

COMPUTING RESEARCH NEWS

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President Requests Slight Increase for IT R&D Funding

By Peter Harsha

Federal funding for information technology research and development would increase only slightly next year under the President's FY 2003 budget plan announced February 4, 2002.

The President's budget request calls for an increase in funding of 3 percent over the Administration's FY 2002 request for IT-related research at the seven federal agencies that form the Networking and Information Technology Research and Development (NITRD) initiative.

Among the participating agencies, the National Aeronautics and Space Administration (NASA) received the largest increase—\$32 million in new funding, bringing it to a total of \$213 million—in the Administration's plan. However, the National Science Foundation, which will provide 78 percent of all federal computing research funding this year, would continue to play the lead role among NITRD agencies, according to the request. NSF would spend \$678 million overall in the President's plan.

Funding would increase in NSF's Computer and Information Science and Engineering (CISE) directorate to \$527 million, up from \$515 million approved by Congress for FY 2002, and significantly above the \$470 million requested by the President in last year's budget. NSF's cross-disciplinary information technology research (ITR) priority area would also see an increase under the new plan, growing to \$191 million in FY 03 from \$174 million in FY 02.

The President's budget also calls for a slight increase in IT R&D at the Department of Energy (DOE), the second largest source of federal NITRD funding. DOE's NITRD-related activities would grow to \$313 million in FY 03, an increase of just \$1 million over last year's request.

For the first time in a budget request, DOE research was evaluated using "Performance Criteria for Applied Research" developed by the President's Office of Management and Budget (OMB) in consultation with DOE and the scientific

Networking and Information Technology Research and Development (in millions of US\$)					
Agency	FY 00 Actual	FY 01 Actual	FY 02 Estimate	FY 03 Proposed	Change
Commerce	36	38	43	42	-2%
Defense	285	310	320	306	-4%
Energy	331	326	312	313	0%
EPA	4	4	2	2	0%
Health and Human Services	214	277	310	336	8%
NASA	129	177	181	213	18%
NSF	496	636	676	678	0%
Total	1,495	1,768	1,844	1,890	3%

community. These performance criteria, used on a "pilot" basis and only at DOE for the FY 03 budget, helped "shape the budget request" for DOE, according to OMB staff.

OMB intends to use the performance criteria more broadly in the FY 04 budget cycle, applying them to all funding for applied research at federal agencies. OMB will also work this year to develop similar performance criteria for basic research in time to "pilot" their application to programs in the FY 04 budget, with

the hope of applying the criteria government-wide to basic research programs beginning in FY 05.

The Department of Defense (DOD) would see a decrease in NITRD funding under the President's plan. The budget calls for a decrease of \$14 million over the FY 02 approved level for NITRD-related funding at DOD. Total NITRD funding at DOD would top \$306 million for FY 03. Offsetting the overall DOD decrease is a 14 percent increase over the FY 02 request for IT R&D at the Defense Advanced Research Projects Agency (DARPA).

IT R&D Funding
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Palo Alto Research Center (PARC) Redefines Itself

By Tracy Kugelman

This is the ninth in a series of CRN articles describing the activities of CRA's industry laboratory members.

The Palo Alto Research Center is nestled in the hills of Palo Alto, California overlooking Stanford University. Founded in 1970, the Center fosters the collaborative efforts of more than 225 researchers from diverse fields ranging from physics to ethnography.

PARC has an illustrious history as one of Xerox Corporation's research and development labs. Xerox established PARC with the mission of designing the office of the future. The scientists lived up to this challenge by inventing personal distributed computing, graphical user interfaces, bit-mapped displays, Smalltalk, Ethernet, client/server architecture, object-oriented programming, laser printing, releasing the first commercial mouse, and creating many of the basic protocols of the Internet. PARC technologies have changed the world. PARC

researchers led the way in early usability studies, and PARC was one of the first labs to bring in ethnographers and social scientists to integrate perspectives on how new technologies influence people and workspaces.

While often cited for its early work, PARC's research over the past three decades has continued to have far-reaching impact. In 1988, Dr. Mark Weiser, then lab manager of PARC's Computational Science Lab, coined the term 'Ubiquitous Computing' to refer to his vision of a time when computers would disappear into the fabric of daily life. The term has now become industry-standard to refer to the pervasiveness of portable, connected computational tools. PARC's research in this area spawned several commercialization efforts that resulted in MobileDoc (a Xerox business division), LiveWorks (a spin-off company), and Uppercase (spun off from PARC and later purchased by Microsoft Corp.).

PARC's research has had an impact on nearly every Xerox product in the market today. The research has also resulted in numerous new spin-off companies, such as:

- Inxight Software, Inc. (1996) information visualization and content analysis software,
- dpiX (1996) digital x-ray imaging and ultra-high-resolution flat-panel displays based on amorphous silicon thin-film transistor arrays,
- ContentGuard (2000) digital rights management software, and
- Gyricon Media Inc. (2000) sign systems based on electronic reusable paper.

More details on these developments can be found at:
<http://www.parc.com/history.html> and
<http://www.parc.com/pressroom/factsheet.html>

In December 2001, it was announced that Xerox PARC would
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Expanding the Pipeline

CRA-W Announces New Distributed Mentoring Project Affiliates Program

By Anne Condon and Mary Lou Soffa

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Affiliate Societies



CRA's Committee on the Status of Women in Computer Science and Engineering (CRA-W) is pleased to announce the expansion of its highly successful Distributed Mentoring Project (DMP) to include an affiliates program. The DMP, active since its inception in 1994, pairs and funds outstanding undergraduates with female mentors for a summer of research, with the overall goal of increasing the participation of women students in graduate school in Computer Science and Computing Engineering (CS&E). Having the same goal, the DMP affiliates program expands the range of faculty and students who can participate in the DMP by providing some of the benefits of the DMP program to an already matched student researcher and faculty member.

"Isn't it opportunities like these that attracted us to academia in the first place?" asks Dave Patterson, Pardee Professor of Computer Science at UC Berkeley, who is planning to apply to the pilot DMP Affiliates Program this year. "Last summer, in conjunction with one of my strong male graduate students, I worked with an undergraduate student. She did great. Not only will our work lead to a paper for all three of us, she is going to apply to Ph.D. programs, which she had no plans to do before the summer. Given 5,000 CS&E faculty, if half of us mentored an underrepresented undergrad and these mentees went to grad school, we could change the face of our field."

According to the most recent Computing Research Association Taulbee Survey of Ph.D.-granting CS&E departments, women received 16 percent of the Ph.D. degrees and 27 percent of the masters degrees awarded in CS&E in 2001. While these numbers are up slightly from previous years, there is a long way to go in order to reach the levels of participation attained by women in other scientific fields.

One reason for the low percentage of women who receive graduate degrees is the low percentage of women who enter graduate school after receiving a B.S. degree. The Baccalaureate & Beyond longitudinal survey, conducted by the U.S. National Center for Educational Statistics, reports that, for 1994, only 3 percent of female graduates with computer science degrees were enrolled in professional or graduate school one year after graduating, whereas 29 percent of the male graduates were enrolled. In both cases, the sample considered graduates with greater than a 3.5 GPA. Continued efforts to improve these statistics are needed to increase the representation of women who hold high-level positions in academia and industry.

To address this need, the DMP has paired outstanding female

undergraduates in the United States with female mentors for a summer of research at the mentor's institution. The program has supported a total of 177 students since 1994. A Canadian DMP program that was initiated in 2001 and supported four students will be offered again this year. The DMP research experience provides students with a window on research and graduate life, and gives them a close mentoring relationship with a faculty researcher. The goal of the DMP program—which has been funded primarily by NSF with additional funds from NPACI and USENIX and through the NSERC USRA program—is to increase the number of women entering graduate school in CS&E.

A longitudinal evaluation of the DMP program has found that most students entered the program with little understanding of graduate school and no experience with research. Forty percent of the women who participated did not enter college considering CS as a college major, and felt that they had less hands-on experience than their male peers. By observing and interacting with graduate students and faculty, and by doing a "hands-on" research project, they gained strategic information about applying to graduate schools, and developed confidence in their abilities to succeed in graduate school or in a research environment. More than 50 percent of the DMP students who had already graduated by 1999 have gone on to graduate school, and an even higher percentage of recent participants who have not yet graduated have indicated their intent to obtain an advanced degree.

In order to extend the benefits of the DMP to more students and to both male and female faculty who are working towards the goals of the DMP, CRA is initiating a new pilot program in the summer of 2002: the DMP Affiliates Program. This program is targeted at female undergraduate students and their faculty advisors, who are funding the students for a summer research project in Canada or the United States and are interested in combining mentoring with research advising. The DMP Affiliates Program differs from the regular DMP in that faculty member and student have their own research funding and must apply as a pair, rather than being matched by the program. There are no citizenship requirements for student applicants,

and both female and male mentors are encouraged to apply.

Students who participate in the DMP Affiliates Program will be included in the DMP network, will be eligible to apply for travel funds to attend a conference with their advisor, and will be invited to attend DMP activities. For example, this year students will be invited to the DMP reunion at the Grace Hopper Conference in October 2002. Mentors will also be invited to attend the DMP reunion, and will be recognized for their participation in the program. Both student and mentor will receive training materials on how to get the most out of this mentoring and research experience. The DMP web site, which includes descriptions of the research projects of DMP students, will also be expanded to include the DMP affiliates.

Student/faculty pairs are eligible to apply to the DMP Affiliates Program if the faculty member is working at a university in the United States or Canada that has an active computing research program into which the student will be integrated. The primary selection criteria are: the suitability of the professor's research project for the participating student; the conduciveness of the professor's university environment to the goals of the project, such as an active summer research population that would provide the student with a window on graduate student life; and the potential that the participation of the professor and student will advance the goals of the program. Participants are expected to take part in the standard DMP program evaluation.

The deadline for applications is **FRIDAY, MAY 3, 2002**. Notifications will be given to applicants by Monday, May 13, 2002. Application details are available at: <http://www.cra.org/Activities/craw/dmpap>. Applications should be sent via e-mail to Donnajean Ward (ward@cra.org) at the CRA office. Plain text files are preferable to formatted documents. Questions about the program can be directed to Anne Condon (condon@cs.ubc.ca) or Mary Lou Soffa (soffa@cs.pitt.edu).

Anne Condon (University of British Columbia) and Mary Lou Soffa (University of Pittsburgh) co-chair CRA's Committee on the Status of Women in Computer Science and Engineering (CRA-W); Soffa is also a member of the CRA board. ■

Using History to Improve Undergraduate Computer Science Teaching

Second Workshop—April 26-28, 2002

University of Minnesota, Minneapolis, MN

Details: <http://www.cra.org/history.workshop/>

Service to the Community: Former CISE Director Comments

By Ruzena Bajcsy

In this short article, I would like to summarize:

- Why I went to NSF.
- Why anyone should do this.
- My experience at NSF.
- The importance of scientists, especially computer scientists, being engaged in public decision-making.

Why I Went to NSF

I am a grateful immigrant. I arrived in this country in October 1967 to attend Stanford University, where I received a graduate fellowship (ARPA Fellowship) to study computer science. This was a great educational opportunity for me. After finishing my Ph.D. in 1972, I took a faculty position at the University of Pennsylvania, where I have been for almost 30 years.

During all of those years I have been generously supported by the National Science Foundation, and later by other federal agencies such as the Army Research Office, Navy Research Office, Air Force Research Office, DARPA, and NIH. This continuous support provided a chance for me, my colleagues, and especially my students to explore many research questions that were very speculative, creative, and exciting. It gave us the freedom to develop ourselves scientifically and to pursue discoveries.

NSF was the first to fund new ideas and research on a small scale, which later enabled us to convince the other agencies that we were eligible for larger grants. It personally gave me the beginner's push and credibility in the scientific community. It did not matter that I was a woman or that I had an accent. What counted were new ideas.

So when the search committee for the Assistant Director for CISE called and asked me to apply I considered it not only an obligation, but also a privilege to serve and, in a way, to pay back to this country what I received during my career.

Why Anyone Should Do This

Science is made by scientists. We form a community. The agencies that provide support for science are part of the scientific community. For that matter, shouldn't the scientific community take full responsibility for their leadership?

After all, it has been the GOOD tradition that the best scientists rose to the occasion of leadership setting the scientific agendas, especially in times of crisis. Scientific agendas are not set in a vacuum. They are capitalizing on what is possible yet needed, desirable, affordable, and exciting.

The scientists/engineers set the boundaries on what is possible; the political realities set the boundaries for what is needed/desirable; and the economics dictates what is affordable.

In this context, the biomedical sciences made a perfect argument in connecting the research in genomics with curing diseases. Similarly, the

defense establishment made a good case in connecting technological advances with saving lives during wars. But the excitement of discovery is much harder to convey. This is where visionary scientists must step up and make the case to the public, which in turn translates to support for further research. Take the example of astronomers who have very successfully conveyed their excitement to the public.

In summary, nobody but the active, visionary computer scientists can make the case—what is exciting, what is possible, and what is necessary for the good of the nation as far as information technology is concerned. Hence, it is the responsibility of all of us to serve in this capacity.

My Experience at NSF

I was very lucky. I came to CISE at the right time. NSF has had the Director, Rita Colwell, who fully supported the increase in the IT budget. She and I agreed on most issues at hand. The Deputy Director, Joseph Bordogna, was my dean at Penn. We knew each other very well and could fully trust each other. His support and advice were invaluable to me.

The PITAC (Presidential Information Technology Advisory Committee) had just issued its 1999 report, which truly energized the Washington Establishment to support new IT investment. In the White House, we had a strong proponent of IT in Vice President Gore and his assistant, Tom Kalil. The President's advisor, Neil Lane, and his special assistant for IT, Henry Kelly, helped to garner support not only in the White House, but also in Congress.

Many other people were deeply engaged. The CRA and Ed Lazowska testified on behalf of the increased budget for IT. All of the CEOs from top computer companies signed a letter in our support. It was a truly coordinated effort from all components of the society that made it happen.

I am recounting all of this so that the community understands that funding for science, and computer science especially, does not happen automatically, and if it happens, it is a work of many. If you read the PITAC report carefully, you will find that it serves three interwoven communities: 1) computer science proper; 2) computational sciences; and 3) networking Infrastructure.

In terms of influence and size, it is the computational scientists who are dominant. For some time, this community has made a very successful argument: for every increase of the power of computation, they deliver new scientific discoveries and service to the nation. Examples include weather forecasting, drug synthesis, new material synthesis, and understanding the environment.

The networking infrastructure group, again, is a rather coherent community whose primary responsibility is to provide connectivity. This

association is composed of the chief information officers employed at each university campus or institution.

Finally, the computer science community: The members are typically researchers either at universities or in research labs. It is important to recognize that all of these three communities are interdependent; therefore it is to their advantage to support, rather than oppose, each other. In fact, there are good intellectual reasons why they should work together. The computational scientists have computational needs on a large scale, and their problems have national importance. Yet the large-scale problems—either in computation or data intensive or geographically distributed—offer fertile grounds for many basic computer science problems and, in turn, it is easy to argue that the computational scientists cannot do their job without the advances in computer science.

So one important lesson from NSF's point of view is to work together as much as possible. This benefits all of the sciences and education that NSF supports.

Furthermore, it is much easier to make an argument to Congress for an increased budget if the constituency is large.

Conclusions

I would like to conclude with an appeal to the scientific community to be engaged in forming scientific policy. This can take many different forms:

- Participating in various workshops convened to formulate the directions of the scientific agendas as the SCIENTISTS see them.
- Participating in various advisory boards to the federal government where priorities are being set regarding where federal investments should be made in science and education.
- Serving in professional organizations that actively inform and argue in Congress about what is scientifically feasible, desirable, important, and so on.
- Serving in various capacities in the federal government where planning of the scientific agenda is taking place, arguing for this agenda, and, finally, seeing through a fair distribution of the resources to the community.

