undergraduate computer science courses in areas such as software and software design, machine organization and architecture, data structures or foundations of computing. Duties also include academic advising of students, service on department committees involved in undergraduate life and development of new curriculum and instructional laboratories.

The CS Department at Arizona has a dozen graduate faculty, with a history of awards in teaching excellence, research accomplishment, influential software distribution and substantial external funding. Areas of research and curriculum include software systems, programming languages, compilers, operating systems, networks, parallel algorithms, database systems, computational biology and theory of computation. There are approximately 40 doctoral students, 40 master's and 85 undergraduate majors in the department's programs. In addition to a broad range of equipment necessary to computing research and instruction, the department supports its instruction and research programs through an exceptional professional laboratory staff. For more information about the department, see the Web site at http://www.cs.arizona.edu.

Applicants must send a curriculum vitae and the names of at least three references to Faculty Recruiting Committee, Department of Computer Science, Gould-Simpson Building, Room 721, 1040 E. Fourth St., The University of Arizona, Tucson, AZ 85721. A majority of the references should be able to comment directly upon the candidate's teaching experience and abilities. Applications will be reviewed beginning Jan. 15, 1996, but the position will remain open until filled.

The University of Arizona is an equal employment opportunity, affirmative action, ADA-compliant employer

University of Arizona
Department of Computer Science

Applications are invited for tenure-track faculty positions beginning August 1996. These positions are at the assistant professor level, although appointments at higher levels will be considered for highly qualified candidates. The key criterion in applicants is quality. Assistant professor candidates must hold a doctorate in computer science or a related field, have a commitment to excellence in teaching and have demonstrated strong potential for excellence in research.

The CS Department at Arizona has a dozen graduate faculty, with a history of research accomplishment, influential software distribution and substantial external funding to individual faculty that exceeded $2.5 million last year Major funding has included two NSF Institutional Infrastructure grants over the past decade and a Research Infrastructure grant funded this year. Research areas include software systems, programming languages, compilers, operating systems, networks, parallel algorithms, database systems, computational biology and theory of computation. There are approximately 40 doctoral students, 40 master's and 85 undergraduate majors in the department's programs. In addition to a broad range of equipment necessary to computing research, the department supports its instruction and research programs through an exceptional professional laboratory staff. For more information about the department, see the Web site at http://www.cs.arizona.edu.

Applicants must send a curriculum vitae and the names of at least three references to Faculty Recruiting Committee, Department of Computer Science, Gould-Simpson Building, Room 721, 1040 E. Fourth St., The University of Arizona, Tucson, AZ 85721. Applications will be reviewed beginning Jan. 15, 1996, but the positions will remain open until filled.

The University of Arizona is an equal employment opportunity, affirmative action, ADA-compliant employer

University of Texas, Austin
Department of Computer Sciences

The Department of Computer Sciences of the University of Texas at Austin invites applications for tenure-track positions at all levels, particularly at the assistant professor level. Of interest to the department are candidates whose research accomplishments are in experimental systems that would broaden and complement the research interests of our faculty in architecture, compilers, databases, graphics, networking, operating systems, robotics and scientific computing. Candidates must hold or be making satisfactory progress toward a Ph.D. or equivalent degree in computer science or a related area, with a reasonable expectation of completion by Aug. 31, 1996. Offers of employment are contingent upon completion of the Ph.D. degree requirements by that date. Successful candidates are expected to pursue an active research program, perform both graduate and undergraduate teaching and supervise graduate students.

The department is ranked among the top 10 Computer Science Departments in the country. It has 40 faculty members throughout all areas of computer science. Austin, the capital of Texas, is located on the Colorado River at the edge of the Texas Hill Country. Live music and outdoor recreation are among the many attractions of this beautiful area. Austin is also a center for high-technology industry, including AMD, Dell, IBM, MCC, Motorola, Sematech, and Tandem and TI.

Applicants should submit a curriculum vitae, a statement of research interests, a list of references and up to three representative publications by Jan. 15, 1996, to Professor Simon S. Lam, Recruiting Committee Chair, Department of Computer Sciences, The University of Texas at Austin, Austin, TX 78712-1188.

Letters of reference will be sought separately Women and minority candidates are especially encouraged to apply. The University of Texas is an equal opportunity, affirmative action employer

University of Tennessee
Department of Computer Science

The Department of Computer Science seeks to fill a tenure-track faculty position at the rank of assistant professor beginning fall 1996. Applicants should have a strong interest in research, preferably in the areas of networking, database or theory, but all major fields in computer science may be considered. Applicants should have a doctoral degree in computer science or a related area.

Departmental Sun, IBM, SGI and DEC workstations abound for students and faculty and are fully networked. In addition, the department has parallel computers of various architectures (for example, Intel iPSC/860, Thinking Machine CM-5, Sequent Symmetry and Maspar-2). The department was one of the major developers of PVM so both prototype and production versions are available to link these computers into a single, extremely powerful resource. The department recently received an NSF Small-Scale Infrastructure Award and is part of the National Science Foundation Science and Technology Center for Research in Parallel Computing. Faculty members collaborate with scientists at the Oak Ridge National Laboratory and have access to their facilities, including a 2,048-processor and a 512-processor Intel Paragon.

Please respond to search@cs.utk.edu. The mailing address is Search Coordinator, Department of Computer Science, 107 Ayres Hall, The University of Tennessee, Knoxville, TN 37996-1301. Additional information about the department is available from URL http://www.cs.utk.edu.

UTK is an equal opportunity, affirmative action, Title IX, Section 504, ADA employer

University of Denver
Department of Mathematics and Computer Science

The department anticipates filling one tenure-track position in computer science at the assistant professor level starting in fall 1996. Candidates must have a Ph.D. in computer science or a related field. We are seeking a candidate in the areas of operating systems, networks or parallel/distributed systems.

The University of Denver is a medium-sized (8,000 students) private university with a strong emphasis on teaching and research. Class sizes are small, the teaching load is moderate, and the salary is competitive. The department offers bachelor's and master's degrees in either mathematics and computer science or a combined Ph.D. in mathematics and computer science.

Departmental facilities include a Sun SPARCStation network with a SPARC file server and workstation laboratory, and networked IBM and Macintosh microcomputer labs. The University Computing Center provides access to the Internet and to the Colorado Supernet for supercomputing facilities.

Applications will be accepted until the position is filled. Screening of candidates will begin Jan. 1, 1996. Resumes and three letters of recommendation should be sent to Chair, Faculty Search Committee, Department of Mathematics and Computer Science, University of Denver, Denver, CO 80208-0189.

The University of Denver is committed to enhancing the diversity of its faculty and staff and encourages applications from women, minorities, disabled persons and veterans.

Purdue University
Department of Computer Sciences

The Department of Computer Sciences seeks a highly qualified person dedicated both to research and teaching to support its interdisciplinary graduate program in computational science and engineering. Areas of specialization appropriate for this tenure-track assistant professor position include scientific computing, high-performance computing, geometry systems, mathematical software, applications of computing to science and engineering, and related areas. The department has a number of substantial research projects in this area. More information about the CS&E program is available on the WWW at http://www.cse.purdue.edu/.

