Bill Joy, Sun Microsystems, Inc., Discusses PITAC Report

By Jean E. Smith

By Bill Joy, Founder and Vice President of Research at Sun Microsystems, Inc., was interviewed by CRN on November 17, 1998. Mr. Joy and Ken Kennedy, Rice University, co-chair the President’s Information Technology Advisory Committee (PITAC). The PITAC’s interim report was submitted in August 1998, and the final report was published in February 1999.

CRN: Why do you think “core” research in computer science and computer engineering is critically important to achieving the objectives of the PITAC’s report?

Joy: Without long-term research, we will lose the industry to countries that do long-term research and development. The United States is a leader in the Internet, for example, because we did the fundamental research to understand the protocols, and that led to the whole industry around the Internet. Without that kind of research, it is possible that the Internet industry would not exist in the United States, but somewhere else. So it is important to our technological base, our defense needs, and our economy that fundamental research in hypergrowth areas like technology is done here.

CRN: How would you characterize the feedback and reactions to the interim PITAC report?

Joy: Very positive overall. But some people thought the research examples we used were too short-term, so, if anything, they were pushing us in the direction that we were already inclined to go anyway. It is hard to give examples of breakthrough ideas without doing the work that leads to those ideas -- except retrospectively. It’s like taking something about that is invisible. Some people said the report should talk more about fields like quantum computing. If you want to see what people contemporaneously think of as long-term basic research, you can go to the DARPA website and look at what they’re saying and extrapolate from there. DARPA’s research is also close to the edge as any.

CRN: How will the PITAC’s final report differ from the interim report?

Joy: The fundamental topics and reactions to the report’s findings into action in Congress, and that is where the report’s findings into action in Congress, and that is where the committee needs to expend its efforts. From the feedback, we have received and from the positive responses on the House side, we’ve added some additions to back up some of the things we said in the report. The big issue now is to translate the report’s findings into action in Congress, and that is where the committee needs to expend its energy and is the strongest opportunity we have for growth in technology. Hopefully the incoming Speaker will be as well, and we’ll be able to get some support from him or from other senior people in the House.

Opportunities in Distance and Continuing Ed.

By Stephen Seidman and Christopher Lacher

For many years, computer science and engineering departments have been called upon to deliver undergraduate and graduate degree programs to off-campus locations. The demand for such distance education has come from individuals who are unable to come to campus and from corporations requesting further education for their employees. Many departments in U.S. universities have responded to this demand, using full-time or part-time instructors to deliver face-to-face instruction at remote sites or videotaping classes to deliver for remote students or sites.

The primary factor driving the need for continuing education is the rapid change in the computer industry. The skills of computer scientists and engineers in industry must be updated on an ongoing basis with training that isn’t necessarily degree-based. Continuing education in computer science and engineering has primarily been provided by professional society tutorials and commercial or university short courses.

Communication technologies are being used to accommodate the growing needs for both distance and continuing education. The National Technological University (http://www.ntu.edu) uses satellite feeds to distribute taped lectures to industrial sites. Drexel University (http://www.cis.drexel.edu/index.htm) and the New Jersey Institute of Technology (http://nit-jit.agnet.com) have pioneered the use of computerized conferencing systems. More recently, some departments have started to experiment with web-based computer science instruction. For example, Colorado State University is offering an entirely web-based Java course for C++ programmers (http://www.cs.colostate.edu/~cs154/syllabus.html). Some publishers have also started to provide web-based continuing education material. Examples of such courses can be found at http://www.ora.com.

Outside the United States, many countries provide distance and residential universities that provide distance education to large numbers of students. Traditional engineering distance education universities in the United Kingdom’s Open University (OU) (http://www.open.ac.uk). OU has decades of experience with distance education, currently enrolling 157,000 students. It produces course materials in text, CD-ROM, television, and web-based formats at its non-residential campus in Milton Keynes, and distributes them to students throughout the United Kingdom and elsewhere. OU provides a distributed network of tutors to support its students and evaluate their work. Other national distance universities include France’s Centre National d’Enseignement a Distance (185,000 students, http://www.cned.fr), Germany’s Fern Universitat (80,000 students, http://www.fernuni-hagen.de), and Canada’s Athabasca University (http://www.athabasca.ca).

The best example of the use of distance education for computer science education is O’U’s new object-oriented programming course (M 206). This 32-week course was first offered in 1998, with an initial enrollment of 5,100 students in the United Kingdom and Europe (http://www.ou.mcs.open.ac.uk). M 206 materials include a specially modified Smalltalk environment (developed by LearningWorks Systems), a 53-chapter text written specifically for the course, a webpage for each text chapter, 11 BBC/OU television shorts, and a CD-ROM of course material.
By Sheila Castaneda

In 1994, the National Center for Education Statistics surveyed 1,115,170 students who had received their baccalaureate degrees the previous year. This survey included 9,650 women with Computer Science (CS) degrees. Of those, 2.94 percent were enrolled in graduate school one year after graduating. If the study were restricted to CS women with a GPA greater than or equal to 3.5, the percentage falls to 2.53. By comparison, of the 17,869 men with CS degrees, 9.23 percent went on to graduate school. If the sample is restricted to a GPA greater than or equal to 3.5, the percent going on to graduate school is 29.19.