Our community, broadly speaking (computer scientists, computational scientist, and the networking people), should take it as our collective responsibility to appoint the best among us to serve our interests. It should be an honor to serve, and we should reward people who are doing a good job in this regard.

Ruzena Bajcsy, who recently completed her term as Assistant Director of CISE at NSF, now directs the Center for Information Technology Research in the Interest of Society (CITRIS) program at UC Berkeley (<http://www.citris.berkeley.edu>). She is an adjunct professor in the department of computer and information science at the University of Pennsylvania. ■

Freeman to Head CISE Directorate

Long-time CRA board member, Peter A. Freeman, has been named the assistant director for Computer and Information Science and Engineering (CISE) at NSF, effective in May. Dr. Freeman is currently the John P. Imlay, Jr. Dean of Computing at Georgia Institute of Technology.

Since 1990, Dr. Freeman has served Georgia Tech as a professor and founding dean of the College of Computing. From 1992 to 1995, he also acted as the university's Chief Information Officer. He is a recognized leader in encouraging interdisciplinary work involving computer science.

Dr. Freeman has served on numerous national panels and advisory committees, is a fellow of the Institute for Electrical and Electronics Engineers, the Association for Computing Machinery and the American Association for the Advancement of Science, and has been a member of the Board of Directors of the Computing Research Association since 1988. As the new CISE director, he is following in the footsteps of other CRA board members, such as William Wulf, Juris Hartmanis, and most recently Ruzena Bajcsy, who have also served in this position.

Dr. Freeman served as director of NSF's Computer and Computation Research Division within CISE from 1987-89, where he helped formulate the federal government's High-Performance Computing and Communications Initiative. He held previous faculty positions at George Mason University and the University of California at Irvine. Dr. Freeman received his Ph.D. in computer science from Carnegie-Mellon University. ■



Peter A. Freeman

2000-2001 Taulbee Survey

Hope for More Balance in Supply and Demand

By Randal E. Bryant and Moshe Y. Vardi

This article and the accompanying tables present the results of the 31st annual CRA Taulbee Survey¹ of Ph.D.-granting departments of computer science (CS) and computer engineering (CE) in the United States and Canada. This survey is conducted annually by the Computing Research Association to document trends in student enrollment, employment of graduates, and faculty salaries.

Information is gathered during the fall and early winter. The period the data cover varies from table to table. Degree production (Ph.D., Master's, and Bachelor's) and total Ph.D. enrollments refer to the previous academic year (2000-2001). Data for new students in all categories and total enrollments for Master's and Bachelor's degrees refer to the current academic year (2001-2002). Projected student production and information on faculty salaries and demographics also refer to the current academic year. Faculty salaries are those effective January 1, 2002. Responses received by January 14, 2002 are included in the tables.

The data were collected from Ph.D.-granting departments only. A total of 215 departments were surveyed, compared with 214 departments last year. As shown in Figure 1, 173 departments returned their survey forms, for a response rate of 80 percent (compared with 81 percent last year). The return rate of 8 out of 28 (29%) for Computer Engineering (CE) programs is very low, although an improvement over recent years. We attribute this low response to two factors: 1) many CE programs are part of an ECE department, and they do not keep separate statistics for CE vs. EE; and 2) many of these departments are not aware of the Taulbee Survey or its importance. The response rate for US CS programs (142 of 164, or 87%) was very good, and the 100 percent response rate for Canadian programs is especially gratifying. We thank all respondents who completed this year's questionnaire. Departments that participated are listed at the end of this article.

Due to the low return rate for CE, we caution against drawing strong conclusions from the data presented for CE. In our discussion, we will focus on the combined numbers for CS and CE. Because of changes in the departments that respond from one year to the next, we must approach any trend analysis with caution.

Figure 1. Number of Respondents to Faculty Salary Questions

Year	US CS Depts.	US CE Depts.	Canadian	Total
1995	110/133 (83%)	9/13 (69%)	11/16 (69%)	130/162 (80%)
1996	98/131 (75%)	8/13 (62%)	9/16 (56%)	115/160 (72%)
1997	111/133 (83%)	6/13 (46%)	13/17 (76%)	130/163 (80%)
1998	122/145 (84%)	7/19 (37%)	12/18 (67%)	141/182 (77%)
1999	132/156 (85%)	5/24 (21%)	19/23 (83%)	156/203 (77%)
2000	148/163 (91%)	6/28 (21%)	19/23 (83%)	173/214 (81%)
2001	142/164 (87%)	8/28 (29%)	23/23 (100%)	173/215 (80%)

For more details on how the faculty salary information is to be interpreted, see the article in the January 2002, CRN on Preliminary Taulbee Faculty Salary Data (<http://www.cra.org/CRN/issues/0201.pdf>). [Note: In the printed version of the January article, in Table 1, the column reporting the number of faculty in each category was incorrect (the five entries should have been 563, 761, 832, 1197, and 3353). These have been corrected in the online version of the January CRN. Table 27 in the current edition presents the corrected counts, incorporating numbers from 13 additional departments.]

The survey form itself is modified slightly each year to ensure as high a rate of return as possible (by simplifying and clarifying), while continuing to capture the data necessary to understand trends in the discipline and also reflect changing concerns of the computing research community. This year we added three new questions to obtain data previously collected on a separate departmental profiles survey. We decided to move these questions into the Taulbee because: 1) the data should be updated annually (the profiles survey is only conducted every 3 years), and 2) the response rate on the profiles survey has historically been low. The three new questions address external research support and graduate student funding (Tables 24-26).

Ph.D. Degree Production and Enrollments (Tables 1-8)

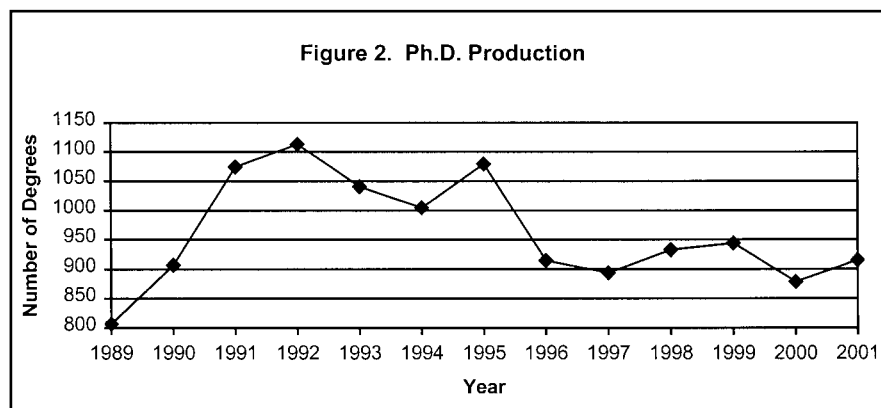
As shown in Table 1, a total of 912 Ph.D. degrees were awarded in 2001 by the 173 responding departments. As Figure 2 indicates, this is a slight (4%) improvement over last year's 881, which was the lowest number in more than 10 years. Note, however, that some of this apparent increase could be due to shifts in the departments that responded to the survey.

The prediction from last year's survey that 1,144 Ph.D. degrees would be awarded in 2001 was, as usual, overly optimistic, with an "optimism" ratio, defined as the actual over the predicted, being 0.80. Given next year's prediction of 1,205 graduates, we predict the actual number will be between 906 and 1,015.

All other numbers indicate a strong growth in the Ph.D. supply in the next few years. The number who entered Ph.D. programs (Table 5) increased from 2,062 to 2,702 (31%). The number who passed qualifiers

graphics, human interface, databases, and information systems), but the large number (202/933) whose specialization is uncategorized makes it risky to draw any strong conclusions.

Most statistics on gender and ethnicity for Ph.D. students (Tables 2, 3, 7, 8) show remarkably little change from last year. White and nonresident alien men continue to account for a very large fraction of our Ph.D. production and enrollments. Women constitute a significant minority (19% of enrollments, 16% of graduates.) All other underrepresented



(Table 1) increased from 1,119 to 1,244 (11%), and the number who passed their thesis proposal exams (Table 1) increased from 788 to 917 (16%). The total Ph.D. enrollments (Table 6) increased from 7,857 to 8,810 (12%). Looking beyond our survey results, some CS programs are reporting record numbers of applicants for their Ph.D. programs this year. It seems that the failure of the dot-com boom has convinced many recent Bachelor's and Master's degree recipients to return to graduate school.

Table 4 shows area of specialization versus types of first appointments for Ph.D. recipients in 2001. These statistics are also very similar to those from last year. There seems to be a slight shift from core areas of computer science (programming languages and theory) toward more applied areas (scientific computing,

groups are very small minorities. As Figure 3 illustrates, we see a continuing increase in the proportion of enrolled Ph.D. students who are nonresident aliens.

Master's and Bachelor's Degree Production and Enrollments (Tables 9-16)

Almost all statistics on Master's and Bachelor's programs show major growth. Master's degrees were awarded to 8,266 students, an increase of 26 percent. Bachelor's degrees numbered 17,048, an increase of 15 percent. This year's Master's production exceeded the projection from last year's survey by 31 percent, while Bachelor's production exceeded projections by 7 percent. If this trend continues, then next year's projected production of 18,695 Bachelor's degrees (Table 11 and Figure 4) and 7,341 Master's degrees (Table 12) may be too low.

Table 1. Ph.D. Production by Type of Department and Rank

Department, Rank	Ph.D.s Produced	Ave. per Dept.	Ph.D.s Next Year	Ave. per Dept.	Passed Qualifier	Ave. per Dept.	Passed Thesis Exam	Ave. per Dept.
US CS 1-12	184	15.3	241	20.1	228	19.0	194	16.2
US CS 13-24	135	11.3	148	12.3	130	10.8	115	9.6
US CS 25-36	78	6.5	127	10.6	157	13.1	77	6.4
US CS Other	372	3.5	473	4.4	473	4.4	328	3.1
Canadian	102	4.4	100	4.3	57	2.5	81	3.5
US CE	41	5.1	116	14.5	199	24.9	122	15.3
Total	912	5.2	1,205	6.9	1,244	7.1	917	5.3

2000-2001 Taulbee Survey

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The number of new undergraduates actually dropped slightly from 23,416 to 23,090 (1%) (see Figure 5), in contrast with significant increases in recent years. As yet, we cannot determine whether this was simply an artifact of the changes in the departments reporting, or the start of a new trend. Perhaps the decline in the technology industry is making computer science and engineering less alluring to new undergraduates. In addition, some programs may be operating in "saturation" mode, where they simply cannot accept more undergraduate majors given their teaching resources.

In all other numbers, we see growth in both Bachelor's and Master's programs. New Master's students (Table 13) increased by 22 percent, total enrollments in Bachelor's programs increased by 8%, and enrollments in Master's programs increased by 10%.

Most demographics regarding gender and ethnicity for Bachelor's and Master's students show remarkable stability from last year. As with Ph.D. recipients, the proportion of Master's degree recipients who are nonresident aliens continually climbs, from 52 percent last year to 57 percent this year.

Faculty Demographics (Tables 17-23)

The total number of faculty increased by 8 percent over the past year to a total of 5,344. These increases came in all categories, with an especially large (60%) increase in postdocs. Considering that 140 faculty are reported to have left academia (Table 23), the survey indicates 759 new faculty this year. Our Ph.D. production shows only 326 graduates taking faculty positions (Table 4.) Some of the new teaching faculty may not have Ph.D. degrees, and some new faculty may have come from nonacademic sources. There is some influx of existing Ph.D. holders into academia as industrial labs are being downsized and reorganized.

This year's faculty growth to 5,344 was slightly less than the prediction of 5,465 from last year's survey. Still, this indicates that departments generally met their faculty recruiting targets. The planned two-year growth rate of 21 percent is the same as last year. Last year they predicted growing to 5,966 for 2002-2003, but this year they have adjusted the prediction for the same time period to 5,613. Last year we observed that the planned growth targets were unrealistically aggressive, compared with the predicted supply of new Ph.D.s. This year, the combination of increasing supply and decreasing targets make the recruiting objectives seem more feasible.

Table 23 on faculty "losses" showed that a large number took

academic positions elsewhere. Only 140 (2.6% of total faculty) actually left academia through death, retirement, or taking a nonacademic position. This compares with 115 (2.3% of total faculty) last year. Overall, the rate of departures over the past few years has remained within the very stable range of between 2.3 percent and 2.6 percent.

The demographic data for faculty (Tables 19-22) are very similar to those from last year. We see that the gender split of new faculty (83% male, 17% female) is very close to the split for new Ph.D. recipients (Table 2). There is some skew in the distribution, with somewhat more men in tenure-track (85%) and research (87%) positions, and somewhat more women in teaching and other (both 22%) positions, but these numbers are actually somewhat more balanced than in previous years.

It is interesting to compare the ethnicity data for new faculty (Table 20) with that of Ph.D. recipients (Table 3). Fully 60 percent of the new faculty are white, non-Hispanic, even though only 38 percent of the Ph.D. recipients are in this category. By contrast, only 17 percent of the new faculty are nonresident aliens, whereas fully 46 percent of the degree recipients are in that category. Some new faculty could have become residents after receiving their Ph.D. degrees, but it seems clear that proportionately fewer foreign students take positions at U.S. universities.

Table 2. Gender of Ph.D. Recipients by Type of Degree

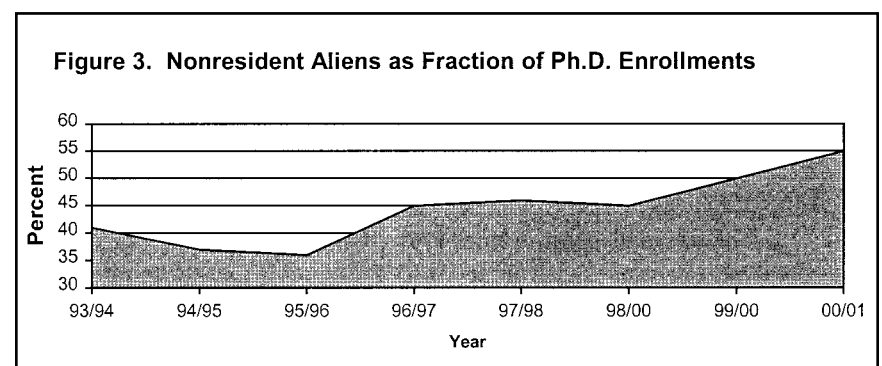
	CS		CE		CS&CE	
Male	673	84%	69	82%	742	84%
Female	129	16%	15	18%	144	16%
Total have Gender Data for	802		84		886	
Unknown	26		0		26	
Total	828		84		912	

Table 3. Ethnicity of Ph.D. Recipients by Type of Degree

	CS		CE		CS&CE	
Nonresident Alien	328	44%	48	64%	376	46%
African American, Non-Hispanic	9	1%	0	0%	9	1%
Native American or Alaskan Native	1	0%	0	0%	1	0%
Asian or Pacific Islander	91	12%	11	15%	102	12%
Hispanic	7	1%	0	0%	7	1%
White, Non-Hispanic	292	39%	16	21%	308	38%
Other/Not Listed	17	2%	0	0%	17	2%
Total have Ethnicity Data For	745		75		820	
Ethnicity/Residency Unknown	83		9		92	
Total	828		84		912	

Table 4. Employment of New Ph.D. Recipients by Specialty

New Ph.D.s in Ph.D. Granting Depts.	Artificial Intelligence/Robotics	Hardware/Architecture	Numerical Analysis/Scientific Computing	Programming Languages/Compilers	OS/Networks	Software Engineering	Theory/Algorithms	Graphics/Human Interfaces	Databases/Information Systems	Other/Unknown	Total	Total	
												Percent	Percent
Tenure-Track	22	14	2	11	27	16	18	20	17	10	157	21%	39%
Researcher	11	2	11	2	9	2	4	9	0	4	54	7%	
Postdoc	12	2	4	2	8	4	13	6	2	3	56	7%	
Teaching Faculty	6	2	0	0	3	2	4	2	1	7	27	4%	
New Ph.D.s, Other Categories													
Other CS/CE Dept.	11	1	2	1	1	1	3	1	9	1	31	4%	61%
Non-CS/CE Dept.	1	0	0	0	0	0	0	0	0	0	1	0%	
Industry	45	46	11	24	86	29	20	32	44	29	366	49%	
Government	5	1	1	0	1	3	0	0	1	1	13	2%	
Self-Employed	2	0	2	0	2	0	0	2	2	1	11	1%	
Employed Abroad	5	2	2	2	5	3	2	5	3	2	31	4%	
Unemployed	0	0	0	0	0	0	1	1	0	4	6	1%	
Total have Employment Data for	120	70	35	42	142	60	65	78	79	62	753	100%	100%
Unknown	9	2	3	3	6	2	8	5	2	140	180		
Total	129	72	38	45	148	62	73	83	81	202	933		



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Table 5. New Ph.D. Students in Fall 2001 by Department Type and Rank

Department, Rank	CS				CE				CS & CE	
	New Admit	MS to Ph.D.	Total	Ave. per Dept.	New Admit	MS to Ph.D.	Total	Ave. per Dept.	Total	Ave. per Dept.
US CS 1-12	414	49	463	38.6	0	0	0	0.0	463	38.6
US CS 13-24	347	30	377	31.4	2	1	3	0.3	380	31.7
US CS 25-36	295	23	318	26.5	0	0	0	0.0	318	26.5
US CS Other	885	167	1052	9.8	47	8	55	0.5	1107	10.3
Canadian	110	36	146	6.3	14	5	19	0.8	165	7.2
US CE	0	0	0	0.0	154	115	269	33.6	269	33.6
Total	2,051	305	2,356	13.5	217	129	346	2.0	2,702	15.5

Research Expenditures and Graduate Student Support (Tables 24-26)

As mentioned earlier, we added three new questions to the Taulbee Survey this year, incorporating key data that previously have been collected as part of a separate departmental profiles survey.