The CS Department computing facility includes a 64-processor nCube 2, more than 200 workstations and a complete video production facility. Purdue also owns Intel and IBM parallel computers and is a member of the Concurrent Supercomputing Consortium, which operates a 540-processor Intel Paragon. The CS&E lab has high-performance graphical machines and multimedia educational facilities.

Applications are solicited for appointments to begin in August 1996. Send curriculum vitae and ask three references to send letters by March 1, 1996, to Chair, CS&E Search Committee, Department of Computer Sciences, Purdue University, W. Lafayette, IN 47907.

Purdue University is in a college town where the schools are excellent, commuting is easy, the cost of living is reasonable, and there is a full range of athletic and cultural events at the university

Purdue University is an equal opportunity employer

Purdue University
Department of Computer Sciences

The department has more than 30 faculty members in operating systems, networks, programming languages, database systems, software engineering, solid modeling, theory and numerical computation. The department invites applications at all professorial levels in any area of computer science with preference for young people in systems and software. There also is a position open in computational science and engineering

The department affords great opportunities for exciting research. Each faculty member has access to the departmental computing facilities (many Sun file/compute servers, a 64-processor nCube 2 and many workstations), to the computing center's Intel Paragon supercomputer and to national computer networks. You must have, or be about to receive, a Ph.D. (or equivalent experience) in computer science or a related discipline.

Purdue University is part of the Lafayette metropolitan area, where the schools are excellent, commuting is easy, and the cost of living is reasonable. Salary is competitive and depends on background and experience. Submit resume and ask three references to write by March 1, 1996, to Chair, Personnel Committee, Department of Computer Sciences, Purdue University, West Lafayette, IN 47907.

Purdue University is an equal opportunity, affirmative action employer

Professional Opportunities

Michigan State University
Department of Computer Science

The Department of Computer Science invites applications for three anticipated tenure-stream positions at the assistant professor level (position numbers ENG 128, ENG 143, ENG 004). Candidates from all areas of specialization in computer science or computer engineering will be considered. However, the department has a special interest in candidates in the areas of software engineering, software systems, computer graphics and visualization, robotics, database and theory. The research foci of the department include artificial intelligence and knowledge based systems, computer architecture and design automation, high-speed networks and performance, parallel and distributed computing systems and algorithms, pattern recognition and image processing, database systems, analysis of algorithms and theory of computation, and formal methods for software systems. Candidates should have a Ph.D. in computer science or computer engineering and have a strong interest in both research and teaching. The appointments will begin in August 1996. For full consideration, applications should be submitted by Jan. 8, 1996. However, applications will be accepted until the positions are filled.

As a unit within the College of Engineering at Michigan State University, the department offers the Bachelor of Science, Master of Science and Doctor of Philosophy degrees. It also jointly administers a Bachelor of Science degree in computer engineering with the Electrical Engineering Department. The department has received extensive funding for support of its instructional and research activities from a broad spectrum of companies and government agencies, local and national. The department currently has 23 tenure-stream faculty and an enrollment of approximately 160 graduate students and 400 undergraduates. Special support is available from within the college and university to initiate research by new faculty members. Faculty offices and laboratories are connected to the MSUnet, which provides access to an array of campus computing resources, including the facilities of the College of Engineering, the department's Pattern Recognition and Image Processing Laboratory, the Intelligent Systems Laboratory, the High-Speed Network and Performance Laboratory, the Multimedia Laboratory and the Advanced Computing Systems Laboratory. The computing facilities in the department include more than 200 high-end workstations, two workstation clusters interconnected by high-speed networks and other specialized research equipment.

Michigan State University enjoys a park-like campus of 2,100 developed acres and 3,100 acres of experimental farms, outlying research facilities and natural areas. The campus is adjacent to the cities of East Lansing and the capital city Lansing. The Greater Lansing area has approximately 250,000 residents. The communities have excellent school systems and place a high value on education.

Applicants should send a letter of intent, a resume, the names of three references and a statement of research and teaching interests to Faculty Search Committee, A714 Wells Hall, Michigan State University, East Lansing, MI 48824-1027. E-mail: search@cps.msu.edu.

For additional information about the department, college and the university, see the http://www.cps.msu.edu.

Michigan State University is an equal opportunity, affirmative action institution. Persons with disabilities have the right to request and receive reasonable accommodations.

Position Numbers ENG 128, ENG 143 and ENG 004.

York University
Department of Computer Science

Applications are invited for tenure-track and/or contractually limited term positions at the assistant professor level.

The department plans to increase its overall strengths and has particular interest in areas such as computer and software systems, parallel processing and architecture, programming languages and databases. But excellent candidates from other areas are encouraged to apply. A recent doctoral degree in computer science is required. Applicants must demonstrate strong potential for excellence in research and teaching at both graduate and undergraduate levels.

The Department of Computer Science at York includes more than 25 faculty members, and it recently moved to expanded facilities in the new Chemistry and Computer Science Building. For more information see http://www.cs.yorku.ca/. York University is the third largest university in Canada. It is located in Metropolitan Toronto and is within easy reach of downtown Toronto.

Applications, with curriculum vitae and the names of four references, should be sent to Patrick Dymond, Chair, Department of Computer Science, CCB 126, Faculty of Pure and Applied Science, York University, North York, ON, Canada M3J 1P3.

Applications should be received by Dec. 31, 1995, although later applications received before Feb. 15, 1996, may be considered if positions are still available.

York University is implementing a policy of employment equity, including affirmative action for women faculty members. In accordance with Canadian Immigration requirements, this advertisement is directed to Canadian citizens and permanent residents. These appointments are subject to budgetary approval.

Lehigh University
Department of Electrical Engineering and Computer Science

The Department of Electrical Engineering and Computer Science seeks applicants for a tenure-track position in computer engineering. Candidates must have a Ph.D. in computer engineering or a related area. We require a strong commitment to teaching and evidence of innovative research through appropriate journal publications. We offer programs in computer engineering, computer science and electrical engineering leading to a Ph.D. degree.

Please send curriculum vitae and names of at least three references to Dr. Meghanad Wagh, Faculty Search Committee, Department of Electrical Engineering and Computer Science, Lehigh University, Bethlehem, PA 18015.

Lehigh University is an affirmative action, equal opportunity employer. Women and minorities are encouraged to apply.

University of Georgia
Department of Computer Science

Applications are invited for assistant professor starting September 1996. Preferred specialties are computational science and parallel or distributed systems. Applicants must have a Ph.D. in computer science or a related discipline before September 1996.

Send curriculum vitae and the e-mail addresses of four references to Dr. R.E. Caufield, Head, Department of Computer Science, University of Georgia, Athens, GA 30602-7404. Only applications received by Jan. 16, 1996, are ensured full consideration.

The university is an equal opportunity, affirmative action employer. We encourage applications from women and minorities.

Arizona State University
Department of Computer Science and Engineering

The department invites outstanding candidates for tenure-track faculty positions in all areas of computer science, but especially in software engineering. Applicants are required to have completed a Ph.D. in computer science, computer engineering or a closely related field by the date of appointment and must show exceptional promise in teaching and research.