A new initiative sponsored by the Computing Research Association's Committee on the Status of Women in Computing Research (CRA-W) is designed to provide grants of undergraduate women the experience of participating in collaborative research in an effort to lessen the gap in the statistics between men and women.

The Collaborative Research Experience for Women in Undergraduate Computer Science and Engineering (CREW) is designed to provide collaborative research experience for groups of two to three undergraduate women during the academic year. Research is conducted at the home institutions of the students. The student researchers work with a sponsoring faculty member on a project for which monetary support is typically not available. Ordinarily each student receives a stipend of $1,000 for her research work. There is no support provided by this program for faculty stipends, however up to $500 per project may be requested for special equipment, travel or supporting materials. It is hoped that by increasing the opportunity to do research and by decreasing the budget for their research the students may be encouraged to pursue similar work in graduate school.

To be eligible, students should be entering their junior or senior years. All II projects must be directly related to computer science or computer engineering and be suitable for undergraduate research.

At the end of the project, students are required to submit a one-page summary of their work. These summaries are posted on the CRA-W website. Of course, students are also encouraged to submit papers and present their work at appropriate journals and conferences.

In the first year of the project, twenty-two applications were received and nine were funded. These nine projects involve twenty-three undergraduate women working with ten sponsoring faculty members at the following institutions: Brooklyn College, CUNY Bryn Mawr College Case Western Reserve University Grinnell College Mills College North Carolina at State University Sonoma State University Texas Christian University University of Wisconsin, Madison

The nine projects received $20,398 in direct support, $1,700 in equipment, travel or supporting materials, and stipends. The total support provided by the program was $22,098.

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Tracing Government Contributions

The report finds that the government exerted tremendous influence on the development of computing technology. The federal government launched the computing revolution immediately after World War II and has continued to sustain it, even as the industry itself has evolved. It did so by contributing funds for research, supporting the education and training of students, and providing research equipment for university laboratories. A such, government became an essential element of the nation’s research infrastructure in computing, complementing the roles of industry and academia.

Federal research funding is perhaps the most visible evidence of government support to computing. From less than $10 million in 1960, federal support for computer science research climbed to almost $1 billion in 1974. Though declining as a fraction of the national TOTAL computing research budget (until industry cut back its funding significantly in the early 1990s), federal funding supported a range of innovative technologies, including time-shared computing, computer graphics, packet-switched networks, and intelligent systems. In fact, over half the research papers cited in U.S. computing-related patents filed between 1993 and 1994 acknowledge public funding as a source of support. Such funding had a profound affect on universities. Nationwide, federal funding comprised roughly 70 percent of university research funding in computer science between 1976 and 1995. Much of this funding was directed to support graduate research assistants. A growing percentage of graduate students in computer science have received federal support for their studies, even as enrollments have increased. In computer science departments at Carnegie Mellon, M.I.T., Stanford, and the University of California at Berkeley, over half of all graduate students (master’s and Ph.D.) received financial support from the government between 1985 and 1995. In addition, most of the funding used by academic computer science departments to purchase research equipment comes from federal agencies.

The result of such investments have been far-reaching. They have enabled federal agencies to perform their public missions and also create the technology base and human resources upon which the computing industry has been built. Companies such as Sun Microsystems, Silicon Graphics, Inforhex, and Netscape Communications were founded by researchers who developed technology for government support change. Though in the United States, Canada, and many other countries, computing has been identified as a technology of critical social importance. This increased political attention has generated new demands on our education and offers new opportunities.

Please contact the person you are nominating before submitting his or her name. Although the Board is not committed to building large systems have also produced significant results. Consider the Internet, the National Computer Systems project of the 1950s. It enabled to develop and a command and control system for the United States by Soviet bombs, SAGE involved researchers from M.I.T., IBM, and other laboratories. The system served as a testbed for research ranging from real-time computing to large-scale systems.

The computing research community has an envious track record of contributing to innovation. From graphical user interfaces to relational databases to speech recognition systems, many of today’s desktop computing technologies trace their roots to universities and industry laboratories. Popular accounts of such technologies tend to properly credit researchers for their pioneering efforts, but often overlook the contributions of the federal government to the innovation process.