The first question asked: "For the most recently completed fiscal year, what was the department's total expenditure (including indirect costs or "overhead" as stated on project budgets) from external sources of support for Computer Science/Engineering research?" The results are reported in Table 24, showing

both absolute and per-capita numbers, where capitation is computed relative to the number of tenured and tenure-track faculty members.

Canadian levels are shown in Canadian dollars. The data show a clear correlation between ranking and per-capita expenditures, although this correlation holds only between ranking bands (1-12, 13-24, etc.) and per-capita expenditures. As expected, Canadian departments show a lower level of expenditures from external sources, stemming, no doubt, from the different way that research is funded in Canada. Computer engineering departments also show a lower level of expenditures

from external sources, but no conclusion can be drawn due to the low response rate of computer engineering departments.

The second question asked departments to "provide the number of graduate students supported as full-time students as of fall 2001," further categorized as teaching assistants, research assistants, fellows, or computer systems' supporters, and split between those on institutional vs. external funds. The results are shown in Table 25. Overall, we can see that the higher ranked schools are able to support more students with research positions through research assistantships and fellowships, while the other schools rely more on teaching assistantships to support their students. Canadian schools also have a high proportion (49%) of students supported via teaching assistantships. The number supported for computer systems support is very small.

The third question asked respondents to "provide the net amount (as of fall 2001) of an academic-year stipend for a graduate student (not including tuition or fees)." The results are shown in Table 26. Canadian stipends are shown in Canadian dollars. The numbers suggest a gap between departments in the top two ranking bands and departments in lower bands in all categories of graduate-student support.

Faculty Salaries (Tables 27-34)

The U.S. average salaries have increased by 5 percent to 7 percent for different categories of U.S. faculty, similar to last year. Canadian salaries (shown as 12-month salaries in Canadian dollars) for tenure-track faculty also increased by 5 to 7 percent for the different categories. Salaries for non-tenure-track teaching faculty show a much greater increase (20%). These numbers are skewed by the presence of one highly paid lecturer at a school with only one such employee; nevertheless, there is evidence of significant salary increases at other institutions.

Concluding Observations

Overall, signs indicate a continued growth in graduate (both Master's and Ph.D.) programs in computer science and engineering. Although the Ph.D. output rose only slightly this year, it appears there will be a significant increase over the next few years. The growth at the Bachelor's level has diminished compared with recent years, with even a slight decrease in the number of newly declared majors. It is still too early to tell whether this is the start of a trend toward declining undergraduate enrollments (as has happened at other times during downturns in the technology

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Table 6. Ph.D. Degree Total Enrollment by Department Type and Rank

Department, Rank	CS		CE		CS & CE	
	Total	%	Total	%	Total	%
US CS 1-12	1601	21%	0	0%	1601	18%
US CS 13-24	1300	17%	12	1%	1312	15%
US CS 25-36	997	13%	0	0%	997	11%
US CS Other	3258	42%	260	25%	3518	40%
Canadian	623	8%	95	9%	718	8%
US CE	0	0%	664	64%	664	8%
Total	7,779		1,031		8,810	

Table 7. Gender of Ph.D. Program Total Enrollment

	CS		CE		CS & CE	
	Total	%	Total	%	Total	%
Male	6,072	80%	871	84%	6,943	81%
Female	1,514	20%	160	16%	1,674	19%

Total have Gender Data for

CS: 7,586 CE: 1,031 CS & CE: 8,617

Unknown: 193 0 183

Total: 7,779 1,031 8,810

Table 8. Ethnicity of Ph.D. Program Total Enrollment

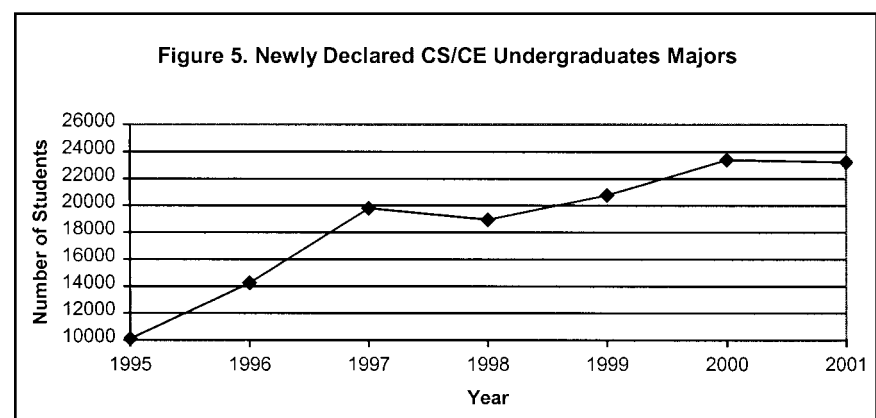
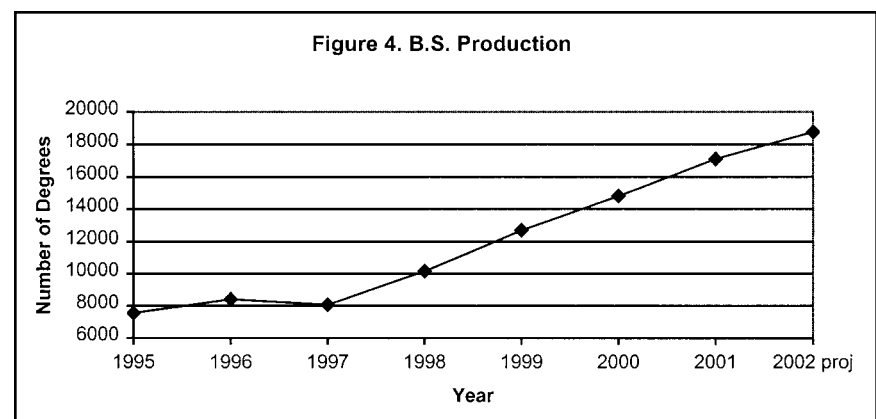
	CS		CE		CS&CE	
	Total	%	Total	%	Total	%
Nonresident Alien	3,715	53%	642	70%	4,357	55%
African American, Non-Hispanic	117	2%	22	2%	139	2%
Native American or Alaskan Native	6	0%	1	0%	7	0%
Asian or Pacific Islander	734	10%	50	5%	784	10%
Hispanic	82	1%	8	1%	90	1%
White, Non-Hispanic	2,303	33%	185	20%	2,488	31%
Other/Not Listed	69	1%	4	0%	73	1%

Total have Ethnicity Data For

CS: 7,026 CE: 912 CS & CE: 7,938

Ethnicity/Residency Unknown: 753 119 872

Total: 7,779 1,031 8,810



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Table 9. Gender of Bachelor's and Master's Recipients

	Bachelor's						Master's					
	CS		CE		CS & CE		CS		CE		CS & CE	
Male	10,903	80%	2,178	86%	13,081	81%	5,174	73%	708	75%	5,882	73%
Female	2,679	20%	343	14%	3,022	19%	1,923	27%	237	25%	2,160	27%
Total have Gender Data for	13,582		2,521		16,103		7,097		945		8,042	
Unknown	845		100		945		222		2		224	
Total	14,427		2,621		17,048		7,319		947		8,266	

Table 10. Ethnicity of Bachelor's and Master's Recipients

	Bachelor's						Master's					
	CS		CE		Total		CS		CE		Total	
Nonresident Alien	903	9%	157	8%	1,060	9%	3,677	57%	489	56%	4,166	57%
African American, Non-Hispanic	311	3%	93	5%	404	3%	89	1%	22	3%	111	2%
Native American or Alaskan Native	37	0%	6	0%	43	0%	2	0%	4	0%	6	0%
Asian or Pacific Islander	2,349	23%	369	18%	2,718	23%	1,036	16%	174	20%	1,210	16%
Hispanic	362	4%	80	4%	442	4%	83	1%	11	1%	94	1%
White, Non-Hispanic	5,521	55%	1,115	54%	6,636	55%	1,475	23%	175	20%	1,650	22%
Other/Not Listed	517	5%	231	11%	748	6%	118	2%	1	0%	119	2%
Total have Ethnicity Data For	10,000		2,051		12,051		6,480		876		7,356	
Ethnicity/Residency Unknown	4,427		570		4,997		839		71		910	
Total	14,427		2,621		17,048		7,319		947		8,266	

Table 11. Bachelor's Degree Candidates for 2001-2002 by Department Type and Rank

Department, Rank	CS		CE		CS & CE	
US CS 1-12	1958	13%	266	8%	2224	12%
US CS 13-24	1512	10%	477	15%	1989	11%
US CS 25-36	1479	10%	69	2%	1548	8%
US CS Other	7353	47%	1477	47%	8830	47%
Canadian	3234	21%	355	11%	3589	19%
US CE	0	0%	515	16%	515	3%
Total	15,536		3,159		18,695	

Table 12. Master's Degree Candidates for 2001-2002 by Department Type and Rank

Department, Rank	CS		CE		CS & CE	
US CS 1-12	850	13%	0	0%	850	12%
US CS 13-24	689	10%	3	0%	692	9%
US CS 25-36	454	7%	0	0%	454	6%
US CS Other	4096	62%	343	45%	4439	60%
Canadian	491	7%	86	11%	577	8%
US CE	0	0%	329	43%	329	4%
Total	6,580		761		7,341	

Table 13. New Master's Students in Fall 2001 by Department Type and Rank

Department, Rank	CS		CE		CS & CE	
	Total	Ave. per Dept.	Total	Ave. per Dept.	Total	Ave. per Dept.
US CS 1-12	644	53.7	0	0.0	644	53.7
US CS 13-24	621	51.8	2	0.2	623	51.9
US CS 25-36	480	40.0	0	0.0	480	40.0
US CS Other	4310	41.4	687	6.6	4997	48.0
Canadian	692	31.5	65	3.0	757	34.4
US CE	0	0.0	290	32.2	290	32.2
Total	6,747	39.5	1,044	6.1	7,791	45.6

Table 14. New Undergraduate Students in Fall 2001 by Department Type and Rank

Department, Rank	CS			CE			CS & CE Majors	
	Pre-Major	Major	Average Major per Dept.	Pre-Major	Major	Average Major per Dept.	Total	Average Major per Dept.
US CS 1-12	380	1102	100.2	0	340	30.9	1442	131.1
US CS 13-24	40	1401	116.8	0	394	32.8	1795	149.6
US CS 25-36	519	1737	144.8	0	0	0.0	1737	144.8
US CS Other	4756	10319	99.2	1053	2033	19.5	12352	118.8
Canadian	1251	4397	199.9	0	681	31.0	5078	230.8
US CE	0	0	0.0	862	686	76.2	686	76.2
Total	6,946	18,956	111.5	1,915	4134	24.3	23,090	135.8

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economy), whether it simply indicates that many programs are operating at full capacity and cannot expand further, or whether it is just an artifact of the shifting departments responding to our survey.

Rankings

For tables that group computer science departments by rank, the rankings are based on information collected in the 1995 assessment of research and doctorate programs in the United States conducted by the National Research Council.

The top twelve schools in this ranking are: Stanford, Massachusetts Institute of Technology, University of California (Berkeley), Carnegie Mellon, Cornell, Princeton, University of Texas (Austin), University of Illinois (Urbana-Champaign), University of Washington, University of Wisconsin (Madison), Harvard, and California Institute of Technology. All schools in this ranking participated in the survey this year.

CS departments ranked 13-24 are: Brown, Yale, University of California (Los Angeles), University of Maryland (College Park), New York

University, University of Massachusetts (Amherst), Rice, University of Southern California, University of Michigan, University of California (San Diego), Columbia, and University of Pennsylvania.² All schools in this ranking participated in the survey this year.

CS departments ranked 25-36 are: University of Chicago, Purdue, Rutgers, Duke, University of North Carolina (Chapel Hill), University of Rochester, State University of New York (Stony Brook), Georgia Institute of Technology, University of Arizona, University of California (Irvine), University of Virginia, and Indiana. All schools in this ranking participated in the survey this year.

CS departments that are ranked above 36 or that are unranked that responded to the survey include: Arizona State University, Auburn, Boston, Brandeis, Case Western Reserve, City University of New York, Clemson, William and Mary, Colorado State, Dartmouth, DePaul, Florida Institute of Technology, Florida International, Florida State, George Mason, Georgia State, Illinois Institute of Technology, Iowa State, Johns Hopkins, Kansas State, Kent State, Louisiana State,

Michigan State, Michigan Technological, Mississippi State, New Jersey Institute of Technology, New Mexico State, North Carolina State, North Dakota State, Northeastern, Oakland, Ohio State, Ohio University, Oklahoma State, Old Dominion, Oregon Health & Science, Oregon State, Pennsylvania State, Polytechnic, Portland State, Rensselaer Polytechnic, Southern Methodist, State University of New York (Albany, Binghamton, and Buffalo), Stevens Institute, Syracuse, Temple, Texas A&M, Texas Tech, Tufts, Vanderbilt, Virginia Polytechnic, Washington State, Washington (St. Louis), Wayne State, West Virginia, Western Michigan, Worcester Polytechnic, and Wright State.