Arizona State University is a major research university widely recognized as one of the most rapidly emerging educational institutions in the United States. The main campus is in the city of Tempe, in the metropolitan Phoenix area. The College of Engineering and Applied Sciences has been recognized for its innovative Engineering Excellence Program, a three-way partnership among state government, the university and high-technology industry.

Applicants must include a curriculum vitae, a selection of most important publications and the names and addresses of four references. Direct applications to Dr. Stephen S. Yau, Chair, Department of Computer Science and Engineering, Arizona State University, Tempe, AZ 85287-5406. E-mail: cs-facsearch@asu.edu.

Questions and inquiries may be submitted by e-mail, but applications and nominations must be received by post. The closing date is Jan. 4, 1996. Applications received after that date will be reviewed the 15th of each month as necessary until the positions are filled. Salary is competitive.

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

Indiana University
Department of Computer Science

The Indiana University Department of Computer Science seeks to fill the positions below. The department occupies a recently renovated spacious, limestone building and has extensive state-of-the-art computing facilities. The attractive wooded campus of Indiana University is located in Bloomington, voted one of the most cultural and livable small cities in the United States, and it is a short drive from the Indianapolis airport.

Faculty: To fill several tenure-track positions, we are looking for outstanding researchers at the forefront of their fields who will also make strong contributions to the educational mission of the department.

We plan to enhance, over the next few years, our existing prominence in programming languages, and to expand our faculty in the core of the subject as well as in aspects of applied logic, scientific computing and cognitive science that pertain to programming languages. The positions this year are slated at the assistant professor level, but senior appointments might become possible for truly exceptional candidates.

Visiting faculty: To fill at least one position of visiting assistant professor we are seeking recent recipients of Ph.D. in computer science or a related field who have a strong commitment to both teaching and research. Positions are for a two-year period, extensible to three years. Salary is competitive and dependent on experience and qualifications. These positions offer excellent early career opportunity for experience in research and teaching. Teaching assignments will include courses at all levels, in a dynamic and forward-looking instructional environment. The department has strong research programs in a variety of areas, in particular: programming languages, applied logic, scientific computing and cognitive science. An exceptionally dynamic suite of colloquia and seminar programs offers added professional opportunities.

To be given full consideration, faculty and visiting faculty applications must be received by Jan. 31, 1996. Please send a detailed curriculum vitae and a list of references to Faculty Search, Computer Science Department, Indiana University, Bloomington, IN 47405. E-mail: search@cs.indiana.edu.

Director of computing facilities: The department seeks a computer scientist for director of its computing facilities.

Responsibilities include leading a team of eight technical specialists; managing the departmental computing and information environment for its educational, research and administrative missions; and supporting computer science research projects. We expect broad technical expertise in hardware and software systems, including developing and maintaining a mixed Unix/PC-based network in a research environment. In addition, the prospective director must have managerial experience in leading software and hardware technical teams.

Of particular interest are candidates with a Ph.D. in computer science who value involvement in part-time teaching and research as well as in planning and managing the department's sponsored external funding and contracts. Salary is highly competitive and depends on experience and qualifications.

Applications will be considered as they are received, starting immediately, and until the position is filled.

Please send a detailed curriculum vitae and a list of references to Facilities Director Search, Computer Science Department, Indiana University, Bloomington, IN 47405. E-mail: facility-search@cs.indiana.edu.

Indiana University is an equal opportunity, affirmative action employer.

Auburn University
Department of Computer Science and Engineering

The Department of Computer Science and Engineering invites applications for a tenure-track faculty position beginning Oct. 1, 1996. Responsibilities include research, graduate student supervision, and graduate and undergraduate teaching. Applicants should have a Ph.D. in computer engineering, computer science or a closely related field. We are particularly interested in candidates with research interests in software engineering, computer and communication networks, and databases. The appointment will be made at the assistant professor level.

The department currently has 11 full-time faculty members and supports strong undergraduate and graduate programs. Faculty research areas include parallel computation, software engineering, artificial intelligence, computer and communication networks, and human-computer interaction. Departmental resources include a network of Sun workstations linked to the College of Engineering's Sun network and to the Internet. Parallel computing research is supported by a 32-processor nCube and a network of 16 T800 transputers.

Auburn University, with more than 21,000 students, is Alabama's land-grant university, located 100 miles southwest of Atlanta. More information about the department and faculty research interests can be obtained from the department's WWW home page. The URL is http://www.eng.auburn.edu/department/cse/csehome.html.

Applicants should send a curriculum vitae and the names, addresses and telephone numbers of three references to Professor Stephen B. Seidman, Head, Department of Computer Science and Engineering, Auburn University, AL 36849-5347. Questions can be e-mailed to seidman@eng.auburn.edu. Review of applications will begin Dec. 1, 1995, and continue until the position is filled.

Auburn University is an affirmative action, equal opportunity employer; women and minorities are encouraged to apply.

Texas A&M University
Department of Computer Science

The Department of Computer Science invites applications for tenure-track faculty positions at the assistant, associate and full professor levels. Research areas of particular interest are artificial intelligence and robotics. However, exceptional candidates from all areas of specialization will be considered.

Candidates should have a Ph.D. in computer science, computer engineering or a closely related field; a strong commitment to both research and teaching; and a demonstrated ability to perform research and acquire external funding appropriate to the rank being sought.

Texas A&M University is a leading national university with approximately 43,000 students and exceptional professional schools in medicine, veterinary medicine, engineering, business and architecture. Texas A&M was the first university with land-grant, sea-grant and space-grant designations and has annual federal research support of approximately $322 million. The Computer Science Department is in the College of Engineering and has 28 faculty members, including three NSF PYI/NYI/Career Award recipients. The department has a rapidly growing research program and has had more than $2 million in external research funding annually for the past several years including an NSF infrastructure grant.

The department and its associated research laboratories in AI and robotics have exceptional facilities.

Areas of significant research within the department include artificial intelligence; robotics; algorithms, languages and computability; computer systems and architecture; fault tolerant computing; computational science and engineering; real-time computing; software systems; vision and graphics; and VLSI design and testing.

Texas A&M University is nestled on a pleasant 5,200-acre campus in the "golden triangle of Texas." It is a short driving distance to the major cities of Austin, Houston and Dallas–Fort Worth. College Station is a desirable place to live, with many fine residential neighborhoods, low home prices and a minimum of urban hassles.

Applicants should send a statement of research and teaching interests, a complete resume, and the names of at least three references and their addresses (including e-mail) and telephone/fax numbers to: Faculty Search Committee, Department of Computer Science, Texas A&M University, College Station, TX 77843-3112. Applications will be accepted until the positions are filled.

Applications from minority and women candidates are especially encouraged. Texas A&M University is an affirmative action, equal opportunity employer committed to diversity.