A new report from the Computer Science and Telecommunications Board (CSTB), “Funding A Revolution: Government Support for Computing Research,” remedies this imbalance. Authorized by a committee of computing researchers, historians of technology, economists, and members of federal agencies, the report reviews developments in computing between 1945 and 1995 to highlight the role of government in supporting computer science research. The report examines specific developments in the areas of relational databases, the Internet, artificial intelligence, and virtual reality, gleanings lessons that can guide future government efforts to support computing.

Nominations Sought For CRA Service Awards

CRA invites nominations for the 1998 CRA Distinguished Service Award honoring outstanding service to the research community in the areas of government affairs, professional societies, publications, or conferences, and leadership, and the A. Nico Haber Award for outstanding contributions in aiding members of underrepresented groups. Nominations should be no more than two pages and describe the contribution that is the basis of the nominations. See our website, http://www.cra.org/main/cra.awards.html for specifics.

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Call 202-234-2111, send e-mail to crn@cra.org or mail subscription inquiries to CRA, 1100 Seventeenth Street, NW, Suite 507, Washington, DC 20036-4632. A free subscription is available to members of the Computer Science and Telecommunications Board (CSTB), “Funding A Revolution: Government Support for Computing Research,” remedies this imbalance. Authorized by a committee of computing researchers, historians of technology, economists, and members of federal agencies, the report reviews developments in computing between 1945 and 1995 to highlight the role of government in supporting computer science research. The report examines specific developments in the areas of relational databases, the Internet, artificial intelligence, and virtual reality, gleanings lessons that can guide future government efforts to support computing.

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In my previous article, I described the “what” of science policy, the variety of issues and concerns of which it is comprised. Even when the basic goal is clear, as it is for the National Information Infrastructure Act of 1996, the need for detailed federal funding for research, the range of debate can be surprising and wide and complex. I am going to talk about the “who” of science policy, that is, who makes it, who influences it, who approves or, on the negative side, who resists it. The picture is complicated, as one might expect when dealing with questions of influence and power in policy and political processes.

John Kennedy reportedly observed that when he was a senator, all power seemed to reside at the other end of Pennsylvania Avenue, in the White House. When he became president, however, it seemed that all power resided in the other direction, in Congress. That observation captures a basic reality of policy and politics in Washington — nobody seems to be in charge of anything.

Of course, at any particular time or on any particular issue, someone or some organization may seem to be in control of the process, but power is nearly always in flux. This can be frustrating for those pushing for major policy change. Once a consensus has been forged around a policy framework, there is not much interest in reopening negotiations, if for no other reason than someone is benefiting from that framework. It becomes easier to do things gradually, seeking incremental change within the old framework, because new decisions don’t have to be made or old ones reopened. This is the failed attempt at a completely restructure health care policy in the early days of this administration. This is an illusion of power results in policy inertia.

Our political system was designed to be ambiguous and conflicting. There are good reasons for this to be so. The country is big, powerful, and incredibly diverse in its peoples interests and values. It does not concentrate power too much, and it is necessary that any major policy change be made only after broad consultation and deliberation. Moreover, we also pay a price for inertia.

Right or wrong, intended or not, diffusion of power has important consequences for people working in science policy, particularly if they are trying to promote change on the scale proposed in the science and technology portion of the President’s Information Technology Advisory Committee (PITAC). (See interview with Bill Joy, Co-chair of the PITAC Committee, page 1.) It means that in order to achieve the desired result of implementation of the full program, a lot of power centers need to be brought on some rough alignment, and marshalling of those who will promote the program and neutralizing those who might be inclined to oppose it must be done. How to do that is the subject of my next article. For now, let’s look at the policy-making landscape.

Overview

Figure 1 provides a top-level map of the policy environment. There are three basic power centers: Congress, the Executive Branch, and a collection of private and quasi-private organizations and individuals that represent the community that is directly affected by or interested in science policy. I call this group the “Private Stakeholder.” A round these three groups is a penumbra of influence that I call “public interest.” I assert that in the particular area of science policy, the public has, for the most part, not been a strong force one way or the other. The general public view that research is, by and large, a social good and that it’s okay for Congress to spend some tax money on it — precisely how much and on what are decisions comfortably left to the system. This runs counter to occasional spurs of angst from some in the science community, who worry that the public is ignorant about science and contend that, if people just understood research better, they might support more funding. I’m skeptical about that particular argument.

That is not to say public opinion should be ignored. It can be a powerful force, good or bad. I certainly believe that it is important for the computer field to be sensitive to public concerns about potential negative effects of information technology. And, it would be a powerful impetus to realizing the PITAC Sprogram were it to find its way in some form on the presidential campaign platforms of one or both parties.

Nevertheless, my principal focus here is on the three “core” groups shown in figure 1. Discussing them is complicated enough, for each has a fairly elaborate structure of competing interests.