University of: Alabama (Birmingham, Huntsville, and Tuscaloosa), Arkansas, California (Davis, Santa Barbara, and Santa Cruz), Cincinnati, Colorado (Boulder and Colorado Springs), Connecticut, Delaware, Denver, Florida, Georgia, Hawaii, Houston, Idaho, Illinois (Chicago), Iowa, Kansas, Kentucky, Louisiana (Lafayette), Maine, Maryland

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Table 15. Master's Degree Total Enrollment by Department Type and Rank

Department, Rank	CS		CE		CS & CE	
US CS 1-12	1419	9%	0	0%	1,419	8%
US CS 13-24	1347	8%	8	0%	1,355	7%
US CS 25-36	628	4%	0	0%	628	3%
US CS Other	12510	76%	982	48%	13,492	73%
Canadian	511	3%	374	18%	885	5%
US CE	0	0%	677	33%	677	4%
Total	16,415		2,041		18,456	

Table 16. Bachelor's Degree Program Total Enrollment by Department Type and Rank

Department, Rank	CS			CE			CS & CE Majors	
	Pre-Major	Major	Average Major per Dept.	Pre-Major	Major	Average Major per Dept.	Total	Average Major per Dept.
US CS 1-12	584	6025	547.7	0	704	64.0	6,729	611.7
US CS 13-24	540	4997	416.4	53	1689	140.8	6,686	557.2
US CS 25-36	1242	6174	514.5	0	0	0.0	6,174	514.5
US CS Other	8007	38144	366.8	1401	6809	65.5	44,953	432.2
Canadian	3020	15763	716.5	0	2550	115.9	18,313	832.4
US CE	0	0	0.0	580	2446	271.8	2,446	271.8
Total	13,393	71,103	418.3	2,034	14,198	83.5	85,301	501.8

Table 17. Actual and Anticipated Faculty Size by Position

	Actual		Projected			Expected Two-Year Growth	
	2001-2002	2002-2003	2002-2003	2003-2004			
Tenure-Track	3,854	4,279	4,279	4,647	793	21%	
Researcher	396	448	448	496	100	25%	
Postdoc	332	410	410	469	137	41%	
Teaching Faculty	665	722	722	770	105	16%	
Other/Not Listed	97	96	96	100	3	3%	
Total	5,344	5,955	5,955	6,482	1,138	21%	

Table 18. Actual and Anticipated Faculty Size by Department Type and Rank

	Actual		Projected			Expected Two-Year Growth	
	2001-2002	2002-2003	2002-2003	2003-2004			
US CS 1-12	655	703	703	766	111	17%	
US CS 13-24	499	569	569	619	120	24%	
US CS 25-36	446	477	477	531	85	19%	
US CS Other	2,594	2,929	2,929	3,198	604	23%	
Canadian	946	1,051	1,051	1,124	178	19%	
US CE	204	226	226	244	40	20%	
Total	5,344	5,955	5,955	6,482	1,138	21%	

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Table 19. Gender of Newly Hired Faculty

	Tenure-Track		Researcher		Postdoc		Teaching Faculty		Other		Total	
Male	336	85%	60	87%	91	84%	139	78%	7	78%	633	83%
Female	58	15%	9	13%	17	16%	40	22%	2	22%	126	17%
Total	394	52%	69	9%	108	14%	179	24%	9	1%	759	
Unknown	0		0		0		0		0		759	

Table 20. Ethnicity of Newly Hired Faculty

	Tenure-Track		Researcher		Postdoc		Teaching Faculty		Other		Total	
Nonresident Alien	50	15%	6	9%	38	36%	18	12%	2	22%	114	
African American, Non-Hispanic	2	1%	0	0%	1	1%	5	3%	0	0%	8	
Native American or Alaskan Native	3	1%	0	0%	0	0%	1	1%	0	0%	4	
Asian or Pacific Islander	70	21%	19	29%	10	9%	18	12%	3	33%	120	
Hispanic	4	1%	1	2%	0	0%	4	3%	0	0%	9	
White, Non-Hispanic	193	58%	40	61%	57	53%	107	69%	4	44%	401	
Other/Not Listed	12	4%	0	0%	1	1%	1	1%	0	0%	14	
Total have Ethnicity Data For	334		66		107		154		9		670	
Ethnicity/Residency Unknown	60		3		1		25		0		89	
Total	394		69		108		179		9		759	

Table 21. Gender of Current Faculty

	Full		Associate		Assistant		Teaching Faculty		Total	
Male	1,554	92%	1025	86%	920	86%	572	74%	4,071	86%
Female	130	8%	163	14%	150	14%	206	26%	649	14%
Total have Gender Data for	1,684	36%	1,188	25%	1,070	23%	778	16%	4,720	

Table 22. Ethnicity of Current Faculty

	Full		Associate		Assistant		Teaching Faculty		Total	
Nonresident Alien	12	1%	23	2%	152	16%	32	4%	219	5%
African American, Non-Hispanic	15	1%	12	1%	18	2%	23	3%	68	2%
Native American or Alaskan Native	14	1%	6	1%	5	1%	1	0%	26	1%
Asian or Pacific Islander	249	16%	221	21%	170	18%	49	7%	689	16%
Hispanic	24	2%	19	2%	23	2%	16	2%	82	2%
White, Non-Hispanic	1,168	76%	756	71%	552	58%	590	81%	3,066	72%
Other/Not Listed	45	3%	29	3%	25	3%	14	2%	113	3%
Total have Ethnicity Data For	1,527		1,066		945		725		4,263	
Ethnicity/Residency Unknown	157		122		125		53		457	
Total	1,684		1,188		1,070		778		4,720	

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(Baltimore Co.), Massachusetts (Lowell), Minnesota, Missouri (Rolla and Columbia), Nebraska (Lincoln), Nevada (Las Vegas), New Hampshire, New Mexico, North Texas, Notre Dame, Oklahoma, Oregon, Pittsburgh, South Carolina, South Florida, Tennessee (Knoxville), Texas (Arlington and Dallas), Utah, Wisconsin (Milwaukee), and Wyoming.

Computer Engineering departments participating in the survey this year include: Georgia Institute of Technology, Northwestern, Oregon State, Purdue, Rensselaer Polytechnic, Santa Clara, University of California (Santa Cruz), and the University of New Mexico.

Canadian departments participating in the survey include: Carleton, Concordia, Dalhousie, McGill, Memorial, Queen's, Simon Fraser, and York universities. **University of:** Alberta, British Columbia, Calgary, Manitoba, Montreal, New Brunswick,

Ottawa, Quebec (Montreal), Regina, Saskatchewan, Toronto (CS and ECE), Victoria, Waterloo, and Western Ontario.

Acknowledgments

Jean Smith, Patrick McMullen, and Bill Aspray assisted with the data collection, tabulation, and analysis for this survey. We thank them for their assistance. Stu Zweben participated in the discussion of the analysis, and provided useful suggestions for this document.

Endnotes

¹The title of the survey honors the late Orrin E. Taulbee of the University of Pittsburgh, who conducted these surveys for the Computer Science Board until 1984, with retrospective annual data going back to 1970.

²Although the University of Pennsylvania and the University of Chicago were tied in the National Research Council rankings, CRA made the arbitrary decision to place

Table 23. Faculty Losses

	Total
Died	14
Retired	62
Took Academic Position Elsewhere	138
Took Nonacademic Position	64
Remained, Changed to Part Time	22
Other	24
Unknown	11
Total	335

Pennsylvania in the second tier of schools.

All tables with rankings: Statistics sometimes are given according to departmental rank. Schools are ranked only if they offer a CS degree and according to the quality of their CS program as determined by reputation. Those that only offer CE degrees are not ranked, and statistics are given on a separate line, apart from the rankings.

All ethnicity tables: Ethnic breakdowns are drawn from guidelines

set forth by the U.S. Department of Education.

All faculty tables: The survey makes no distinction between faculty specializing in CS vs. CE programs. Every effort is made to minimize the inclusion of faculty in electrical engineering who are not computer engineers. ■

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Table 24. Total Expenditure From External Sources for CS/CE Research by Department Rank and Type

Department, Rank	Total Expenditure			Per Capita Expenditure		
	Minimum	Average	Maximum	Minimum	Average	Maximum
US CS 1-12	\$1,700,000	\$16,164,476	\$48,172,085	\$109,677	\$465,567	\$866,274
US CS 13-24	\$3,426,625	\$8,221,119	\$13,000,000	\$135,897	\$297,867	\$608,532
US CS 25-36	\$692,886	\$4,103,609	\$11,488,546	\$49,281	\$155,676	\$250,000
US CS Other	\$100,000	\$1,766,006	\$11,360,895	\$7,692	\$99,103	\$571,105
Canadian	\$115,743	\$2,954,000	\$13,500,000	\$5,787	\$88,048	\$265,452
US CE	\$13,156	\$1,183,717	\$3,165,098	\$1,196	\$57,742	\$166,666

Table 25. Graduate Students Supported as Full Time Students by Department Type and Rank

Department/ Rank	No. on Institutional Funds						No. on External Funds													
	Teaching Assistants		Research Assistants		Full-Support Fellows		Graduate Assistants for Computer Systems Support		Other		Teaching Assistants		Research Assistants		Full-Support Fellows		Graduate Assistants for Computer Systems Support		Other	
US CS 1-12	632	27%	33	1%	80	3%	1	0%	4	0%	0	0%	1,375	58%	249	10%	1	0%	3	0%
US CS 13-24	346	22%	151	9%	149	9%	7	0%	57	8%	0	0%	866	54%	26	2%	0	0%	3	0%
US CS 25-36	566	41%	54	4%	33	2%	31	2%	7	1%	1	0%	620	45%	55	4%	0	0%	5	0%
US CS Other	2,861	49%	462	8%	125	2%	124	2%	73	2%	7	0%	2,109	36%	59	1%	9	0%	41	1%
Canadian	1,037	49%	294	14%	12	1%	4	0%	54	4%	24	1%	573	27%	56	3%	2	0%	40	2%
US CE	305	43%	38	5%	34	5%	1	0%	2	1%	5	1%	289	41%	29	4%	0		2	0%
Total	5,747	41%	1,032	7%	433	3%	168	1%	197	3%	37	0%	5,832	42%	474	3%	12	0%	94	1%

Table 26. Fall 2001 Academic-Year Graduate Stipends by Department Type and Rank

Department, Rank	Teaching Assistants			Research Assistants			Full-Support Fellows			Grad. Assistants for Computer Systems Support			Other		
	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum
US CS 1-12	\$9,250	\$15,001	\$18,000	\$13,378	\$16,069	\$18,000	\$15,750	\$16,993	\$20,000	\$14,250	\$15,122	\$15,993	\$15,993	\$19,934	\$27,000
US CS 13-24	\$3,362	\$15,278	\$20,000	\$13,464	\$16,685	\$22,440	\$13,252	\$16,208	\$22,440	\$14,420	\$15,999	\$17,700	\$1,300	\$1,300	\$1,300
US CS 25-36	\$10,880	\$13,172	\$15,867	\$10,751	\$13,781	\$15,381	\$12,000	\$14,713	\$18,000	\$4,250	\$10,583	\$14,000	\$11,900	\$12,690	\$13,500
US CS Other	\$3,483	\$11,542	\$23,067	\$4,073	\$12,880	\$26,692	\$1,350	\$15,484	\$31,950	\$4,770	\$11,759	\$24,000	\$1,360	\$11,587	\$28,000
Canadian	\$3,000	\$10,369	\$21,510	\$4,500	\$11,587	\$21,572	\$13,000	\$22,307	\$33,373	\$12,000	\$17,927	\$33,500	\$1,875	\$11,344	\$16,500
US CE	\$9,900	\$12,360	\$14,145	\$6,976	\$13,155	\$19,140	\$11,700	\$15,709	\$22,000	\$9,600	\$9,750	\$9,900	\$0	\$0	\$0

Table 27. Nine-month Salaries, 141 Responses of 164 US CS Computer Science Departments

Faculty Rank	Number of Faculty	Reported Salary Minimum				Reported Salary Maximum		
		Minimum	Mean	Maximum	Average of all Salaries	Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	606	\$24,000	\$47,944	\$96,084	\$55,450	\$34,901	\$65,062	\$130,000
Assistant	805	\$45,996	\$68,740	\$86,829	\$72,691	\$50,004	\$76,443	\$116,390
Associate	890	\$45,624	\$73,520	\$117,000	\$81,050	\$67,064	\$90,115	\$147,750
Full	1,245	\$49,500	\$85,630	\$139,000	\$105,396	\$79,697	\$136,904	\$264,892

Table 28. Nine-month Salaries, 11 Responses of 12 US CS Computer Science Departments Ranked 1-12

Faculty Rank	Number of Faculty	Reported Salary Minimum				Reported Salary Maximum		
		Minimum	Mean	Maximum	Average of all Salaries	Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	69	\$31,500	\$56,384	\$96,084	\$68,852	\$64,800	\$84,111	\$100,404
Assistant	105	\$49,500	\$72,419	\$78,500	\$78,250	\$78,304	\$83,045	\$88,000
Associate	91	\$60,825	\$81,462	\$102,800	\$88,232	\$77,700	\$96,265	\$120,000
Full	216	\$49,500	\$88,106	\$106,400	\$119,665	\$138,000	\$166,364	\$188,800

Table 29. Nine-month Salaries, 12 Responses of 12 US Computer Science Departments Ranked 13-24

Faculty Rank	Number of Faculty	Reported Salary Minimum				Reported Salary Maximum		
		Minimum	Mean	Maximum	Average of all Salaries	Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	54	\$46,542	\$59,936	\$81,840	\$69,019	\$61,000	\$80,233	\$130,000
Assistant	76	\$69,200	\$75,956	\$84,000	\$80,324	\$78,381	\$84,748	\$93,600
Associate	63	\$74,700	\$84,601	\$95,000	\$91,756	\$83,000	\$99,231	\$141,500
Full	195	\$74,590	\$89,190	\$108,100	\$121,580	\$147,500	\$174,470	\$264,892

2000-2001 Taulbee Survey

Table 30. Nine-month Salaries, 12 Responses of 12 US Computer Science Departments Ranked 25-36

Faculty Rank	Number of Faculty	Reported Salary Minimum			Average of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum		Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	47	\$38,480	\$52,520	\$73,712	\$59,901	\$47,500	\$71,705	\$129,150
Assistant	84	\$64,400	\$71,690	\$80,000	\$75,051	\$68,000	\$78,555	\$87,188
Associate	87	\$62,963	\$77,809	\$86,536	\$84,456	\$83,600	\$94,139	\$112,500
Full	146	\$68,199	\$86,729	\$99,350	\$114,218	\$109,200	\$161,186	\$245,575

Table 31. Nine-month Salaries, 106 Responses of 128 US Computer Science Departments Ranked Higher than 36 or Unranked

Faculty Rank	Number of Faculty	Reported Salary Minimum			Average of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum		Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	436	\$24,000	\$44,952	\$80,000	\$51,805	\$34,901	\$60,368	\$114,480
Assistant	540	\$45,996	\$67,131	\$86,829	\$70,898	\$50,004	\$74,486	\$116,390
Associate	649	\$45,624	\$70,975	\$117,000	\$78,719	\$67,064	\$88,006	\$145,750
Full	688	\$59,660	\$84,807	\$139,000	\$100,871	\$79,697	\$126,347	\$194,893

Table 32. Nine-month Salaries, 8 Responses of 28 US Computer Engineering Departments

Faculty Rank	Number of Faculty	Reported Salary Minimum			Average of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum		Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	8	\$50,688	\$58,096	\$67,194	\$65,400	\$50,688	\$72,703	\$92,700
Assistant	54	\$55,000	\$68,705	\$80,100	\$72,285	\$68,000	\$75,441	\$82,500
Associate	64	\$60,200	\$71,325	\$79,006	\$75,944	\$60,200	\$83,969	\$98,000
Full	110	\$79,400	\$85,909	\$95,000	\$98,158	\$80,220	\$132,893	\$180,000

Table 33. Twelve-month Salaries, 23 Responses of 23 Canadian Computer Science Departments (Canadian Dollars)

Faculty Rank	Number of Faculty	Reported Salary Minimum			Average of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum		Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	67	\$44,097	\$59,169	\$108,000	\$63,780	\$46,809	\$69,707	\$108,000
Assistant	186	\$54,019	\$69,202	\$95,000	\$75,208	\$57,368	\$82,359	\$117,000
Associate	206	\$60,319	\$76,452	\$111,000	\$87,107	\$78,684	\$98,368	\$150,000
Full	296	\$50,211	\$85,827	\$119,912	\$104,845	\$91,557	\$130,158	\$182,000

Table 34. Nine-month Salaries for New Ph.D.s, Responding US CS and CE Departments

Faculty Rank	Number of Faculty	Reported Salary Minimum			Average of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum		Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	67	\$44,097	\$59,169	\$108,000	\$63,780	\$46,809	\$69,707	\$108,000
Tenure-Track	101	\$45,996	\$73,393	\$85,000	\$73,979	\$45,996	\$74,646	\$86,000
Researcher	8	\$27,000	\$53,830	\$93,000	\$54,187	\$27,000	\$54,544	\$93,000
Non-Tenure Teaching Faculty	10	\$35,000	\$51,767	\$63,000	\$52,374	\$35,000	\$54,671	\$72,785
Postdoc	22	\$28,500	\$46,475	\$60,000	\$47,776	\$28,500	\$49,665	\$60,000

CRA Conference at Snowbird

It's time once again to begin thinking about Snowbird! Mark your calendars for CRA's biennial conference scheduled for July 14-16, 2002 in Snowbird, Utah. See back page to review the preliminary program.