Iowa State University
Department of Computer Science

The Department of Computer Science seeks applicants for a tenure-track faculty position at the assistant professor level. Strong preference will be given to applicants in the area of programming languages and compilers. Applicants should hold a Ph.D. in computer science or expect to receive the Ph.D. by the time the appointment becomes effective. Candidates should exhibit strong evidence of research accomplishment or potential. Interest and ability in teaching graduate and undergraduate students are also required.

The department places a strong emphasis on research, supports a high-quality graduate program and provides a teaching load of three courses per year. For more information about the department, see the WWW home page at the URL http://www.cs.iastate.edu.

Applicants should send a curriculum vitae, including names of three references, to Faculty Search Committee, Department of Computer Science, Iowa State University, Ames, IA 50011. The deadline for applications is Jan. 31, 1996, or until the position is filled.

Iowa State University is an equal opportunity, affirmative action employer. Women and minorities are particularly encouraged to apply.

University of California, Berkeley
Department of Electrical Engineering and Computer Sciences

The University of California at Berkeley invites applications for tenure-track positions in electrical engineering and computer sciences beginning in fall semester 1996.

The department expects two to four faculty positions. Applications for appointments at the

Continued on Page 10

Professional Opportunities

Jobs from Page 9

assistant professor level will be given highest preference, but other levels also will be considered.

Applicants should have received (or be about to receive) a doctoral degree in computer science, electrical engineering, computer engineering or a related field. All areas of 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 are important requirements. Successful applicants will be expected to set up a quality research program and to teach both graduate and undergraduate courses in their general area of specialty. Interested persons should send a resume, a select subset of papers, a one- to two-page statement of their future research plans and interests and the names of three references by Jan. 31, 1996, to the appropriate address below. In addition, the applicant should ask the three references to send letters directly to the same address. These letters will not be requested directly by the department.

Applications submitted after the deadline will not be considered; earlier applications are encouraged.

Electrical engineering applications: Professor David Messerschmitt, Chair, Department of Electrical Engineering and Computer Sciences, 231 Cory Hall, University of California, Berkeley, CA 94720-1770.

Computer science applications: Professor Robert Wilensky, Chair, Computer Science Division, 381 Soda Hall, University of California, Berkeley, CA 94720-1776

The University of California is an equal opportunity, affirmative action employer

Kansas State University
Department of Computing and Information Sciences

The Department of Computing and Information Sciences at Kansas State University invites applications for anticipated tenure-track positions beginning in fall 1996. Applicants should have a Ph.D. in computer science by the starting date of the appointment; salary will be commensurate with qualifications. Applicants must be committed to both teaching and research. Primary consideration will be given to candidates in the areas of programming language semantics, database engineering and distributed computing. Applications must include descriptions of teaching and research interests along with copies of representative publications. Non-US citizens must include visa status.

The department has a faculty of 17 and offers B.S., M.S., M.S.E. and Ph.D. degrees. Computing facilities center around a network of Unix- and Solaris-based single and multiprocessor Sun workstations, X-terminals, Macintoshes and PCs. Details can be found at the URL http://www.cis.ksu.edu/.

Please send applications to: Dr. Virgil Wallentine, Head, Department of Computing and Information Sciences, 234 Nichols Hall, Kansas State University, Manhattan, KS 66506. E-mail: virg@cis.ksu.edu. Review of applications will commence January 15 and continue until the positions are filled.

Kansas State University is an affirmative action, equal opportunity employer

University of Minnesota
Department of Computer Science

Applications are invited for tenure-track positions beginning Sept. 16, 1996. These positions are at the assistant professor level, although appointments at the associate and full professor levels will be considered for highly qualified applicants. The two areas of primary interest are: 1) software engineering and 2) computer systems with emphasis on networks, and parallel and distributed systems. A Ph.D. in computer science or related disciplines, a commitment to teaching, distinguished research experience and a demonstrated ability to define new and innovative research directions are required.

The Department of Computer Science at the University of Minnesota encompasses a wide range of research areas, including software engineering, networks and distributed multimedia, databases, human-computer interaction, parallelizing compilers, computer architecture, robotics and computer vision, algorithms and complexity theory, computational geometry, parallel and scientific computing, and numerical analysis.

Faculty members in the Department of Computer Science have access to outstanding computer facilities both within the department and at the various high-performance computing centers on campus, including the Minnesota Supercomputer Institute, the Army High-Performance Computing Research Center and the Computational Science and Engineering Laboratory. The Minneapolis–St. Paul area is a major center for advanced technology and computer industry, and the Department of Computer Science enjoys strong interactions with several such local industries.

Applicants should send curriculum vitae (including publications), research summary and the names of at least three references to: Chair, Faculty Recruiting Committee, Department of Computer Science, 4-192 EE/CS Building, University of Minnesota, 200 Union St. SE, Minneapolis, MN 55455.

Applications must be received by Jan. 8, 1996. Interviews may take place before the closing date, but final decisions will not be made before January 8.

For more information about the Department of Computer Science, see the World Wide Web home page: http://www@cs.umn.edu.

The University of Minnesota is an equal opportunity educator and employer

Ohio State University
Department of Computer and Information Science

The Ohio State University invites outstanding applicants for several tenure-track or tenured faculty positions in the Department of Computer and Information Science. The department is especially seeking candidates with research interests in architecture, database systems, networking and software engineering, but exceptionally strong candidates in other areas of computer science are encouraged to apply as well. Appointments at all ranks will be considered.

Applicants should e-mail a cover letter and curriculum vitae to fsearch@cis.ohio-state.edu and have three letters of reference sent to the same e-mail address or to Chair, Faculty Search Committee, Department of Computer and Information Science, The Ohio State University, Columbus, OH 43210-1277. For more information regarding electronic submission of applications and references, please send a message to faculty-applications@cis.ohio-state.edu with the word "information" in the subject field of the message. The search committee will consider applications until available positions are filled.

The Ohio State University is an equal opportunity, affirmative action employer. Qualified women, minorities and individuals with disabilities are encouraged to apply

Pennsylvania State University
Department of Computer Science and Engineering

The Department of Computer Science and Engineering is seeking qualified candidates for expected tenure-track positions. Applications in all areas of computer science will be considered. Salary and rank will be commensurate with experience. Applicants must have completed all requirements for the Ph.D. degree in computer science, computer engineering or a closely related area before assuming duties. Excellence in research and teaching is required. Candidates for senior positions must have an established reputation supported by a substantial record of publications. Openings are expected for August 1996.

The Department of Computer Science and Engineering maintains a Computer Systems Laboratory consisting of a distributed system of Sun and DEC workstations and file servers (all running Unix).

Applications should be received by Dec. 28, 1996. Applications will be considered until suitable candidates can be identified. Please send resume and the names of three or more references to: Chair, Faculty Search Committee, The Pennsylvania State University, Department of Computer Science and Engineering, Box CRA, 220 Pond Laboratory, University Park, PA 16902.

The university is an affirmative action, equal opportunity employer. Women and minorities are encouraged to apply

University of British Columbia
Department of Computer Science

The Department of Computer Science at the University of British Columbia is recruiting for a tenure-track position at the rank of assistant professor. The department will consider outstanding applicants over a wide range of areas of computer science research. At the same time, the department has particular interest in recruiting in the areas of databases, software engineering, systems, computer graphics, programming languages and scientific computation.