Executive Branch

Well, surely, the Executive Branch isn’t complicated. “For all, it has a single boss and operates from a uniform policy;” you might be tempted to say. “And pigs fly,” I’d answer. Probably tougher even than worry about the politics of decisions. A loo, policy analysts in offices such as the Office of Science and Technology Policy look at the core substance of issues, and the inevitable keepers of the budget at the Office of Management and Budget are always saying, “Nice idea, but where is the money coming from?”

On a more specific a particular issue, all three messages will be coming out of the White House at once. The president may express sympathy for the need to double research budgets. The budget director voices skepticism: whatever we can afford it, and the political staff ask what the benefit and cost of spending limited political capital on this issue versus all other possible ones. (This situation is not unusual, nor is it specific to the current White House. They all act the same way, because all presidents face very similar dilemmas in running the government.)

Congress

Congress has its own morass of interests and power centers that have to be accommodated also. Just for starters, we have two houses, populated by 100 senators and 435 representatives. Each has been chosen in a separate election and considers himself or herself to be an autonomous decision-maker. It is a self-organizing group, the Constitution really says very little about day-to-day processes and structures. Members have personal offices with staff whose principal function is to serve their specific political interests and provide services to their constituents.

Each member also sits on committees, where the principal legislative work is done. So, adding to the complexity, we have several dozen committees and subcommittees to deal with. Science and technology policy, particularly when it involves complicated, touchy issues, involves a large number of them, including, of course, the Committee on Appropriations.

Finally, think of all the lines that particular issue has been involved in that affect their specific interests in issues — political party, regionality, ideology (not always party specific), ethnicity and gender, and so on.

The bottom line is that it is not easy to get a majority congressional vote for some new change in policy, although it can be done. It took many years and the efforts of countless people to get the H.R. 3162 High Performance Computing Act through congress, but it did pass and with a nearly unanimous and bipartisan vote at that.

Stakeholders

Finally, let’s take a look at other groups that make up the science policy community, we the people, the stakeholders, the special interest groups, as we are sometimes known to those who disagree with our views. We have influence on science policy and our voices are heard through a surprisingly complex group of forces.
1999 Federated Computing Research Conference

Planning continues for the third Federated Computing Research Conference (FCCRC), which will be held in Atlanta at the downtown Hilton Atlanta Marriott, 4th - 6th May 1999. CRA will be a cosponsor along with ACM and other organizations, with ACM doing the major part of the administrative work. The conference chair is CRA Board member David S. Johnson of AT&T Labs. Past Chair Mary Jane Irwin, CRA Board member from Pennsylvania State University, is on the steering committee, along with David W. Uied of Indiana University and Donna Baglio of ACM.

As in the past, registrants for one conference can attend talks at any of the other conferences going on at the same time. In addition, registration fees will be structured to encourage attendees at one conference to extend their stay for all or part of a conference in the other half of the schedule. The portion of the registration fee that covers overall conference overhead will only be charged once for each attendee, no matter how many conference events he/she chooses to attend.

The remainder of the registration fee consists of changes and individual conference “package fees.” The charges will cover the daily amenities, which include individual breakfasts, breaks, buns, lunches, and evening “mix and mingle” hours. (The charges are uniform among all the conferences, at the request of past attendees.) The conference package fees will cover conference-specific items, such as receptions and business meetings, conference proceedings, and program committee expenses. A thorough review of the conference program will be held to ensure that there will be no FCCRC-wide conflicts this time, ISCA and PA DS intend to include exclusions in their packages, for which other attendees may purchase tickets.

For more information, see the FCCRC website: http://www.acom.org/sigcs/ conferences/fccrc/. Details of the program and how to register should be available by early February.

The conferences committed to participate so far are:
- CRA Workshop on A cademic C areers for Women in Computing Science (CRA-W)
- ACM IEEE International Symposium on Computer A rchitecture (ISCA)
- ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)

In addition to acting as individuals, scientists belong to influential groups. They sit on advisory committees to NSF and other agencies and they belong to study groups of the National Research Council, particularly the Computer Science and Telecommunications Board, and, of course, the President's Information Technology Advisory Committee -- groups that conduct studies and publish reports urging policy action.

The scientific societies also exert a strong policy voice in support of the fields they represent. Many are based or have offices in Washington specifically for this purpose. When CRA was created, it was purposely to be based in Washington because its membership expected it to assume a major role in science policy, representing the needs and interests of the computer research community. The coalitions of scientific organizations also form to advocate in support of particular research areas and funding priorities, such as the HPCC Initiative, and so on.

Some of these groups can be hard-hitting, coming and going quickly as issues change; others have broader agendas that may persist over the long term.

Lastly, there are several organizations that, while not scientific societies themselves, have occasional interest in science policy. Most important for the computing community are industry groups and coalitions. They can be powerful voices for or against computing research initiatives. A thorough review of the conference program will be held to ensure that there will be no FCCRC-wide conflicts this time.