This is CRA's flagship conference for chairs of Ph.D.-granting departments of computer science and computer engineering, as well as leaders from U.S. industrial and government computing research laboratories and centers. A number of other senior people from research groups, government, academia, and professional societies also attend.

The Snowbird Committee has been working since last fall to put together a strong program to address many of the biggest issues facing CS&E departments and research organizations.

The conference opens with a keynote address by Robert Kahn, President of the Corporation for National Research Initiatives (CNRI) and a driver of major

computing research initiatives for the past 30 years. There are three joint industry/academic plenary sessions: Bioinformatics and Computational Biology; Diversifying Computing—Three Perspectives; and Homeland Security. Peter Freeman, newly appointed assistant director for the NSF Computer and Information Science and Engineering (CISE) Directorate, will give a keynote luncheon address. The program also will offer a workshop for new department chairs.

Every non-plenary time slot has workshop sessions of interest both to industrial research directors and academic attendees. Some focus on technical issues, such as the relationship of computer science and engineering to other research disciplines and efforts to set new research directions. Some cover problems of industry, such as the future of corporate labs and of industry/academic interaction, such as collaboration models and legal agreements. Other sessions of

general interest address the business of publications, public policy aspects of computing research, and the evolution of IT into a profession.

For the academic audience, there are sessions on undergraduate curriculum and accreditation, developing a research environment in traditionally non-research departments, research funding, recruiting and retention, new academic structures, and new pressures on CS&E academic units.

The opportunity to network with peers is one of the most valuable aspects of the conference, and it comes around only once every two years. So make your plans to escape to the mountains in July and join the crowd for several days of stimulating discussions about the future of computer science and engineering research.

For details about the program, accommodations, and registration, please visit the CRA Web site at: <http://www.cra.org/>. ■

UBIQUITY Grace Hopper Celebration of Women in Computing 2002 Conference

Hyatt Regency Vancouver, British
Columbia, Canada

October 9-12, 2002

Details: <http://gracehopper.org>

CRA Welcomes New Academic Members

Drexel University (MCS)
**New Mexico State
University (CS)**
University of Vermont (CS)

Professional Opportunities

Auburn University

Department of Computer Science and Software Engineering

Assistant, Associate, and Full Professor

The Department of Computer Science and Software Engineering (CSSE) invites applications for a tenure-track faculty position at the Assistant, Associate, or full Professor level to begin fall semester 2002. Salary will be commensurate with the candidate's qualifications. Women and ethnic minorities are encouraged to apply. Responsibilities include research, graduate student supervision, and graduate and undergraduate teaching. In addition, successful applicants will be expected to participate in departmental, college, and university service activities.

Applicants should have a Ph.D. in computer science, software engineering, or a closely related field; however, applicants that are ABD may apply if they reasonably expect to complete the terminal degree by January 2003. The following are preferred research areas: computer and communication networks, wireless engineering, information assurance and security, real-time and embedded systems, wearable computing, operating systems, interactive and intelligent systems, database systems, and software engineering; however, all areas of computer science and software engineering will be considered.

CSSE is in the process of forming a center for Innovations in Mobile, Pervasive, and Agile Computing Technologies (IMPACT), which is a joint effort with the Department of Electrical and Computer Engineering. The University will invest over \$1M (estimated) in five years in new positions with an objective of gaining national prominence in the IMPACT research areas.

The CSSE Department currently has 17 full-time faculty members and supports strong undergraduate (B.S., B.Sw.E.) and graduate programs (M.S., M.Sw.E., Ph.D.). Enrollment for Fall 2001 is approximately 600 undergraduate and 100 graduate students. Faculty research areas include software engineering, computer and communication networks, human-computer interaction, wearable computing, artificial intelligence, and database systems. More information about the Department and faculty research interests can be obtained from the Department's home page (<http://www.eng.auburn.edu/csse>).

Auburn University was chartered in 1856, and is the largest university in the state of Alabama, with a student enrollment of over 22,000 and 1,125 faculty. Auburn is located 100 miles southwest of Atlanta and 50 miles northeast of Montgomery, the State Capitol. Auburn offers nearly 150 baccalaureate degree programs in 64 academic departments. The Graduate School provides master's level programs in 130 areas and doctoral programs in 96 fields. The College of Engineering has an enrollment of 3,100 undergraduates and 500 graduate students in eight departments. The picturesque main campus covers 1,875 acres, and includes the entire southwest quadrant of the city of Auburn. The Auburn-Opelika community has a population of about 70,000, an excellent public school system, and has been nationally ranked as one of the "best small towns in America".

Applicants should submit a current curriculum vita, research vision, teaching philosophy and three references to:

James H. Cross II, Professor and Chair
Computer Science and Software Engineering
107 Dunstan Hall
Auburn University, AL 36849-5347
cross@eng.auburn.edu (with copy to sheriev@eng.auburn.edu)
334-844-6300 (Voice)
334-844-6329 (Fax)
<http://www.eng.auburn.edu/csse/>

The applicant review process is expected to begin in January 2002 and continue until successful candidates have been identified.

Auburn University is an Affirmative Action/Equal Opportunity Employer.

Ball State University

Department of Computer Science

Tenure/Rank Open

The Department of Computer Science seeks applicants for a full-time, tenure-track faculty position. Rank open. Applicants should have the desire and interest to teach all undergraduate and master's level graduate courses with a special background in one or more of the following areas: database/data mining, Web technologies, systems software, networks, security, software testing and reliability, and other areas closely related to software engineering. In particular, the successful applicant must be able to teach CS1 and CS2. An active productive research program is required for tenure and promotion. Minimum qualification: doctorate in computer science or closely related field, such as mathematics or electrical engineering by August 16, 2002. Preferred qualifications: Ph.D. in computer science; teaching experience.

Ball State University has approximately 17,500 students. The Department of Computer Science has approximately 200 undergraduate majors and 100 M.S. students. Departmental lab facilities include both Microsoft Windows-based machines and Unix-based machines. For more information, visit Web pages at www.bsu.edu/ and www.cs.bsu.edu/

Send letter of application; vita; copies of transcripts; and the names, addresses, and telephone numbers of at least three references to:

Dr. J. Michael McGrew
Computer Science Search Committee
Department of Computer Science
Ball State University
Muncie, IN 47306

Review of applications will begin immediately and will continue until the position is filled. (www.bsu.edu)

Ball State University is an equal opportunity, affirmative action employer and is strongly a and actively committed to diversity within its community.

Boston University

Bioinformatics Program

Faculty Position

The Bioinformatics Program at Boston University is inviting applications for tenure-track appointments in Bioinformatics and Computational Biology. Junior and senior level candidates with established international reputations in the field are encouraged to apply. All candidates must have a strong commitment to interdisciplinary computational research and education. Boston University has established a flourishing PhD program in Bioinformatics with 45 PhD students currently pursuing leading edge research in areas ranging from whole-genome analysis and cancer to systems biology and molecular/cell modeling (<http://bioinformatics.bu.edu>). The faculty and students are often involved in collaborative research with the NCBI at NIH, the BU Array Facility, the MIT Genome Center, the Institute for Genomic Research, Boston area medical schools and numerous biotech companies in New England.

All faculty in the Bioinformatics Program have appointments in traditional departments such as Biology, Chemistry, Biomedical Engineering, Mathematics, Computer Science and others.

To apply please send a resume (including the names of at least four references) to:

Chair, Bioinformatics Search Committee
c/o Caroline Lyman
Bioinformatics Program
Boston University 44 Cummington Street
Boston, MA 02215

BUCKNELL UNIVERSITY

Department of Computer Science

Applications are invited for one or more anticipated one-year entry-level visiting assistant professor positions beginning mid-August, 2002. A Ph.D. in Computer Science or Computer Engineering is preferred, but individuals with substantial progress towards such a degree will be considered. A demonstrated interest in and promise of excellence in teaching is important. All research areas will be considered. Interest and ability to teach one or more of the core courses (computer organization, programming languages, operating systems, CSI, and CSII) should be indicated in the application letter. Salary and fringe benefits are competitive.

The computing environment for instruction, research, and laboratories consists of nearly 70 SUN Ultra 10 workstations. For more information on our program visit our web page at www.eg.bucknell.edu/csci.

Applications will be considered as received and recruiting will continue until the positions are filled. Candidates should send a resume, transcripts for all graduate work (photocopy acceptable), and the name of three references to:

Gary Haggard, Chair
Dept. of Computer Science
Bucknell University
Lewisburg, PA 17837

Bucknell encourages applications from women and members of minority groups (EEO/AA).

College of Staten Island of the City University of New York

New Media and Software DEVELOPMENT Department of Computer Science

The Department of Computer Science, College of Staten Island of the City University of New York, seeks candidates for an anticipated tenure-track position as Associate or Professor of Computer Science, to start September 2002. Requirements: Ph.D. in Computer Science or related field with a specialization in New Media and Software Development; a strong publication record, including evidence of active research. The successful candidate will present credentials appropriate for appointment to the doctoral faculty of the CUNY Graduate Center. Responsibilities include teaching at the undergraduate and graduate levels, performing department and college service, and engagement in an active and productive research agenda. Rank and salary commensurate with qualifications. Review of applications will begin on February 11, 2002 and continue until the position is filled. Send letter of application, including statement on teaching philosophy, proposal for future research projects, *curriculum vitae*, and names, addresses, and phone numbers of three references to:

Chair, Computer Science
New Media and Software Search Committee
Room 1N-215c
College of Staten Island/CUNY
2800 Victory Blvd.
Staten Island, NY 10314
EEO/AA/ADA employer.

Georgia Institute of Technology

College of Computing

DIRECTOR OF ACADEMIC SUPPORT SERVICES

Position Number - PVA 43596

The College of Computing has about 1800 BS, MS and PhD students. We seek a highly-motivated professional to join our academic affairs team in this major enterprise. You will manage daily operations and office staff, oversee all administrative aspects of undergraduate and graduate programs, outreach programs, study abroad programs, UROC program, job fair, course scheduling, data gathering and reporting. You will have the opportunity to initiate new outreach programs designed to attract strong undergraduate and graduate students, including under-represented minorities and women.

The academic affairs team includes the Director of Undergraduate Student Services, the Director of Undergraduate Education, the Director of Assessment and Accreditation, the Director of International Programs, and this new position. All report to the Associate Dean. You will participate fully in planning and executing a program that will distinguish the College of Computing as having one of the best educational programs in the United States.

A Master's Degree is required, preferably in academic administration, student personnel, or management. You should have four years of relevant job experience in academic administration, including management of an office staff and working with teaching assistants. This position requires excellent leadership skills, the ability to communicate and work with diverse audiences as well as a high level of attention to detail. This is an Academic Professional position, which carries general faculty status. Competitive salary and benefits. Georgia Tech is an equal opportunity employer.

Please submit your resume to:
Linda Dillon
College of Computing
801 Atlantic Drive
Atlanta, GA 30332-0280 or via
email at dillon@cc.gatech.edu

Indiana University

Computer Science Department

Faculty Positions

The Indiana University Computer Science Department anticipates filling several tenure-track faculty positions beginning 2002-2003. Areas of interest are databases, embedded systems and networking. In addition our new, privately endowed, pervasive technology labs will be hiring several senior positions in the areas of graphics, human computer interaction, embedded systems and data mining.

The CS department, which is part of the College of Arts and Sciences, is working cooperatively with our new School of Informatics, which offers a B.S. degree focusing on the application of information technology to various disciplines and has M.S. programs in Human Computer Interaction, and Bio and Chemical Informatics. Cross-appointments with Informatics are possible in computer science related areas such as data mining and search technologies.

A Ph.D. in Computer Science is required for all CS faculty positions. Applicants must have demonstrated potential for excellence and productivity in research. In addition, a strong contribution to the educational mission of the department is expected.

The department occupies a spacious limestone building with extensive state-of-the-art computing facilities. The attractive wooded campus of Indiana University is located in Bloomington, chosen as one of the most cultural and livable small cities in the US, and only one hour from the Indianapolis airport. To learn more about the department please visit our web site at www.cs.indiana.edu.

Please send a detailed CV and a list of references to:

Faculty Search, Computer Science Department
Indiana University, Lindley Hall 215
Bloomington, IN 47405-7104
email: search@cs.indiana.edu

Indiana University is an Equal Opportunity/Affirmative Action Employer. The Computer Science Department strongly encourages applications from women and minorities.

Lehigh University

Lehigh University is seeking a dynamic individual with strong credentials in computer science/engineering and the visionary skills to lead an active and young faculty team as Chair of the CSE department. The successful candidate will build upon and shape the department's core strengths and plan, recruit and mentor outstanding new faculty and promote productive interactions with our sister departments in Electrical and Computer Engineering

(ECE) and Industrial and Systems Engineering (ISE). The new Chair will lead the CSE faculty in maintaining outstanding computer science and engineering activities and fostering significant growth and interdisciplinary collaboration.

As part of a new \$75M plan for the future, Lehigh University is investing in Information Technology across three departments in the P.C. Rossin College of Engineering and Applied Science and in a new degree program in Computer Science and Business (CSB) to be offered jointly by the College of Business and Economics and the CSE Department.

Lehigh is ranked among the top 40 national universities with quality graduate and undergraduate programs in Computer Science and Computer Engineering — the Gourman report consistently ranks our undergraduate Computer Engineering program among the top 20 in the nation. The CSE department offers BA, BS, MS, and PhD degrees in CS, and co-sponsors computer engineering degrees with the ECE department.

Lehigh University invites applications and nominations for the position of Chair of the Department of Computer Science and Engineering (CSE) in the P.C. Rossin College of Engineering and Applied Science. Candidates should have:

A Ph.D. in Computer Science, Computer Engineering or a closely related field. A distinguished record of research scholarship, funding, and service appropriate for a tenured appointment at the rank of Full Professor.

Demonstrated visionary leadership, excellent interpersonal skills, and administrative talent. A commitment to excellence and innovation in education.

Review of applications will begin in January 2002 and continue until the position is filled. Informal inquiries and nominations are encouraged and will be treated confidentially. Applicants should submit a CV and cover letter to:

Roger Nagel
Chair of the CSE Chair Search Committee
Lehigh University, 200 West Packer Ave.
Bethlehem, PA 18015
Email questions to: Roger.nagel@lehigh.edu
For more information visit www.cse.lehigh.edu/. Lehigh is an AA/EEO Employer.

Marquette University

Department of Mathematics, Statistics, and Computer Science

Assistant or Associate Professorships

Applications are invited for three tenure-track positions in computer science or closely related disciplines. These positions will begin no later than August 16, 2002. For the first position, preference will be given to applicants with expertise in scientific computing in bioinformatics and should be ready to teach numerical analysis. For the second position, preference will be given to applicants with expertise in distributed computing, especially with respect to Internet distributed applications, and should be ready to teach networking. For the third position, preference will be given to applicants with expertise in computational mathematics, such as computational graph theory or computational algebra (this person should feel comfortable teaching computer science classes). We're not married to these categories; we would consider a good person in, for example, cognitive science. Candidates should have a Ph.D. in computer science, mathematics, or a closely related discipline, be ready to teach computer science at both the undergraduate and graduate levels, and show a professional commitment to good teaching, to continuing scholarly productivity, and to service. Screening will begin immediately and continue until the positions are filled.