One of the university's highest academic priorities is to continue to build a leading center in computer science, and outstanding candidates are sought to participate in this effort. Applicants must demonstrate exceptional research potential and teaching ability. The successful candidate is expected to pursue an active research program, perform both graduate and undergraduate teaching and supervise graduate students. A Ph.D. or equivalent in computer science or related area is required. The position is available as of July 1, 1996, and salary will be commensurate with experience.

The University of British Columbia is situated on the tip of a peninsula and is surrounded by beaches, lush green forests and spectacular views of the ocean, mountains and downtown Vancouver. Just 20 minutes away from both downtown and the airport, this location enjoys a unique combination of unsurpassed opportunities for outdoor recreation and easy access to an exciting cosmopolitan city.

Applicants should submit their resume and the names of at least three references to: Dr. Nick Pippenger, Chair, Recruiting Committee, Department of Computer Science, University of British Columbia, Vancouver, BC, Canada V6T 1Z4. Applications will be accepted until Dec. 31, 1995.

In accordance with Canadian Immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada. UBC welcomes all qualified applicants, especially women, aboriginal people, visible minorities and persons with disabilities.

The position is subject to available funding

Colorado Technical University
Department of Computer Science

Colorado Technical University seeks a Ph.D. in computer science or related field committed to teaching and who has excellent interpersonal skills to work with mature students. Interests include software engineering, distributed systems and multimedia. Experience developing complex computer-based systems and graduate curricula required. Develop and teach graduate and undergraduate courses, and supervise graduate research in expanding university. Send resume to D.S. Shefrin, 12211 N. Paradise Village Parkway, Suite 206, Phoenix, AZ 85032. Fax: 602-996-3836. Please do not contact the university directly

University of Iowa
Department of Computer Science

The University of Iowa invites applications for a tenure-track assistant professorship, with an appointment beginning August 1996. Candidates from all areas of computer science are encouraged to apply. Established research and educational programs in the Computer Science Department include automated reasoning, computer vision, distributed computing, graphics/virtual environments, programming languages, simulation and software engineering.

Selection will be based on evidence of outstanding research accomplishments and teaching ability. We seek candidates whose research has achieved, or promises to achieve, national recognition and appropriate extramural funding. Within that level of excellence, we will favor candidates whose interests complement those of current faculty. In evaluating a candidate's teaching ability, we expect to consider breadth of course background and teaching interests along with communication skills. A Ph.D. in computer science or a closely related field is required.

Iowa City is a small city of approximately 75,000, with excellent public schools, affordable housing, a world-class medical center with the largest university-owned teaching hospital in the country, and abundant cultural and recreational activities. The university has approximately 29,000 students. The campus of 100 buildings on 900 acres is nicely situated along both banks of the Iowa River and is adjacent to the thriving downtown commercial area of Iowa City. Additional information about Iowa City, the university and the department can be found on the World Wide Web at URL http://www.cs.uiowa.edu/hiring.html.

Evaluation of applications will commence Feb. 15, 1996, and continue until the position is filled. Please send a resume and three letters of recommendation to: Hiring Committee, Department of Computer Science, University of Iowa, Iowa City, IA 52242.

Informal inquiries may be directed to cs_hiring@cs.uiowa.edu.

Women and minority candidates are especially urged to apply for this position. The university welcomes the employment of highly qualified professional couples. The university permits the appointment of faculty couples within the same department and permits the sharing of a single appointment by a faculty couple.

The University of Iowa is an equal opportunity, affirmative action employer

North Carolina State University
Department of Computer Science

Applications are invited for a tenure-track assistant professor position, to begin Aug. 16, 1996. The position presents a unique opportunity for combined university/industry research because it is partially funded by the SAS Institute, one of the world's leading software developers. The department seeks an ambitious candidate with demonstrated expertise in both the theory and practice of user interface design and evaluation. A Ph.D. in computer science and a commitment to excellence in teaching and research in human-computer interaction are required. We are particularly interested in strong candidates with multidisciplinary backgrounds, industrial experience—especially participatory design—and the exceptional communication skills required of a faculty member who will serve as a liaison between the department and the software industry.

Located in the College of Engineering, the Department of Computer Science offers B.S., M.S. and Ph.D. degrees. We have 27 tenure-track faculty, 400 undergraduate majors and 125 graduate students. The department provides an excellent research environment, and several faculty work in areas complementary to CHI, including artificial intelligence (intelligent interfaces, computational linguistics, knowledge-based learning environments), software systems (graphics, concurrent systems, database systems, programming languages, software engineering) and communications (ATM networks, distributed multimedia technologies). In addition to regular interactions with members of the SAS Institute's technical staff, there are numerous opportunities for joining interdisciplinary research projects within the department, with the university's College of Education and Psychology and with its internationally recognized School of Design. The successful candidate will be affiliated with the department's Multimedia Laboratory, which will soon move into a 5,000-square-foot space in the new $41 million Engineering Graduate Research Center.

The university is located in Raleigh, which was recently rated as the best place to live in the United States. Raleigh forms one vertex of the world-renowned Research Triangle, which boasts a high concentration of high-technology companies such as the SAS Institute, IBM, Glaxo-Wellcome, Bell-Northern Research and research institutions such as EPA and NIEHS/NIH.

Interested candidates should send their curriculum vitae, including citizenship and visa status, and the names of four references to: Chair, CHI Recruitment Committee, Department of Computer Science, North Carolina State University, Raleigh, NC 27695-8206.

Prospective candidates are encouraged to access the department's home page (http://www.csc.ncsu.edu) and to send e-mail to chi_search@adm.csc.ncsu.edu.

The university is an equal opportunity, affirmative action employer

University of Kentucky
Department of Computer Science

The Department of Computer Science at the University of Kentucky invites applications for one or more anticipated tenure-track positions beginning Aug. 15, 1996. Although appointment at the assistant professor level is preferred, exceptionally qualified candidates will be considered for appointment at associate or full professor level. Candidates should have a Ph.D. in computer science or a related discipline. Review of credentials began November 1, and the search process will continue until suitably qualified candidates are found.

We are interested in candidates with an expertise in distributed and high-performance computing, operating systems, networking, vision and computer graphics, and database engineering. Exceptionally strong candidates in other areas also will be considered. Individuals appointed to these positions will be expected to conduct innovative research and participate in the department's undergraduate and graduate instructional programs.

Please send curriculum vitae and the names of three references to: Faculty Search Committee, c/o Ms. Diane Mize, Department of Computer Science, University of Kentucky, Lexington, KY 40506-0046. Fax: 606-323-1971; e-mail: diane@cs.engr.uky.edu. For details see http://www.cs.engr.uky.edu/positions.html.

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

Texas Tech University
Department of Computer Science

Applications and nominations are invited for the chair position in the Department of Computer Science at Texas Tech University. The chair is expected to lead the department in the continued development of high-quality undergraduate and graduate programs in computer science. Successful candidates must have formal training in both engineering and computer science and sufficient scholarly accomplishments, including the direction of doctoral students in a Ph.D. program, to justify appointment at the rank of full professor with tenure.