Wrapping it all up

What does this enormous complex array of players in science policy mean for us? My thesis is as follows:

For major policy change to take place, there must be agreement among the major players -- executive, congressional, and stakeholders. In order for that to happen, communication among them must be strong. That is why I drew the lines connecting them as arrows. Cultural and communication barriers exist among the three groups that limit their ability to understand each other and reach consensus.

In fact, one of the major tasks of Washington science representatives is to monitor and strengthen communication among them. I am not the only one involved. Some other initiative has been added to carry a message from an executive agency to congressional staff and vice versa, and between both government sectors and the scientific community.

And, of course, the same need for convergence (and similar barriers) exists within each group. A scientist and the administration need to be aligned, as do the various interests in Congress. And, our own community, as well as the broader science policy community, needs to be brought together.

The President’s Information Technology Advisory Committee really proposed a major shift, both in funding and in the patterns of research support. If that is what we want to see happen, my thesis above suggests that we need to expand our horizons, to include more science and technology that may result in high-impact products, and to refine our research agendas.

The new language is meant to increase the focus on research and development. A significant change in strategy or effort on our part. On the other hand, what the Committee really proposed represents a major shift, both in funding and in the patterns of research support. If that is what we want to see happen, my thesis above suggests that we need to expand our horizons, to include more science and technology that may result in high-impact products, and to refine our research agendas.

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In addition, there will be workshops on
- Scalable Shared Memory Multithreaded Processors on Friday afternoon and Saturday (4/30-5/1) and Compiler Support for System Software (WCSS’99) on Wednesday (5/5), as well as an assortment of tutorials and FCCRC-wide plenary speakers Sunday through Thursday.

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Next Generation Internet Act Passes

The 105th Congress passed legislation that amends the High-Performance Computing Act of 1991. The amendments authorize appropriations for the fiscal years 1999 and 2000 for the Next Generation Internet (NGI) program. The President's Information Technology Advisory Committee (PICTA) is to monitor and give advice concerning the development and implementation of the NGI program and is to report to the President and the Congress on its activities, and for other purposes.

The legislation contains several important statements which emphasize the continued importance of the computing fields, as such as the United States investment in science and technology has yielded a scientific and engineering enterprise without peer, and [the Federal investment in research is simply as useful ammunition for an incremental gain over current funding. This requires no major change in strategy or effort on our part. On the other hand, what the Committee really proposed represents a major shift, both in funding and in the patterns of research support. If that is what we want to see happen, my thesis above suggests that we need to expand our horizons, to include more science and technology that may result in high-impact products, and to refine our research agendas.

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1997-1998 Preliminary Taulbee Survey Data on Faculty Salaries

By Dexter Kozen and Jim Morris

Each September, the Computing Research Association surveys academic departments in the United States and Canada that offer the Ph.D. in computer science or computer engineering. The annual C.R.A. Taulbee Survey collects data on enrollment in the undergraduate, master’s, and Ph.D. computer programs, about employment of Ph.D. graduates of these programs, and on the number and salaries of faculty in these programs.

This is the 28th year that CRA has tracked the production and employment of Ph.D.s in the computer science field. For the past 12 years, computer engineering data have also been incorporated into the survey. The traditionally high response rate to the Engineering Research Association surveys in the computer science ranking of research-doctorate programs in the United States, released in 1995.

Each department is asked to report the number, minimum, and maximum salary for each professorial rank and the number of persons at each rank. The salaries are those effective as of January 1, 1999. For U.S. departments, nine-month salaries are reported in U.S. dollars. For Canadian departments, twelve-month salaries are reported in Canadian dollars. The column labeled "# Faculty" is the sum of the number of faculty in each rank for those departments that reported salary data in that rank. The minimum and maximum of the reported salary minima (and maxima) should be self-explanatory. Thus, the range of salaries in a given rank among departments that reported data for that rank is the interval ["minimum of the minima, "maximum of the maxima]. The means of the reported salary minima (maxima) in a given rank are computed by summing the departmental reported minimum (maximum) and dividing by the number of departments reporting data at that rank. The average salary at each rank is computed by summing the individual means reported at each rank and dividing by the number of departments reporting data at that rank.

For comparison with last year’s data, Table 10 shows the overall (unweighted) average salaries for the U.S. departments and separately for the Canadian departments. The preliminary data from 1997 are those published in the March 1998 C.R.N. and the final data from 1997 are those published in the March 1999 C.R.N. As can be seen, the U.S. averages appear to have increased about 4% in both the Assistant Professor and Full Professor categories from last year. Averages at the Associate professor level increased by around 1%. Canadian averages appear to have changed at a similar rate, however the Full Professor category average seems to have slightly decreased. This category is however based on a smaller number of departments and is therefore more strongly influenced by a single department’s value. The reader should note that there was an error in the preliminary reporting of the number of Canadian departments responding –– the actual number was 10. However, the salary data was correct. The response rate was computed by summing the departmental reported minimum (maximum) and dividing by the number of departments reporting data at that rank.