The Department of Mathematics, Statistics and Computer Science is a diverse department of twenty-three tenured or tenure-track faculty with undergraduate majors in computer science, computational mathematics, mathematics, and mathematics education. The Department also offers graduate degrees at the master's and doctoral levels. Moreover, it provides support for students in the Department of Electrical and Computer Engineering, a professional master's degree in computing, and a new master's degree in bioinformatics offered jointly with the Medical College of Wisconsin.

Marquette University is a Jesuit, Catholic university of about 11,000 students in downtown Milwaukee, Wisconsin, dedicated to teaching, research, and service to humanity. Milwaukee, a great place on a great lake (Lake Michigan) is the core of a metropolitan area of about 1.5 million people, close to Madison, Wisconsin, and Chicago, Illinois, and the locus of vibrant intellectual, cultural, and business communities. Applicants should submit a letter of application, a resume, transcripts, which need not be official, and three letters of reference to:

Prof. John Simms
Department of Mathematics, Statistics and Computer Science
Marquette University
POB 1881

Milwaukee WI 53201-1881
More information is available at <http://mscs.mu.edu>.

Professional Opportunities

Montana State University Department of Computer Science Department Head

The Computer Science Department at Montana State University is looking for a leader with passion, vision, and a clear understanding of the instructional, research, interdisciplinary, and career aspects of the discipline of computing to guide the department through an anticipated period of development and growth. This position is truly unique in that it offers the successful candidate outstanding opportunities for career development in a superb living environment. The Computer Science Department at Montana State University is part of the College of Engineering. The department has grown into one of the most highly respected in the northern Rocky Mountain region, offering B.S., M.S., and Ph.D. degrees. The department is engaged in a variety of research activities. Interdisciplinary collaborations are highly encouraged on campus and are a particular strength of the department.

MSU is located in Bozeman, an extended community of about 40,000 nestled in the Rocky Mountains of Southwest Montana. Outdoor recreational activities abound: hiking, mountain biking, climbing, skiing (downhill and cross-country), camping, backpacking, fishing, hunting, and whitewater sports are all offered within minutes from town. Yellowstone Park can be visited in a day trip. The airport is served by four national airlines. The city boasts high quality medical facilities, very low crime rate, many fine restaurants, acclaimed public and private schools, a symphony orchestra and choir, an annual opera, and nationally known events such as the Sweet Pea Festival, Lewis and Clark Marathon and Bridger Ridge Run. Screening of applications will begin February 15, 2002 and continue until a suitable candidate is found. Women and minority candidates are especially encouraged to apply.

All applicants must request complete vacancy announcement and application directions from Cindy Bridgewater, 406-994-2272, or see at www.montana.edu/level2/jobs.html. ADA/AA/EO/VET PREF

North Dakota State University Available position Fall 2002:

Computer Science tenure track Assistant/Associate Professor

Networks, Software Engineering or Systems preferred. Quality research & teaching (3 courses/year) expected, substantial startup package. Dept. has 16 faculty in diverse research areas, 20 PhD, 100 MS & 400 BS students. Admin. is committed to carnegie research extensive class. Research funds over \$4 million in the past 3 years. Fargo ranks high in national quality-of-life surveys. NDSU is an equal opportunity employer. www.cs.ndsu.nodak.edu/position.

Oak Ridge National Laboratory Computational Chemistry Computer Science and Mathematics Division Postdoctoral Position

The Computer Science & Mathematics (CSM) www.csm.ornl.gov/csm-home.html Division at the Oak Ridge National Laboratory (ORNL) invites outstanding candidates to apply for an immediate opening in computational chemistry. The successful applicant will participate in a highly interdisciplinary project on the development of advanced software tools for the automatic synthesis of high-performance algorithms for applications such as correlated electronic structure methods.

This position offers an opportunity to interact with a broad range of research activities at a world-class laboratory for computational science, including the Center for Computational Sciences (CCS), which hosts one of the largest unclassified computing capabilities in the world.

Position requires a Ph.D. in chemistry or closely related field, experience in the implementation of correlated electronic structure methods, and a desire to work closely with computer scientists and other computational scientists. Applicants with experience in parallel computing or the NWChem package are especially encouraged. A strong background in scientific publications is also encouraged. Initial appointment is for one year.

For consideration, please submit a CV and cover letter, including a description of research interests, chemistry software packages used, and software development experience to:

David Bernholdt
Computational Chemistry
Computer Science and Mathematics
Division
Oak Ridge National Laboratory
P. O. Box 2008
Oak Ridge, TN 37831-6367 or
e-mail bernholdtde@ornl.gov
Please reference project #ORNL02-14-CMSMD when applying for this position.

This appointment will be offered through the ORNL Postdoctoral Research Associates Program (<http://www.ornl.gov/orise/edu/postgrad/ornlpdoc.htm>), which is administered by the Oak Ridge Institute for Science and Education (ORISE). Further information regarding this program, as well as visa and clearance requirements can be found under the "Appointment Information" link at this website. The program is open to all qualified

U.S. and non-U.S. citizens without regard to race, color, age, religion, sex, national origin, physical or mental disability, or status as a Vietnam-era veteran or disabled veteran.

ORNL, a multiprogram research facility managed by UT-Battelle, LLC, for the U.S. Department of Energy, is an equal opportunity employer committed to building and maintaining a diverse work force.

Oak Ridge National Laboratory Computer Science Computer Science and Mathematics Division Postdoctoral Position

The Computer Science & Mathematics (CSM) www.csm.ornl.gov/csm-home.html Division at the Oak Ridge National Laboratory (ORNL) invites outstanding candidates to apply for an immediate opening in computer science. The successful applicant will participate in a highly interdisciplinary project on the development of advanced software tools for the automatic synthesis of high-performance algorithms for complex tensor-based simulation methods, focusing initially in the areas of quantum chemistry and nuclear physics.

This position offers an opportunity to interact with a broad range of research activities at a world-class laboratory for computational science, including the Center for Computational Sciences (CCS), which hosts one of the largest unclassified computing capabilities in the world.

Position requires a Ph.D. in computer science or closely related field, a desire to work closely computational scientists from other fields, and experience in one or more of the following areas: compilers and optimization techniques, domain-specific languages, generic and generative programming, or functional programming and monads. A strong background in scientific publications is also encouraged. Initial appointment is for one year.

For consideration, please submit a CV and cover letter, including a description of research interests, software development experience, and interdisciplinary or computational science experience to:

David Bernholdt
Computer Science
Computer Science and Mathematics
Division
Oak Ridge National Laboratory
P. O. Box 2008
Oak Ridge, TN 37831-6367 or
e-mail bernholdtde@ornl.gov
Please reference project #ORNL02-13-CMSMD when applying for this position.

This appointment will be offered through the ORNL Postdoctoral Research Associates Program (<http://www.ornl.gov/orise/edu/postgrad/ornlpdoc.htm>), which is administered by the Oak Ridge Institute for Science and Education (ORISE). Further information regarding this program, as well as visa and clearance requirements can be found under the "Appointment Information" link at this website. The program is open to all qualified U.S. and non-U.S. citizens without regard to race, color, age, religion, sex, national origin, physical or mental disability, or status as a Vietnam-era veteran or disabled veteran. ORNL, a multiprogram research facility managed by UT-Battelle, LLC, for the U.S. Department of Energy, is an equal opportunity employer committed to building and maintaining a diverse work force.

The Ohio State University Department of Computer and Information Science

The Department of Computer and Information Science invites applications for at least six tenured or tenure-track positions. Areas of primary interest include, but are not limited to, artificial intelligence (including speech and language processing, vision, and machine learning), graphics (including visualization, computer animation, geometric modeling and meshing), human-computer interaction, networking (including mobile computing and network security/dependability), software engineering (including component-based software, formal methods, and programming languages), and systems (including operating systems, data-intensive computing, grid computing, network-based computing, parallel systems, distributed computing, and scientific computing).

Appointments at all ranks will be considered. Applicants for an assistant professor position should hold or be completing a Ph.D. in computer science or a closely related field, and have a commitment to excellent research and quality teaching. Applicants for a senior position should also demonstrate a strong record of external funding and impact on their field.

The department maintains active collaborative relationships with the Ohio Supercomputer Center, Advanced Computing Center for the Arts and Design, Cognitive Science Center, and many other centers and departments in the university.

To apply, please send a curriculum vita, along with a cover letter, by e-mail to fsearch@cis.ohio-state.edu or by mail to:
Chair, Faculty Search Committee
Department of Computer and Information Science
The Ohio State University
2015 Neil Avenue, DL395
Columbus, OH 43210-1277

Review of applications will begin immediately and will continue until the positions are filled. For additional information please see <http://www.cis.ohio-state.edu>.

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 SCHOOL OF INFORMATION SCIENCES AND TECHNOLOGY

ist.psu.edu
The School of Information Sciences and Technology (IST) invites applications for a number of full-time, tenure-track positions at University Park. Rank will be determined on the basis of qualifications and experience. Senior rank will be considered for applicants with recognized national and international stature. Anticipated starting date is August 2002.

Faculty members will have an opportunity to participate actively and contribute significantly in the formative stages of this exciting new school and its programs. The School opened in Fall 1999, as a brand new academic unit with college status within the University. It began to offer a baccalaureate program in Fall 1999, and commences a research Ph.D. program in August 2001. A professional masters program is slated to begin in Fall 2002. A new 180,000 ft², state-of-the-art building is expected to open in winter 2003. This building will showcase the School and stand as a symbol of the University's commitment to the fields of the information sciences and related technologies.

IST is an interdisciplinary school with a focus on research and education that emphasizes how people apply technology to support information processing in virtually any setting. The faculty's research integrates concepts of users, information, and technology, and multiple domains and levels of analysis. Current research encompasses, but is not restricted to, cognitive, computer and social sciences. The School's educational mission is to provide students with the general principles that describe the creation, organization, application, and structure of information, as well as the implications of information and information technologies in law, ethics, economics and social policy. Our close interaction and collaboration with traditional and existing programs is reflected in a growing number of multi-disciplinary educational and research initiatives. The School also benefits from an ever-increasing number of strong partnerships with industry and government.

Candidates with strong backgrounds in all aspects of the information sciences and technology are encouraged to apply. Candidates with interests and experience in requirements engineering, enterprise integration, software engineering, databases, human computer interaction, information policy, and/or telecommunications for the global digital economy are especially welcome.

Candidates should hold a doctorate degree. The discipline of a candidate's education is not as important as having strong interest and experience in computer applications within that discipline. Candidates should have a strong research interest in areas consistent with the information orientation of the School and have the potential to obtain and direct funded research projects. Background should also include an interest in and commitment to teaching at both the undergraduate and graduate level.

Review of candidate applications will begin immediately and will continue until all positions are filled. Applications should include cover letter, full curriculum vitae, a one page statement of professional interests, and a separate listing of three references (referees should submit their letters to us under separate cover) that includes their names, addresses, and phone/e-mail addresses. Submit applications to:

Chair, Faculty Search Committee
recruit@ist.psu.edu
School of Information Sciences and
Technology
001 Thomas Building
Box - CRA
The Pennsylvania State University
University Park, PA 16802
Tel: 814-865-4461
Toll-Free (US only): 877-690-1266

Penn State is committed to affirmative action, equal opportunity and the diversity of its workforce. General 10/10/01

PURDUE UNIVERSITY Department of Computer Sciences Tenure-Track Positions

The Department of Computer Sciences at Purdue University invites applications for tenure-track positions beginning August 2002. Positions are available at the assistant professor level; senior positions will be considered for highly qualified applicants. Applications from outstanding candidates in all areas of computer science will be considered. Areas of particular interest include security, networking and distributed systems, scientific computing, and software engineering.

The Department of Computer Sciences offers a stimulating and nurturing academic environment. Thirty-five faculty members

have research programs in analysis of algorithms, bioinformatics, compilers, databases, distributed and parallel computing, geometric modeling and scientific visualization, graphics, information security, networking and operating systems, programming languages, scientific computing, and software engineering. The department implements a strategic plan for future growth which is strongly supported by the higher administration. This plan includes a new building expected to be operational in 2004 to accommodate the significant growth in faculty size. Further information about the department is available at <http://www.cs.purdue.edu>.

Applicants should hold a Ph.D. in Computer Science, or a closely related discipline, and should be committed to excellence in teaching and have demonstrated strong potential for excellence in research. Salary and benefits are highly competitive. Special departmental and university initiatives are available for junior faculty. Candidates should send a curriculum vitae, a statement of career objectives, and names and contact information of at least three references to:

Chair, Faculty Search Committee
Department of Computer Sciences
Purdue University
West Lafayette, IN 47907-1398

Applications are being accepted now and will be considered until the positions are filled. Inquiries may be sent to fac-search@cs.purdue.edu.

Purdue University is an Equal Opportunity/Affirmative Action employer. Women and minorities are especially encouraged to apply.

Purdue University School of Electrical and Computer Engineering

The School of Electrical and Computer Engineering seeks outstanding candidates in computer engineering for research and teaching in the following areas: artificial intelligence, compilers, computer graphics, computer architecture, computer networks, distributed computing, multimedia systems, operating systems, software engineering, VLSI and CAD. Strong candidates in all areas of computer engineering are encouraged to apply. Openings are for tenure-track faculty at all levels.

Send a resumé, including a statement of research and teaching interests and a list of at least three references, to:
Head, School of Electrical and Computer
Engineering
Purdue University, 1285 EE Building
West Lafayette, IN 47907-1285

Applications will be considered as they are received. Purdue University is an Equal Opportunity/Affirmative Action employer.

Rensselaer Polytechnic Institute Department of Computer Science

The Department of Computer Science at Rensselaer Polytechnic Institute invites applications for expected tenure-track positions at the Assistant Professor level in networking, data mining, data visualization, and scientific computation and modeling, and at the full Professor level in imaging and visualization, starting in the fall of 2002. Additionally, strong candidates in all areas of computer science will be considered. Applicants should hold a PhD in Computer Science or a closely allied field, have substantial research accomplishments, and demonstrate a strong commitment to teaching. Applicants should submit a vita with a list of publications, a statement describing current and planned research, and a statement describing teaching philosophy to:

New Staff Committee
Department of Computer Science
Rensselaer Polytechnic Institute
Troy, NY 12180-3590

Candidates should also arrange to have at least three letters of recommendation sent to the same address.

Rensselaer, under the leadership of its new president, plans to double its research program in the next five years. Major research initiatives in information technology and biotechnology are integral components of this plan. The Department of Computer Science faculty are strongly encouraged to participate in collaborative research at the forefront of both these initiatives. The Department, currently consisting of 22 full-time faculty members, offers BS, MS and PhD degrees, and has multi-million dollar research programs with excellent computing facilities. It has hired 9 junior faculty over the past 4 years, 5 of whom have won NSF Career Awards. Substantial growth over the next several years is anticipated.

Rensselaer Polytechnic Institute is an Affirmative Action/Equal Opportunity Employer.

Rutgers University Faculty Positions

Rutgers University's newly launched Division of Computer and Information Sciences has openings for senior and junior positions in the broad area of systems. The Division is especially interested in developing interdisciplinary centers and seeking highly qualified senior individuals to lead them.

We offer very competitive salaries and startup packages and are aggressively growing. We especially encourage women and under-represented minorities to apply. Please submit a

Professional Opportunities

curriculum vita including names of at least four professional references to:

Hiring Chair
Department of Computer Science
Rutgers, the State University
110 Frelinghuysen Road
Piscataway, NJ 08854-8019
by March 15, 2002 or send email to hir-ing@cs.rutgers.edu for further information.
Rutgers University is an Equal Opportunity/Affirmative Action Employer.