Candidates also must have commitment and vision for computer science education and curricula, scholarly publication, funded research and public service. Candidates must have demonstrated leadership and managerial skills,

Professional Opportunities

excellent communication and teaching abilities, strong motivational skills and a commitment to alumni and corporate development. An applicant must be either a US citizen or a permanent resident to be considered.

The Computer Science Department is one of eight departments in the College of Engineering and it offers degrees at the bachelor's, master's and doctoral levels. At present, there are 10 full-time and two part-time faculty, three TAs and 500 students. The graduate program includes four principal focus tracks: software development systems, artificial intelligence and robotics, computer-aided design systems, and parallel and distributed systems. The specific research areas of the faculty can be found along with other pertinent information on the WWW home page at http://gs1.cs.ttu.edu.

Texas Tech is one of the four major state-supported multipurpose universities in Texas. It has an enrollment of about 25,000 students in seven colleges, a school of law and a health sciences center. The College of Engineering has a current enrollment of about 2,300 undergraduate students, 500 graduate students and 100 faculty. The university is located in Lubbock, TX, a city with a population of just less than 200,000.

The Search Committee began reviewing applications August 1 and will continue until the position is filled. The position will be available January 1, 1996. Applicants should send a letter expressing interest in the position, a detailed resume and the names and addresses of at least three professional references to: Dr. John J. Day, Chair, CS Search Committee, Department of Petroleum Engineering, Texas Tech University, PO Box 43111, Lubbock, TX 79409-3111.

Texas Tech is an equal opportunity, affirmative action employer.

University of California, Irvine
Department of Information and Computer Science

The Department of Information and Computer Science (ICS) at the University of California at Irvine invites applications for two tenure-track positions at the assistant professor level—although well-qualified candidates at the beginning associate professor level may be considered—in the areas of computer systems design and software/software engineering. We are looking for candidates with strong research records who would thrive in a highly productive setting. Duties include undergraduate and graduate teaching in computer science. Applicants must possess a Ph.D. Candidates should show excellent promise of a distinguished research career.

The current computer systems design group has six faculty, with more than 40 students pursuing Ph.D.'s and several international scholars working with the group. Research areas within the group include design automation, fine-grain compilers, computer networks, distributed systems and parallel processing. The computer systems design faculty have research funding totaling more than $1 million per year from agencies such as SRC, NSF, AFOSR, NASA and ONR as well as several industrial partners. Research emphases of interest include, but are not limited to, embedded systems; hardware/software codesign; interactive design frameworks and environments; hardware/software reuse; and system-level synthesis, analysis and verification tools.

The current software group has the following research interests: software processes and their specification, software analysis and testing, human-computer interaction, software measurement and evaluation, software architectures and programming languages. There currently are 25 students pursuing Ph.D.'s in software and several international scholars working with the software group. The software group has been responsible for $17.6 million of extramural research funding since 1987. Software-area research funding from contracts and grants from agencies such as ARPA, NSF and ONR currently total more than $1 million per year. The software group has created IRUS (Irvine Research Unit in Software), an alliance between the university and California industry designed to promote problem understanding, technology transition and joint work. IRUS sponsors technical roundtables, symposia and networking meetings. IRUS is sponsored by 17 companies, and employees from more than 40 companies actively participate in monthly IRUS events. Research emphases of interest include, but are not limited to, software architectures, formal methods, safety, specification languages, programming languages, requirements and design methods, and user interfaces.

The ICS Department is an independent campus unit reporting to the executive vice chancellor. ICS faculty emphasize core computer science as well as research in emerging areas of the discipline, with effective interdisciplinary ties to colleagues in engineering, medicine, biology, management, neurobiology, cognitive science and the social sciences. The department currently has 26 full-time faculty and 130 Ph.D. students with research interests that include automated reasoning, biomedical computing, computer networks, computer-supported cooperative work, computational biology, computational neuroscience, social and managerial analysis of computing, design automation, human-computer interfaces, machine learning, parallel processing, software and theoretical computer science.

UC-Irvine is located in Orange County, three miles from the Pacific Ocean near Newport Beach, and approximately 40 miles south of Los Angeles. The campus is situated in the heart of a national center of high-technology enterprise. Both the campus and the enterprise area offer exciting professional and cultural opportunities. Salaries and benefits are competitive. Mortgage and housing assistance are available. Housing options include newly built, for-sale housing located on campus and within a short walking distance from the department.

Send resume and contact information for four references to: Computer Systems Design Faculty Position or Software Faculty Position, c/o Lisa Tellier, Department of Information and Computer Science, 444 Computer Science, University of California, Irvine, Irvine, CA 92717-3425.

Application screening will begin immediately upon receipt of curriculum vitae. Maximum consideration will be given to applications received by Dec. 1, 1995.

The University of California is an equal opportunity employer committed to excellence through diversity.

Oklahoma State University
Department of Computer Science

Applications are invited for two anticipated full-time tenure-track positions at the assistant professor level. The term of initial appointment will begin in fall 1996.

The Oklahoma State University Computer Science Department is seeking applications from qualified individuals in all areas of computer science. However, the department is especially interested in candidates with research experience in artificial intelligence (all areas), computer graphics, computer networks, database systems or programming languages. A Ph.D. or D.Sc. in computer science or a closely related area is required. The department is strongly committed to the goal of excellence in both research and teaching and offers a full range of undergraduate and graduate courses leading to B.S., M.S., Ph.D. and Ed.D. degrees.

Please send a curriculum vitae and names of three references to: M. L. Neilsen, Faculty Search Committee, Computer Science Department, Oklahoma State University, Stillwater, OK 74078-1053. For more information: tel. 405-744-5668; WWW: http://www.cs.okstate.edu/search.

Review of applications will begin in Jan. 1, 1996. However, applications will be accepted until all positions have been filled.

Oklahoma State University is an affirmative action, equal opportunity employer. It encourages applications from qualified women, minorities and persons with disabilities.

Stanford University
Departments of Computer Science and Electrical Engineering

Stanford University's Departments of Computer Science and Electrical Engineering seek applicants for a tenure-track faculty position in software systems and tools. There is particular interest in applicants who have designed, built and/or experimented with large software systems or software tools that support engineering tasks. Example tasks include parallel computing, computational modeling and prototyping, scientific computing, rapid prototyping, embedded system design and implementation, and real-time system design and implementation.

Applicants should have a Ph.D. in a relevant field, and should have a strong interest in both teaching and research. The appointment will be made at the level of assistant professor. The successful candidate will be expected to teach courses, both in the candidate's specialty area and in related subjects, and to build and lead a team of graduate students in Ph.D. research.

Applications, including a resume, a publications list and the names of five references, should be sent by Feb. 1, 1996, to Professor Hector Garcia-Molina, Search Committee Co-Chair, Computer Systems Laboratory, ERL 444, Stanford University, Stanford, CA 94305-4055. Fax: 415-725-7398; e-mail: csl-search@shasta.stanford.edu.