Table 1. Nine-Month Salaries, 12 Responses of 149 U.S. CS Departments

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Faculty</th>
<th>Minimum</th>
<th>Mean</th>
<th>Maximum</th>
<th>Average of all salaries</th>
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<tr>
<td>Assistant</td>
<td>461</td>
<td>$29,150</td>
<td>$57,632</td>
<td>$70,900</td>
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<td>$63,420</td>
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<td>$110,000</td>
<td>$93,554</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Faculty</th>
<th>Minimum</th>
<th>Mean</th>
<th>Maximum</th>
<th>Average of all salaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>67</td>
<td>$60,000</td>
<td>$63,265</td>
<td>$70,000</td>
<td>$66,588</td>
</tr>
<tr>
<td>Associate</td>
<td>89</td>
<td>$49,050</td>
<td>$71,158</td>
<td>$90,000</td>
<td>$77,997</td>
</tr>
<tr>
<td>Full</td>
<td>195</td>
<td>$43,000</td>
<td>$80,301</td>
<td>$110,000</td>
<td>$106,475</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Faculty</th>
<th>Minimum</th>
<th>Mean</th>
<th>Maximum</th>
<th>Average of all salaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>58</td>
<td>$33,000</td>
<td>$60,594</td>
<td>$69,700</td>
<td>$65,021</td>
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<tr>
<td>Associate</td>
<td>75</td>
<td>$57,349</td>
<td>$67,707</td>
<td>$75,850</td>
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<td>Full</td>
<td>153</td>
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<table>
<thead>
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<th>Faculty Rank</th>
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<th>Mean</th>
<th>Maximum</th>
<th>Average of all salaries</th>
</tr>
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<tbody>
<tr>
<td>Assistant</td>
<td>58</td>
<td>$66,250</td>
<td>$70,146</td>
<td>$70,000</td>
<td>$68,800</td>
</tr>
<tr>
<td>Associate</td>
<td>74</td>
<td>$58,472</td>
<td>$67,761</td>
<td>$79,000</td>
<td>$72,678</td>
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<tr>
<td>Full</td>
<td>134</td>
<td>$67,574</td>
<td>$77,013</td>
<td>$90,000</td>
<td>$96,879</td>
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<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Faculty</th>
<th>Minimum</th>
<th>Mean</th>
<th>Maximum</th>
<th>Average of all salaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>278</td>
<td>$29,150</td>
<td>$55,984</td>
<td>$70,900</td>
<td>$58,569</td>
</tr>
<tr>
<td>Associate</td>
<td>500</td>
<td>$40,758</td>
<td>$61,026</td>
<td>$63,500</td>
<td>$67,613</td>
</tr>
<tr>
<td>Full</td>
<td>463</td>
<td>$48,978</td>
<td>$75,067</td>
<td>$104,300</td>
<td>$89,551</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Faculty Rank</th>
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<th>Minimum</th>
<th>Mean</th>
<th>Maximum</th>
<th>Average of all salaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>18</td>
<td>$50,908</td>
<td>$56,702</td>
<td>$63,500</td>
<td>$58,541</td>
</tr>
<tr>
<td>Associate</td>
<td>36</td>
<td>$59,700</td>
<td>$62,882</td>
<td>$66,000</td>
<td>$67,100</td>
</tr>
<tr>
<td>Full</td>
<td>37</td>
<td>$63,000</td>
<td>$75,628</td>
<td>$84,921</td>
<td>$88,806</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Faculty Rank</th>
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<td>$88,806</td>
</tr>
</tbody>
</table>

By Dexter Kozen and Jim Morris

Each September, the Computing Research Association surveys academic departments in the United States and Canada that offer the Ph.D. in computer science or computer engineering. The annual C.R.A. Taulbee Survey collects data on enrollment in the undergraduate, master’s, and Ph.D. computer programs, about employment of Ph.D. graduates of these programs, and on the number and salaries of faculty in these programs.

This is the 28th year that CRA has tracked the production and employment of Ph.D.s in the computer science field. For the past 12 years, computer engineering data have also been incorporated into the survey. The traditionally high response rate to the Engineering Research Association surveys in the computer science ranking of research-doctorate programs in the United States, released in 1995.

Each department is asked to report the number, minimum, and maximum salary for each professorial rank and the number of persons at each rank. The salaries are those effective as of January 1, 1999. For U.S. departments, nine-month salaries are reported in U.S. dollars. For Canadian departments, twelve-month salaries are reported in Canadian dollars. The column labeled "# Faculty" is the sum of the number of faculty in each rank for those departments that reported salary data in that rank. The minimum and maximum of the reported salary minima (and maxima) should be self-explanatory. Thus, the range of salaries in a given rank among departments that reported data for that rank is the interval ["minimum of the minima, "maximum of the maxima]. The means of the reported salary minima (maxima) in a given rank are computed by summing the departmental reported minimum (maximum) and dividing by the number of departments reporting data at that rank. The average salary at each rank is computed by summing the individual means reported at each rank and dividing by the number of departments reporting data at that rank.