Ryerson University Department of Mathematics, Physics and Computer Science Chair

Canada's leading university for applied education with over 40 career-oriented undergraduate and graduate programs, distinguished by their relevant curriculum and applied research, scholarly and creative activities, Canada's largest Continuing Education Division, offering courses and certificates for personal and professional development.

Applications and/or nominations are invited for the position of Chair for an initial term of five years, beginning on July 1st, 2002. The Department has 700 undergraduate students, 43 full-time faculty and offers full and part-time undergraduate degree programs in Applied Computer Science with a co-op option. The Department also provides a wide variety of service courses in all three disciplines. In cooperation with other departments in Engineering and Applied Science at Ryerson, the Department participates in the delivery of both M.A.Sc and M.Eng graduate programming. Further information is available at the departmental website <http://www.mpcs.ryerson.ca>

Candidates must have an earned doctorate in Mathematics, or Physics, or Computer Science, or a closely related field, and ideally should have some exposure to all three disciplines. If the degree is not in Computer Science, the candidate must have a demonstrated knowledge in Computer Science or industrial experience in the computer field. A demonstrated record of teaching, research and administration is required.

As the chair, you provide leadership for the development, implementation and evolution of undergraduate and graduate degree programs and curriculum, promote the expansion of research, establish strong University-Industry relationships, support development activities and administer resources. The chair is expected to facilitate a collegial, interactive learning environment for the benefit of all members of the community that includes students, staff and faculty.

Applications and nominations for the position should be sent to:

Dr. Derek O. Northwood, Chair
MPCS Search Committee
Ryerson University
350 Victoria Street
Toronto, Ontario M5B 2K3, or
email at: dnorthwo@gwemail.ryerson.ca

Applications should include a curriculum vitae, a statement of research interests, and names of three references. Applications/nominations will continue to be received until the position is filled.

Ryerson Polytechnic University has an employment equity program and encourages applicants from all qualified individuals including women, Aboriginal peoples, persons with disabilities, and members of visible minorities. Members of designated groups are encouraged to self-identify. In accordance with the Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents of Canada.

State University of New York, New Paltz Department of Computer Science Assistant Professor

The Department of Computer Science invites applications for a tenure-track position in Computer Science. The Department offers a CSAB-accredited Bachelor's degree in Computer Science and a Masters degree in Computer Science. For information about the Department and the college, see the web site www.mcs.newpaltz.edu.

Qualifications: A Ph.D. in Computer Science, with a commitment to excellence in teaching and research, is required.

Contact Information: Please note search #F01-08 on all materials submitted in connection with this search. Applicants should send a curriculum vita, two representative publications (if available), and three letters of reference to:

Search #F01-08 Chair
Department of Computer Science
FOB - N12, SUNY New Paltz
75 S. Manheim Blvd.
New Paltz, NY 12561

Deadline: Review of applications will continue until position is filled.

Starting date: Fall 2002 pending budgetary approval.

SUNY New Paltz is an AA/EOE/ADA employer.

UMass Lowell Department of Computer Science

The Department of Computer Science at the University of Massachusetts Lowell seeks scholars with exceptional records or, for junior appointments, with exceptional potential to expand our suite of research groups. We invite applications for several tenure-track faculty positions to start in January 2002 or September 2002, from applicants with specialties in traditional or innovative areas of computer science. We anticipate hiring at the assistant professor level, but will consider candidates at all levels.

Our campus is located 35 miles northwest of Boston in the state's high-tech corridor and is considered the most technology-oriented of the five UMass campuses. The CS department had 18 full-time faculty, as well as over 400 undergraduates in our accredited bachelor's program and over 250 graduate students in the master's and doctoral programs. Our research specialties include human-computer interaction, visualization and perception, bioinformatics, database systems, networking and telecommunications, languages and compilers, object-oriented software engineering, internet and web systems and newly formed groups in computational complexity, computational geometry, network and system security, and robotics and assistive technology. For more information about us, please visit: www.cs.uml.edu.

We are seeking candidates who will contribute to the intellectual life of the department, the university and the region by establishing active research groups, teaching core and elective computer science courses to undergraduate and graduate students, and establishing professional connections with the some of the thousands of thriving information technology companies in the area.

Applicants must have a doctorate in Computer Science or a closely related discipline at the time of appointment. Please send a statement of research interests; curriculum vitae; selected relevant papers; the names, addresses, email addresses, and telephone numbers of at least three references; and, if appropriate, your residency status to:

Dr. Thomas M. Costello, Head
Department of Computer Science
University of Massachusetts Lowell
One University Avenue
Lowell, Massachusetts 01854
tom@cs.uml.edu

Review of applications will begin immediately and continue until the positions are filled. U. S. citizenship or permanent residency is required. The University of Massachusetts is an equal opportunity, affirmative action employer, and encourages applications from women and minorities.

UMBC Bioinformatics Research Center Two Positions Available

The emerging Bioinformatics Research Center of the University of Maryland, Baltimore County, invites applications for two positions in the Center: Research Scientist and Assistant Professor. The University has committed a multi-year plan for faculty and staff lines as well as for resources to the Center, beginning with the recent hiring of a director and business director.

The Center seeks applicants from several disciplinary backgrounds (biological, statistical, mathematical, computational sciences) with strong research experience and collaborative interests. Preferred areas of concentration are molecular evolution and functional genomics.

The Research Scientist position is a non-tenure track, multi-year appointment, involving research and service.

The Assistant Professor position is a tenure-track position, involving research, teaching, and service, that will include a faculty appointment in an appropriate affiliated academic department.

Review of applications will begin in February 2002 and continue until the positions are filled. Candidates are urged to apply without delay.

To apply, send a letter of application, curriculum vitae, statement of research interests and have at least three letters of recommendation sent to:

The Search Committee
Bioinformatics Research Center
Department of Mathematics and Statistics
UMBC
Baltimore, MD 21250

Clearly identify the position for which you are applying.

UMBC is an Affirmative Action, Equal Opportunity Employer.

University at Buffalo, The State University of New York Department of Computer Science and Engineering Teaching Faculty

The Department of Computer Science & Engineering at the University at Buffalo (SUNY) has openings for two non-tenure-track Lecturer positions beginning Fall 2002. The department has a strong commitment to hiring and retaining lecturers for these career-oriented positions renewable for an unlimited number of terms.

Applicants for these positions must have at least an MS degree in Computer Science/Engineering, or related field, by September 2002, and strong teaching credentials. Ph.D. holders are preferred and will be eligible for the in-house title of Teaching Assistant Professor and for membership in the graduate faculty.

Duties include teaching and development of undergraduate Computer Science and Engineering courses (with an emphasis on lower-division), advising undergraduate students, and participation in department and university governance. Contribution to research is encouraged.

The University at Buffalo is New York's largest and most comprehensive public university. As the second largest city in New York State, Buffalo is the hub of a metropolitan area with a population over 1.1 million. University life is enriched by scenic, recreational, and cultural opportunities in the city, suburbs, and the neighboring Niagara and Metro Toronto regions. For more information, please visit our website at <http://www.cse.buffalo.edu>.

All applications should include a cover letter, curriculum vitae, and the names of at least three references. Applications should be addressed to:

Chair, Lecturer Search Committee
Department of Computer Science and Engineering
201 Bell Hall
University at Buffalo
Buffalo, NY 14260-2000

Email: cse-lecturer-search@cse.buffalo.edu
Due date for applications is March 31, 2002, or until positions are filled. Applicants should also have their letters of reference sent to the above address by the due date.

The University at Buffalo is an Equal Opportunity Employer/Recruiter.

University of Colorado at Boulder Department of Computer Science Tenure Track Positions

The Department of Computer Science of the University of Colorado at Boulder is seeking applications for tenure track faculty positions. While we normally hire at the Assistant Professor level, we will consider outstanding candidates at all levels. The Department has 42 faculty (including five new members who have joined this year), 194 graduate students, and 580 undergraduates. It has strong research programs in human computer interaction, machine learning, numerical and parallel computation, software and systems, speech and language processing, and theoretical computer science. The Department has received four successive five-year NSF CER and RI awards to support its computing infrastructure and collaborative research among its faculty, most recently for the period 2000-2005. Current research expenditures are \$3.1M annually. The faculty is also proud of its record in offering an outstanding educational experience to our students. We are seeking new colleagues who share our commitment to the ideals of the research university as a uniquely valuable institution in our society, combining the creation of new knowledge with the shaping of future leaders.

Our location in Boulder offers a pleasant college town ambience, easy access to the great outdoors, and participation in a vibrant high tech industry community. A recent study by a major telecommunications startup identified Boulder County as the most attractive setting nationally to which to recruit staff. Our alumni are playing important roles in creating the next generation of technology and technology companies here and elsewhere. We are interested in outstanding candidates in all areas of Computer Science. We are participating in research and educational initiatives in cognitive assistive technology, computational science and engineering, and infrastructure protection, and candidates who can contribute to these will be of special interest. Technical areas involved in these initiatives include distributed systems, power-aware computing, mobile and wireless systems, collaboration technology, machine learning and data mining, visualization, software engineering, software architecture, collaborative information spaces, data management for large computations, parallel systems and architectures, theoretical aspects of systems, and language technology. More information about the Department and its programs can be found on our website at <http://www.cs.colorado.edu>.

Review of applications will begin immediately, and continue as long as positions are open. We expect to have positions in future years as well as for appointments beginning in academic year 2002-2003, and we welcome inquiries about these future opportunities. Because we have more than one position available, we would be glad to receive inquiries from research collaborators interested in joining our faculty together. We also welcome applications from academic couples wishing to co-locate. Applicants should send a current curriculum vitae, the names of four references, and one-page statements of research and teaching interests to:

Professor Clayton Lewis
Search Committee Chair
Department of Computer Science
430 UCB
University of Colorado
Boulder, CO 80309-0430

Email inquiries may be addressed to Jane.Obrecht@Colorado.EDU. The University of Colorado at Boulder is committed to diversity and equality in education and employment.

University of Delaware Computer and Information Sciences Faculty Positions

Applications are invited for multiple tenure track Assistant Professor positions to begin Fall 2002. Outstanding candidates for senior level positions are also encouraged to apply. Of primary interest are candidates whose research is in systems, software engineering, graphics, visualization, vision, speech processing, data mining, databases, bioinformatics, or security. Applicants should hold a Ph.D. or its equivalent, and should be committed to excellence in research and teaching. The normal teaching load is three courses per year.

The Department has 16 tenure-track and 3 research faculty members, with a substantial portion of our 100 graduate students pursuing the Ph.D. We have significant external funding, including NSF Career Awards, a \$2.2M grant in Communications and Networks that is part of the Army Research Labs Collaborative Technology Alliance, and an NSF CISE Research Infrastructure Grant for parallel and distributed computing. A major UDel biotechnology initiative (<http://www.dbi.udel.edu>) offers opportunities for collaborative research in bioinformatics. The University of Delaware is centrally located between Philadelphia and Baltimore, with major government and industrial labs nearby. Considerable information about the Department is available at <http://www.cis.udel.edu>.

To apply, please mail a curriculum vitae to: Dr. Errol Lloyd
Chair of the Faculty Search Committee
Department of Computer and Information Sciences
University of Delaware
Newark, DE 19716

In addition, candidates should have three confidential letters of reference sent directly to either (but not both) the above address or csfacsch@cis.udel.edu. Applications will be accepted until the positions are filled; those received by March 1, 2002 are assured full consideration. Qualified minority group members and women are encouraged to apply. The University of Delaware is an equal opportunity employer.

UNIVERSITY of PENNSYLVANIA Department of Computer and Information Science LECTURER POSITIONS

The University of Pennsylvania invites applicants for the position of Lecturer in Computer Science to start July 1, 2002. Lecturer duties include undergraduate and graduate level teaching. The position is for one year and is renewable annually up to three years.

Successful applicants will find Penn to be a stimulating environment conducive to professional growth. Construction is under way on our new \$21 Million Computer Science Building. Beginning Fall 2001, the Department of Computer and Information Science will institute the Master of Computer and Information Technology (MCIT). The MCIT is designed for candidates who have a strong academic background in areas other than computer science but who have a need for graduate education in computer science or a closely related discipline. Completion of the MCIT program will give the graduate a solid foundation in computer science, providing the advanced expertise needed to meet the demands of the rapidly growing field of information technology. MCIT graduates will be ready to enter the IT workforce, or will find new opportunities in continuing their education. The MCIT program will also prepare students for further graduate education in computer science.

The University of Pennsylvania is an Ivy League University located near the center of Philadelphia — the 5th largest city in the US. Within walking distance of each other are its Schools of Arts and Sciences, Engineering, Medicine, Nursing, Law, Business and Fine Arts. The University campus and its surroundings in Philadelphia benefit from a rich diversity of cultural opportunities as well as attractive urban and suburban residential neighborhoods.

To apply, please complete the form located on the Faculty Recruitment Web Site at: http://www.cis.upenn.edu/positions/faculty_application.html

Electronic applications are strongly preferred, but hard-copy applications (including the names of at least four references) may alternatively be sent to:

Chair, Lecturer Search Committee
Department of Computer and Information Science
School of Engineering and Applied Science
University of Pennsylvania
Philadelphia, PA 19104-6389

Applications should be received by March 1, 2002 to be assured full consideration. Applications will be accepted until positions are filled. Questions can be addressed to faculty-search@central.cis.upenn.edu.

Professional Opportunities

The University of Pennsylvania is an Equal Opportunity/Affirmative Action Employer. The Penn CIS Faculty is sensitive to "two-body problems" and would be pleased to assist with opportunities in the Philadelphia region.

The University of Texas at Tyler Department of Computer Science Two tenure-track assistant professor positions

The Department of Computer Science invites applications for two tenure-track assistant professor positions. The appointment will begin August 2002. A Ph.D. in Computer Science is required by the time of employment. All areas of specialization will be considered; preferred areas include architecture, networking-telecommunications, operating systems and software engineering. Demonstrated English communications skills and evidence of a commitment to excellence in teaching, research, scholarship and service are required. Salary is competitive. UT Tyler is a component of The University of Texas System and is located in the beautiful East Texas lake country on the I-20 corridor, about 90 miles east of Dallas. Tyler was ranked by the Milken Institute in 1999 as the 2nd fastest growing high-tech metropolitan area in Texas and the 14th fastest growing high-tech city in the nation. Information about the university and department, as well as the city of Tyler may be found at www.uttyler.edu. Send a letter of application, vita, and names and contact information of three references to:

Dr. Ronald S. King, Chair
Department of Computer Science
UT Tyler, 3900 University Blvd.
Tyler, TX 75799 UT

Tyler is an EEO/AA employer. Women and minorities are strongly encouraged to apply. The successful candidate must provide valid documentation of the right to work in the United States.

University of Victoria Canada Research Chair in Foundations of Computer Science

The Department of Computer Science at the University of Victoria seeks an outstanding individual to be appointed as an Assistant or Associate Professor and to hold a Canada Research Chair at the Tier 2 level. The Department wishes to complement the existing research group in Theoretical Computer Science with a person who has the potential to be a leader in the field. The successful candidate will be in the early to middle stages of their career and will have already demonstrated a good record of teaching and an exceptional research record for someone at their level. Full details are on line at <http://www.csc.uvic.ca/news/career/index.html>

University of Wyoming Computer Science Academic Professional Lecturer

Pursue your academic career in the high plains of the Rocky Mountains. The University of Wyoming has embarked on an aggressive plan for long-term growth of the Computer Science Department. We expect to have positions open each year for the next five years.

This year, we invite applicants for an academic professional lecturer position to start at the end of August, 2001. Candidates must have an M.S. or Ph.D. in Computer Science or a closely related field. We prefer candidates with a Ph.D. and prior teaching experience. Responsibilities of the position include teaching, advising, and service to the University. Typically teaching responsibilities are 12-14 hours of undergraduate credit per semester.