Stanford University is an equal opportunity employer and welcomes nominations of women and minority group members and applications from them.

Oregon Graduate Institute
Department of Computer Science and Engineering

The department seeks faculty with strong research credentials in the areas of networking or graphics and multimedia systems. Applicants should have prior faculty or postdoctoral research experience, although exceptional candidates who are anticipating completion of a Ph.D. may also be considered.

OGI is an independent graduate school with no undergraduate programs. Teaching loads are light, but the quality of teaching and research is valued highly. The department currently has 18 full-time faculty and 56 doctoral students, and external research funding approaching $6 million annually. More information can be found at http://www.cse.ogi.edu.

To apply, send a brief description of research interests, the names of at least three references and a resume with a list of publications to: Professor Philip Cohen, Faculty Search Committee, Department of Computer Science and Engineering, Oregon Graduate Institute, PO Box 91000, Portland, OR 97291-1000. E-mail: csedept@cse.ogi.edu.

OGI is an equal opportunity employer and particularly welcomes applications from women and minority candidates. Appointment is subject to the availability of funding.

Georgia Institute of Technology
College of Computing

Georgia Tech's College of Computing invites applications for faculty positions at all levels. We are primarily seeking applicants with expertise in graphics or educational technology, but outstanding candidates in any area will be considered. With an academic faculty of 40 and a research faculty of nine, the college has a current enrollment of 625 undergraduates, 110 master's students and 130 Ph.D. students. One of the college's missions is to interact with other academic units, so candidates with an interdisciplinary research focus and interest in potential joint appointments are most welcome.

Georgia Tech is located in Atlanta (home of the 1996 Summer Olympics), and is a unit of the University System of the State of Georgia.

Candidates should send complete resumes and names of at least three references, preferably by Jan. 15, 1996, or until positions are filled, to: Professor Umakishore Ramachandran, Chair, Faculty Search Committee, College of Computing, Georgia Institute of Technology, Atlanta, GA 30332-0280. Tel. 404-894-5136; fax: 404-894-9846; e-mail: recruiting@cc.gatech.edu.

For more information about the College of Computing, see the World Wide Web site at URL http://www.cc.gatech.edu/.

Georgia Tech is an affirmative action, equal opportunity employer; applications from women and underrepresented minorities are strongly encouraged.

Universite de Montreal
Departement d'Informatique et de Recherche Operationnelle

The DIRO (Departement d'Informatique et de Recherche Operationnelle) seeks candidates for one tenure-track assistant professor position in computer science. The preferred area of specialization is distributed systems and algorithms, with emphasis on applications such as network management, distributed operating systems, distributed multimedia systems, high-speed network protocols and mobile communication.

Universite de Montreal is the largest North American university operating entirely in French. DIRO offers both graduate and undergraduate degrees. There currently are 39 faculty members, including nine who specialize in operations research.

The appointment date is Aug. 1, 1996.

Applications, accompanied by a curriculum vitae, the names of at least three referees and up to three reprints, should be sent no later than Dec. 15, 1995, to: Guy Lapalme, Departement d'Informatique et de Recherche Operationnelle, Universite de Montreal, CP 6128, Succ. Centre-Ville, Montreal, Quebec, Canada H3C 3J7.

In accordance with Canadian Immigration requirements, priority will be given to Canadian citizens and permanent residents. Universite de Montreal is an equal opportunity employer.

University of Rochester
Department of Computer Science

The Department of Computer Science at the University of Rochester invites applications for a tenure-track position in the systems area at the rank of assistant professor. Candidates must have received, or be about to receive, a doctorate in computer science or a related discipline and must demonstrate exceptional potential for both research and teaching.

Our department is small (12 faculty), with a strong record of research publication and external funding. We offer an outstanding research environment with excellent students and facilities and an unusually close-knit and collegial atmosphere. Current research interests include artificial intelligence (vision/robotics, natural language/knowledge representation), parallel systems and theory of computation. Approximately 40 students are enrolled in the Ph.D. program. There is no professional master's program. A selective undergraduate major began in 1995.

Applicants should send a curriculum vitae, copies of relevant papers and the names and addresses of at least three references to: Faculty Recruiting Committee, Department of Computer Science, University of Rochester, Rochester, NY 14627-0226.

The University of Rochester is an equal opportunity, affirmative action employer. Women and members of minority groups are strongly encouraged to apply.

University of Pittsburgh
Department of Computer Science

The Department of Computer Science invites applications for two tenure-track faculty positions at the assistant professor level beginning with the 1996-97 academic year. The department is seeking to augment its already strong research group in parallel and distributed systems, as well as enhance the interaction between this group and two other significant departmental strengths: artificial intelligence and algorithms/theory. However, a broad interpretation of parallel and distributed systems will be used, which means that this area must either be the candidate's research speciality or it must represent a major area of application. For

Continued on Page 12

1996 CRA Conference at Snowbird
July 14–16 ◆ Snowbird, Utah

The 1996 CRA Conference at Snowbird will include:
- the Department Chairs Workshop.
- the Research Managers Workshop.
- the Effective Teaching in CS&E Workshop for new faculty members.

The CRA Conference at Snowbird is the flagship conference for academic and research laboratory administrators interested in computing research issues. If you would like to receive information about the conference when it becomes available, return this form to CRA.

Name _____

Title/Position _____

Organization _____

Department _____

Address _____

City _____ State _____

ZIP+4 _____ E-mail Address _____

CRA Conference at Snowbird, Computing Research Association, 1875 Connecticut Ave. NW, Suite 718, Washington, DC 20009. Tel. 202-234-2111; Fax: 202-667-1066; e-mail: info@cra.org.

People in the News

Salton dies; was leader in information retrieval field

Gerard Salton, a professor of computer science at Cornell University, "arguably the preeminent figure in the field of information retrieval," died of cancer in August, a Cornell press release said. He was 68.

Salton was born in Nürnberg, Germany, in 1927, but was forced to flee the country during World War II. He came to the United States in 1947 and became a US citizen in 1952. He received a B.A. (1950) and an M.A. (1952) in mathematics from Brooklyn College.

Salton earned his Ph.D. at Harvard University and stayed on as an instructor (1958-60) and assistant professor (1960-65). "Salton was the last of Howard Aiken's Ph.D. students—and also one of the first programmers for the Harvard Mark IV computer," the press release said. He was interested in natural-language processing, especially information retrieval, and began the SMART information retrieval system in the 1960s (allegedly, SMART is known as "Salton's Magical Automatic Retriever of Text"), the release said.

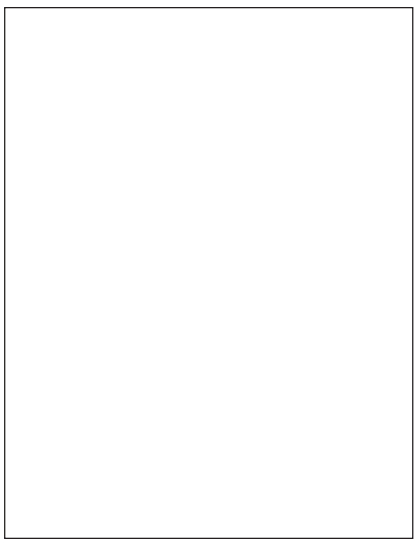
In 1965, Salton helped create Cornell's Department of Computer Science, and he stayed at the university for the next 30 years.