For comparison with last year’s data, Table 10 shows the overall (unweighted) average salaries for the U.S. departments and separately for the Canadian departments. The preliminary data from 1997 are those published in the March 1998 C.R.N. and the final data from 1997 are those published in the March 1999 C.R.N. As can be seen, the U.S. averages appear to have increased about 4% in both the Assistant Professor and Full Professor categories from last year. Averages at the Associate professor level increased by around 1%. Canadian averages appear to have changed at a similar rate, however the Full Professor category average seems to have slightly decreased. This category is however based on a smaller number of departments and is therefore more strongly influenced by a single department’s value. The reader should note that there was an error in the preliminary reporting of the number of Canadian departments responding –– the actual number was 10. However, the salary data was correct. The response rate was computed by summing the departmental reported minimum (maximum) and dividing by the number of departments reporting data at that rank.

For comparison with last year’s data, Table 10 shows the overall (unweighted) average salaries for the U.S. departments and separately for the Canadian departments. The preliminary data from 1997 are those published in the March 1998 C.R.N. and the final data from 1997 are those published in the March 1999 C.R.N. As can be seen, the U.S. averages appear to have increased about 4% in both the Assistant Professor and Full Professor categories from last year. Averages at the Associate professor level increased by around 1%. Canadian averages appear to have changed at a similar rate, however the Full Professor category average seems to have slightly decreased. This category is however based on a smaller number of departments and is therefore more strongly influenced by a single department’s value. The reader should note that there was an error in the preliminary reporting of the number of Canadian departments responding –– the actual number was 10. However, the salary data was correct. The response rate was computed by summing the departmental reported minimum (maximum) and dividing by the number of departments reporting data at that rank.
industry.  For example, both relational researchers who developed and experimentation with SAGE and core memories to computer graphics.  facilities by the availability of services will be provided at community college campuses.  Developing web-based materials for computer science courses is facilitated by the availability of supporting software.  The best-known example is WebCT (http://homebrew.cscu.cs.ubc.ca/webct/webct.html), developed by the computer science department of the University of British Columbia.  WebCT can be used to publish materials that supplement existing courses or to create entire online courses. It uses Web browsers as the interface for a course-building environment, and includes tools that provide services to students (navigation tools, homework, conferencing, on-line chat, self-evaluation) and-instructors (accesscontrol, course calendar, automatic index generation, automatic grading and reporting, student progress tracking).  WebCT has been used for over sixty courses at the University of British Columbia, including an upper-level undergraduate operating systems course and a first-year C++ course with an enrollment of 650 students. Students enrolled in distance and continuing education courses will need support for asynchronous learning. The Mallard Project (http://www.cen.uiuc.edu/Mallard/) at the University of Illinois has developed effective tools that provide such support services, including automatic assignment grading and reporting, asynchronous student assistance, and synchronous whiteboards. Mallard allows students to be given randomized assignments, and Java applets can be used for grading. Mallard has been used for courses in electrical engineering, economics, and language instruction (Italian, Spanish).  It is clear that on-campus instruction will not be able to meet the computer science education needs of an increasingly diverse and distributed population.  The example shows that distance and continuing education provides significant opportunities for computer science.  These opportunities include using the web to provide materials and support asynchronous learning, and collaborating with publishers and professional societies to develop materials.  It is important to note that while there are great opportunities, responding to them is not cost-free.  The OU's development cost for M206 was over $500,000, and its tutorial network was already in place. In summary, the increasing need for distance and continuing education in computer science presents departments with new opportunities.  The Web offers a cost-effective way to meet this need by bringing CS courses to large numbers of students, and current tools simplify the process of developing web-based course materials. In the other hand, a significant up-front investment is needed in course development and delivery infrastructure.