The department offers B.S., M.S., and Ph.D. degrees in Computer Science. We support a B.S. in Computer Engineering, offered through the department of Electrical and Computer Engineering, as well as a B.S. in Management Information Systems and a new M.S. degree in E-Business that is offered jointly with the Business College.

The university is located in Laramie Wyoming (pop. 28,000), located 130 miles northwest of Denver. Laramie is a friendly town offering a reasonable cost of living; we have clean air, 300 days of sunshine, no traffic jams, and easy access to wilderness activities in the Rocky Mountains with the 12,000 ft. Snowy Range just 35 miles west of town.

To apply, send a curriculum vitae, a statement of teaching interests, and three letters of reference (email is acceptable) to:

Faculty Search Committee
Dept. of Computer Science
University of Wyoming
PO Box 3682
Laramie, WY 82071-3682
Email: search@cs.uwyo.edu
WWW: <http://www.cs.uwyo.edu/>

The search committee will begin reviewing files on February 1, 2002, and the search will continue until the position is filled.

The University of Wyoming is an affirmative action/equal opportunity employer.

Valparaiso University Mathematics and Computer Science Assistant/Associate/Full Professor of Computer Science

Full-time, tenure-track, effective Fall 2002.

Ph.D. (or near completion) in Computer Science or related field. Industry and teaching experience are advantageous. Expertise in computer graphics is desired, but all qualified individuals will be considered. Candidates should be willing to work in a scholarly community committed to Christian higher education and the Lutheran tradition. Send letter of application, statement of teaching philosophy and CV to:

Gregory Hume
Math/CS
Valparaiso University
Valparaiso IN 46383
(or email Gregory.Hume@valpo.edu)

Vanderbilt University Institute for Software Integrated Systems Research Scientist Positions

ISIS is a premier research organization dedicated to developing and applying advanced concepts and tools for computer system development and integration. At ISIS, we're creating the technology and tools for engineering tomorrow's distributed and embedded systems. ISIS has immediate openings for Research Scientists to investigate and develop technology and software tools for computer-based system specification, analysis and synthesis. Via externally funded projects, ISIS scientists define and develop new concepts to improve the state-of-the art in the creation and evolution of embedded information systems. Research scientists are expected to lead projects in nationally recognized programs. Specific research areas include: Model-based embedded systems Structurally adaptive systems System synthesis and generative programming Network-embedded systems Adaptive micro-architectures Middleware services for embedded applications High-performance distributed embedded systems Real-time fault diagnostics and prognostics System & architecture simulation Software synthesis/aspect-oriented design PhD in a related field: EE, CS, Computer Engineering or equivalent experience required. Experience in software architecture, hybrid systems, model checking, network protocols, or graph algorithms is a plus.

ISIS offers a competitive salary and excellent benefits in a very affordable cost-of-living area. For more information about ISIS, visit our website at <http://www.isis.vanderbilt.edu>. For information about the School, visit the website at <http://www.vuse.vanderbilt.edu>

Send a resume with employment history, research experience, a detailed publication list, and at least three references to:

The Institute for Software Integrated Systems
Box 36, Peabody, Suite 201
Hill Center Annex
1231 18th Avenue South
Nashville, TN 37212 Or
e-mail information to:
michele.m.codd@vanderbilt.edu.

Vanderbilt University is an equal opportunity, affirmative action employer.

Wake Forest University Department of Computer Science Assistant Professor of Computer Science

Applications are invited for a tenure-track Assistant Professor to begin Fall 2002.

Applicants must have completed a PhD in Computer Science by the time of appointment. The position requires a demonstrated potential for research and the ability to teach undergraduate and graduate courses. Strong applicants in all areas will be considered, but specialties of interest are software engineering, bioinformatics, and networking. The department currently has ten faculty and offers B.S. and M.S. degrees in Computer Science. (See www.cs.wfu.edu.) The campus is located in the foothills of the Blue Ridge Mountains and offers a beautiful setting and supportive environment for excellent teaching and research. To apply, send a CV, statement of teaching philosophy, and names of four references to:

Department of Computer Science
P. O. Box 731
Wake Forest University
Winston-Salem, NC 27109
AA/EO Employer

West Virginia University College of Engineering and Mineral Resources

Lane Department of Computer Science and Electrical Engineering
LANE CHAIR IN COMPUTER SCIENCE

The Lane Department of Computer Science and Electrical Engineering at West Virginia University (WVU) is conducting a search for an appointment to the newly established Lane Chair in Computer Science. Applications are invited from the academic, governmental, and private sectors. The individual appointed to the Lane Chair will be a distinguished scholar with an outstanding record of ongoing research at the frontiers of computer science and engineering. In addition, he or she will have a strong commitment to undergraduate and graduate education. Preference will be given to a leader who will build successful interdisciplinary teams to advance new paradigms in research and education. Applicants must have an earned Ph.D. in CS, CE, EE or a closely related discipline. The successful candidate must present a

distinguished record of research and scholarship, teaching, and service sufficient to support appointment as a tenured faculty member at the full professor level. Salary will be commensurate with the track record of the successful candidate. Review of applications will begin January 1, 2002. The search will continue until the position is filled. Women and minorities are encouraged to apply. The Lane Department offers BS, MS, and Ph.D. degrees in computer science, computer engineering, and electrical engineering; a BS in Biometric Systems and an MS degree in software engineering (SE). The department has 30 tenure-track faculty members, over 500 undergraduate, and over 200 graduate students. Recently it was designated as a Center of Excellence in Information Assurance Education by the US National Security Agency. Major funded research programs include software IV&V, information assurance, biometrics, biosignals, nano/microdevices and systems, power, and wireless networks. The Lane Department is leading WVU's new interdisciplinary initiative focusing on emerging systems at the intersection of the triad of bio-, nano-, and information technologies, and developing an NSF center in biometrics (CITeR). See our website, www.csee.wvu.edu for more information on these activities including the Morgantown's numerous federal R&D facilities, high tech growth, and our nationally ranked quality of life. Applicants should send a letter describing their qualifications, a curriculum vitae, statements of teaching philosophy and research objectives, and the names, addresses, and e-mails of 5 references to:

Dr. Wils L. Cooley, Lane Professor Search Committee
Lane Department of Computer Science and Electrical Engineering
West Virginia University
P. O. Box 6109
Morgantown, WV 26506-6109
cooley@csee.wvu.edu
Tel: 304-293-0405x2527 or 304-293-LANE
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PARC Redefines Itself from Page 1

become a spin-off company called the Palo Alto Research Center (PARC). This new, stand-alone company is redefining itself as a private company doing fundamental research in a variety of areas. Current PARC projects are focused on a broad spectrum of topics—MEMS, optics, software, collaborative sensing, robotics, systems architecture, linguistics, user interface design, human document interaction, security and encryption, with new research projects in exciting new areas under way.

The research staff is organized into six labs, each with a unique focus. But what has kept PARC in the forefront of research for so many years has been the cross-disciplinary nature of many of our research projects. For example, the Collaborative Sensing project, which combines computational theory, electrical engineering, MEMS and wireless networking, shows how thousands of sensors in an environment can be used in multiple applications.

Descriptions of current PARC research can be found at: <http://www.parc.com/projects.html>.

The transition from a corporate lab to an independent company will not happen overnight, but we will not lose sight of the research goals that created the world-changing reputation of PARC. We will continue to pursue research in areas that show far reaching potential in a variety of fields.

Other information about PARC can be found at www.parc.com.

Tracy Kugelman is the PR Manager at PARC. ■

IT R&D Funding from Page 1

The Administration's request is \$60 million more than the amount approved in FY 02.

NITRD-related programs at Health and Human Services (HHS) would receive an increase in IT research funding to \$336 million from \$310 million approved last year. The Department of Commerce (DOC) NITRD programs would decrease to \$42 million from \$43 million approved last year; and the Environmental Protection Agency (EPA) would receive \$2 million, the same amount it received in FY 02.

A more detailed look at each agency's NITRD-related request can be found on the CRA Government Affairs website. [<http://www.cra.org/govaffairs>]

The President's budget submission marks the start of the annual budget debate on Capitol Hill and sets into motion the year-long appropriations process. The budget now goes to Congress, where it will be considered (or not) by the various budget, authorization, and appropriations committees who will, with the President's assent, ultimately determine the final funding levels next fall. ■

Transitions

Leon J. Osterweil has been named Dean of the College of Natural Sciences and Mathematics at the University of Massachusetts at Amherst. The College consists of nine departments in the sciences (including computer science) and more than 240 faculty members. Osterweil previously served as Chair of the Information and Computer Science department at UC Irvine, and the Computer Science Department at the University of Colorado Boulder.

NSF Honors Leah Jamieson



Photo: Christy Bowe 2001

CRA board member, Leah Jamieson, Professor of Electrical and Computer Engineering at Purdue, received the NSF Director's Award for Distinguished Teaching Scholars at a ceremony held at the National Academy of Sciences in November 2001.

Pictured above, l to r, are: Norman L. Fortenberry, Director of the Division of Undergraduate Education at NSF; Leah Jamieson; and NSF Director, Rita Colwell.

CRA CONFERENCE AT SNOWBIRD 2002 ♦ JULY 14-16, 2002 ♦ SNOWBIRD, UTAH

The flagship conference for chairs of Ph.D.-granting departments of CS and CE and leaders from U.S. industrial and government computing research laboratories and centers interested in computing research issues.

Preliminary Program

Sunday, July 14

CRA Board of Directors meeting 8:00AM - 2:45PM
 Registration 2:00PM - 7:30PM
 Workshop for New Department Chairs 3:00PM - 5:30PM
Chairs:
 Randy Bryant (Carnegie Mellon University)
 Kathleen McKeown (Columbia University)

Keynote Speaker: 5:30PM - 6:30PM
 Robert Kahn, President
 Corporation for National Research Initiatives (CNRI)

Welcome Reception 6:30PM - 7:30PM

Dinner 7:30PM - 9:00PM

Monday, July 15

Breakfast Buffet 7:00AM - 8:30AM
 Registration 7:30AM - 6:00PM

Welcome 8:30AM - 8:40AM

Speakers:
 Phil Bernstein, Microsoft Research (Labs/Centers Snowbird Chair)
 Leah Jamieson, Purdue University (Academic Snowbird Chair)

PLENARY SESSION I 8:40AM - 10:10AM

Bioinformatics and Computational Biology
Chair:
 Oscar N. Garcia (Wright State University)
Speakers:
 Eugene Myers (Celera Genomics)
 Richard Karp (University of California and International Computer Science Institute, Berkeley)

Break 10:10AM - 10:30AM

Workshop I (parallel sessions) 10:30AM - Noon

Bioinformatics, Genomics, Proteomics
Chair:
 Oscar Garcia (Wright State University)

Speakers:
 Jim Cassatt (National Institutes of Health)
 Aravind Joshi (University of Pennsylvania)
 Peter Karp (SRI)
 Gary Strong (National Science Foundation)

Trends in Research Funding
Chairs:
 Dan Reed (University of Illinois at Urbana-Champaign)
 Jeff Vitter (Duke University)

Speakers:
 Michael Lesk (National Science Foundation)
 Shankar Sastry (University of California at Berkeley)
 Others tbd

Undergraduate Curriculum and Accreditation Advances
Chair:
 Stu Zweben (Ohio State University)

Speakers:
 Ben Huey (Arizona State University; Chair of the Computing Accreditation Commission of ABET)
 Eric Roberts (Stanford University; Co-chair and Editor of the Computing Curricula 2001 Task Force)

Research in Corporate Labs
Chair:
 Dick Waters (Mitsubishi Electric Research Labs)
Speakers:
 Dan Ling (Microsoft Research)
 Others tbd

Luncheon Noon - 1:30PM

Keynote Speaker:
 Peter A. Freeman, NSF CISE

PLENARY SESSION II 1:30PM - 3:00PM

Diversity in the Computing Field
Chair:
 Bryant York (Portland State University)
Speakers:
 Allan Fisher (Carnegie Mellon University)
 Richard Tapia (Rice University)
 Caroline Wardle (National Science Foundation)

Break 3:00PM - 3:30PM

Workshop II (parallel sessions) 3:30PM - 5:00PM

Computer Science and Other Disciplines: Mainframe, Client-Server, or Peer-to-Peer?

Chair:
 Margaret Wright (New York University)

Speakers:
 Juris Hartmanis (Cornell University)
 Stuart Feldman (IBM)
 Edward Lazowska (University of Washington)

When IT Becomes a Profession
Chair:
 Peter Denning (George Mason University)
Speakers: tbd

Developing a Research Environment

Chairs:
 Sheila Castaneda (Clarke College)
 David Novick (University of Texas, El Paso)

Speakers:
 Garrison Walters (Vice Chancellor for Academic Access Programs, The Ohio Board of Regents)
 Joseph O'Rourke (Smith College)
 Gary Strong (National Science Foundation)

Issues and Models for Academic-Industry Agreements
Chairs:
 J. Strother Moore (University of Texas-Austin)
 Gabby Silberman (IBM)

Dinner and State of the CRA Address 6:30PM - 9:30PM

Speakers:
 James Foley (Georgia Institute of Technology)
 William Aspray (CRA)

The CRA Distinguished Service and A. Nico Habermann Awards will be presented.

Tuesday, July 11

Breakfast Buffet 7:00AM - 8:30AM

PLENARY SESSION III 8:30AM - 10:00AM

Homeland Security
Chair (tentative):
 Peter Freeman (Georgia Institute of Technology)

Break 10:00AM - 10:30AM

Workshop III (parallel sessions) 10:30AM - Noon

Law, Policy, and Research

Chairs:
 Andrew Hume (AT&T Labs)
 Jon Peha (Carnegie Mellon University)

Speakers: tbd

New Academic Structures Involving Computing, Information Science, and Technology

Chair:
 Bobby Schnabel (University of Colorado)

Speakers:
 Robert Constable (Cornell University)
 Harry Bruce (University of Washington)
 Michael Dunn (Indiana University)
 Bobby Schnabel (University of Colorado at Boulder)

New Pressures on CS&E Academic Units

Chair:
 Frank Tompa (University of Waterloo)

Speakers:
 David Notkin (University of Washington)
 Stephen Seidman (New Jersey Institute of Technology)
 Debra J. Richardson (UC Irvine)

Industry/Academic Collaboration: What Works? What's New?

Chairs:
 Tom Henderson (University of Utah)
 Dave Waltz (NEC Labs)

Luncheon: Noon - 1:30PM
 [CRA Board Interaction with Conference Participants]

Workshop IV (parallel sessions) 1:30PM - 3:00PM

Technology Roadmaps and Plotting Research Routes

Chair:
 Mary Jane Irwin (The Pennsylvania State University)

Speakers:
 Jan Rabaey (University of California at Berkeley)
 Hector Garcia-Molina (Stanford University)
 Others tbd

The Business of Publication

Chair:
 Bob Allen (University of Maryland)
 Chair, ACM Publications Board
Speakers:
 Lillian (Boots) Cassel (Villanova University)
 Michiel Kolman (Elsevier)

Recruiting and Retention of Faculty

Chair:
 Jack Stankovic (University of Virginia)
Speakers:
 Doris Carver (Louisiana State University)
 Clayton Lewis (University of Colorado at Boulder)
 Eric Roberts (Stanford University)

Industry Roundtable

Chairs:
 Jim Foley (Georgia Institute of Technology)
 Dave Waltz (NEC Research Institute)

Workshop for IT Deans 1:30PM - 9:00PM

Chair:
 Peter Freeman (Georgia Institute of Technology)

Program and Registration Information: <http://www.cra.org/Activities/snowbird/2002/>

Conference Sponsors: American Association for Artificial Intelligence; Lucent Technologies, Bell Labs; Microsoft Research; NASA Ames Research Center; and Telcordia Technologies.