His main research tool was the SMART information retrieval system, and "ideas in this work fundamentally changed full-text processing methods on computers and provided the field of information retrieval with solid underpinnings," the press release said.

Many well-known information retrieval concepts were introduced as a result of SMART, including the vector space model, sophisticated statistical term weighting schemes that distinguish concepts important for text representation from other more marginal concepts, and the relevance feedback technique for query optimization.

Salton was a prolific writer. He published five texts on information retrieval and more than 150 research articles in the field.

Salton's research earned him many awards. He was a Guggenheim Fellow in 1962 and became an Association for Computing Machinery Fellow in 1995. Two of his books and papers won ASIS awards. He won a prestigious German Alexander Humboldt Senior Scientist Award" in 1988 and the ASIS Award of Merit in 1989.



Gerard Salton

In 1983, the ACM Special Interest Group on Information Retrieval (SIGIR) created an award for Outstanding Contributions. Salton received the first award, "marking him as the preeminent figure in the field," the press release said.

Over the years he served as editor-in-chief of ACM *Communications* and the ACM *Journal*. And when he died, he was an editor of the ACM *Transactions on Database Systems*.

Salton served on the ACM Council for seven years, "where his no-nonsense style and his adherence to principles made themselves felt," the press release said. He was active in SIGIR since its creation and served as its chair in 1979-83.

Salton also was chair of the American Association for the Advancement of Science's Section T for several years and was on the Board of Directors of the American Society for Information Science.

"Gerry upheld the highest standards of scholarship for himself, his students and his colleagues," the press release said. "He was a nurturing, caring adviser. He supervised 20 Ph.D. students, who are now in industry and academia."

Contributions may be made to the Gerard Salton Distinguished Lectureship Series in Computer Science. Contact Marsha Pierce, Carpenter Hall, Cornell University, Ithaca, NY 14853.

Library from Page 1

3) Select one of the documents from the hit list. The gateway retrieves the document and makes it available to the user for reading or browsing online or for downloading for printing.

The technology underlying NCSTRL is a network of interoperating digital library servers and FTP repositories. A department may choose to contribute in one of two ways: either as an NCSTRL-Standard site or as an NCSTRL-Lite site. A Standard site runs a server and maintains an FTP repository; a Lite site maintains only an FTP directory. The level of functionality for Standard sites is higher than for Lite sites. To make this choice, an individual department needs to balance the level of resources it can dedicate with the level of functionality it wishes to provide.

There are several differences in functionality:

• Standard sites can provide customized user interfaces to their collection. They can create special browsing interfaces to help users scan all documents in the local collection. Lite sites do not run any local user interface and rely on one of the other user interface gateways.

• Standard sites store bibliographic data locally and maintain their own search engines. This gives these sites immediate control over the contents of bibliographic records and the ability to install more powerful search engines and search interfaces. Lite sites submit bibliographic records to the central indexing site and do not control any of the actual indexing technology.

• Standard sites have the ability to store and provide access to documents in multiple formats. Lite sites can only provide access to a single document format, generally PostScript.

• Standard sites can provide a number of additional user interface features, such as page zooming, which is an interface for downloading and printing selected pages, and an interface for displaying and accessing the logical structure of documents—chapters, sections and so on.

The cost of sites are the start-up expenses of installing the software and preparing bibliographic records for the initial collection and the continuing costs of installing new releases and maintaining the collection. Lite takes about an hour to install, and Standard takes about two days. Email and telephone assistance will be available. Preparing bibliographic records is a simple clerical task. Installing new releases takes about two days a year. The largest cost is establishing the procedures to ensure that new reports continue to be entered. The actual labor is small, only a few minutes per document, but it requires a commitment from every author in the department. The cost of storage is small; a high-capacity disk can easily store all of a site's reports (in PostScript). Many departments already make all their reports available by FTP. These departments will find they can increase accessibility with a minimal increase in cost or effort. Most sites will place only their recent reports online, while others may choose to place their entire collection online, which will entail scanning their collection of older paper reports. A department might initially choose Lite, then move up to Standard after gaining experience.

The NCSTRL project and architecture is the result of a collaboration of two earlier successful technical report services. The first of these is Dienst, a result of the Advanced Research Projects Agency-funded CS-TR project. The second is the National Science Foundation-funded Wide Area Technical Report Service, which originated as a recommendation of a workshop on managing department technical reports at the 1992 CRA Conference at Snowbird. Stable organizational structure will be provided by CRA representation and by the NCSTRL Working Group. The latter is an activity of the DLIB Forum, which is supported by ARPA. The DLIB Forum is sponsored by the Information Infrastructure Technology and Applications Task Group of the High-Performance Computing and Communications program.

We are eager to add your department to the library. We stress that NCSTRL is self-explanatory and easy to use. Anyone is welcome to search and read the documents, provided they respect the terms and conditions of the contributors. To try NCSTRL, learn more about NCSTRL or get detailed installation information, see the NCSTRL home page at http://www.ncstrl.org.

Alan L. Selman is professor and chair of the Department of Computer Science at the State University of New York at Buffalo. His principal research interest is complexity theory. Selman was one of the collaborators who helped to formulate WATERS, a precursor of NCSTRL.

Jobs from Page 11

example, applicants working in parallel or distributed artificial intelligence or in analysis of parallel algorithms also will be considered for these positions.

Responsibilities include research, supervision of graduate student research (Ph.D. and MS.), and graduate and undergraduate teaching. Candidates should have a Ph.D. in computer science and a strong interest in both teaching and research.

The department currently has 22 full-time faculty members and supports strong graduate and undergraduate programs. Departmental resources include an excellent research library and extensive computing facilities, including a departmental network linking nearly 300 systems, workstations and other devices that supports a wide variety of architectures and platforms. Network access also is provided to the general computing facilities of the university as well as to the Pittsburgh Supercomputer Center (of which the University of Pittsburgh is a founding member). For more information about the department please see http://www.cs.pitt.edu.

Applications should include a curriculum vitae and names of three references and should be sent to Professor Robert Daley, Chair of Faculty Search, Department of Computer Science, University of Pittsburgh, Pittsburgh, PA 15260.

Applications must be received by April 1, 1996.

Pitt is an equal opportunity, affirmative action employer and especially encourages women and ethnic minorities to apply.

NSF division director named

Richard B. Kieburtz has taken office as director for the National Science Foundation's Division of Computer and Computation Research within the Directorate for Computer and Information Science and Engineering.

Kieburtz earned B.S. and Ph.D. degrees in electrical engineering from the University of Washington. He has taught at New York University, the State University of New York at Stony Brook and most recently at the Oregon Graduate Institute of Science and Engineering.

His expertise is in functional programming languages, program transformations, and automatic program generation and the application of formal methods in software engineering.