Education from page 1 programs (topics include security, HCI, and DDA/ODDI, and 3 BCC/ODU CD-ROMs.  Programming projects include individual and group assignments coordinated by local tutors.  Assignments are submitted and returned by e-mail, and OU course technology supports electronic marking of assignments. More information on M 206 can be found at the following websites: http://www.3.open.ac.uk/ courses/framed/modules/m206.htm, and http://www.cs.open.ac.uk/7em206/m206.html. A recent partnership between OU and the Florida University system will bring M 206 and other OU computer science courses to the United States in 1999.  University of Florida students can view lectures and tutorials on the web browser and submit assignments via e-mail.  In addition, the course is open to all students in Florida and includes a web-based tutorial network.  The main advantages of this system are convenience and flexibility.  It is clear that on-campus instruction will not be able to meet the computer science education needs of an increasingly diverse and distributed population.  The example shows that distance and continuing education provides significant opportunities for computer science.  These opportunities include using the web to provide materials and support asynchronous learning, and collaborating with publishers and professional societies to develop materials.  It is important to note that while there are great opportunities, responding to them is not cost-free.  The OU's development cost for M 206 was over $500,000, and its tutorial network was already in place. In summary, the increasing need for distance and continuing education in computer science presents departments with new opportunities.  The Web offers a cost-effective way to meet this need by bringing CS courses to large numbers of students, and current tools simplify the process of developing web-based course materials. In the other hand, a significant up-front investment is needed in course development and delivery infrastructure.

Past from page 3 core memories to computer graphics.  Many of the pioneers of computing learned their craft through hands-on experimentation with SA GE and subsequently staffed the companies and laboratories of the nascent computing industry.  The internet is a more modern example of this phenomenon.  Federal support created the community of researchers who developed and prototyped networks based on the Internet Protocol and invented a range of related applications, such as e-mail.  Federally sponsored research has also been on the pioneering work in the industry.  For example, both relational databases and reduced instruction set computing (RISC) technology were first proposed by researchers at IBM.  The company did not immediately commercialize either technology.  Rather, commercialization was hastened by federal support for university research that further refined the technology and built a pool of expertise.  Many researchers involved in these projects assisted in the subsequent commercialization of the technology, working with established companies or starting new ones.  The most obvious benefit of diverse funding agencies is the opportunity for researchers to seek support from multiple sponsors, widening the range of applications developed and approachedstein.  Diversity helpsto ensure continuous support for research areas as they continue to mature. Second, agencies were able to recruit and develop new talent.  Visionary leaders, such as C. R. Wickard, Leroy Sutliff, and Robert Taylor, who were drawn from the research community for short tours of duty, were instrumental in identifying new research areas and ensuring sustained support.  Third, federal agencies have continued to adapt to changes in the political and technological environments.

### Table 7: Twelve-Month Salaries, 12 Responses of Canadian CS Departments (Canadian Dollars)

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Faculty</th>
<th>Minimum</th>
<th>Mean</th>
<th>Maximum</th>
<th>Average of all Salaries</th>
<th>Minimum</th>
<th>Mean</th>
<th>Maximum</th>
<th>Reported Salary Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>35</td>
<td>$40,000</td>
<td>$57,288</td>
<td>$75,215</td>
<td>$59,217</td>
<td>$40,000</td>
<td>$62,030</td>
<td>$85,000</td>
<td></td>
</tr>
<tr>
<td>Associate</td>
<td>118</td>
<td>$46,350</td>
<td>$64,697</td>
<td>$82,175</td>
<td>$71,990</td>
<td>$46,350</td>
<td>$83,060</td>
<td>$126,703</td>
<td></td>
</tr>
<tr>
<td>Full</td>
<td>134</td>
<td>$58,520</td>
<td>$75,767</td>
<td>$95,474</td>
<td>$90,823</td>
<td>$58,520</td>
<td>$111,357</td>
<td>$162,075</td>
<td></td>
</tr>
</tbody>
</table>

### Table 8: Nine-Month Salaries, 118 Responses of 16 US CS and CE Departments

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Faculty</th>
<th>Minimum</th>
<th>Mean</th>
<th>Maximum</th>
<th>Average of all Salaries</th>
<th>Minimum</th>
<th>Mean</th>
<th>Maximum</th>
<th>Reported Salary Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistant</td>
<td>479</td>
<td>$29,150</td>
<td>$57,583</td>
<td>$70,900</td>
<td>$60,418</td>
<td>$45,000</td>
<td>$63,541</td>
<td>$83,600</td>
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</tr>
<tr>
<td>Associate</td>
<td>774</td>
<td>$40,758</td>
<td>$63,392</td>
<td>$90,000</td>
<td>$66,867</td>
<td>$54,535</td>
<td>$77,294</td>
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</tr>
<tr>
<td>Full</td>
<td>982</td>
<td>$43,300</td>
<td>$76,118</td>
<td>$110,000</td>
<td>$93,313</td>
<td>$59,747</td>
<td>$118,639</td>
<td>$223,569</td>
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</tr>
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</table>

### Table 9: Nine-Month Salaries for New Ph.D.s Reporting US CS and CE Departments

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th># Faculty</th>
<th>Minimum</th>
<th>Mean</th>
<th>Maximum</th>
<th>Average of all Salaries</th>
<th>Minimum</th>
<th>Mean</th>
<th>Maximum</th>
<th>Reported Salary Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenure</td>
<td>73</td>
<td>$51,500</td>
<td>$60,458</td>
<td>$74,000</td>
<td>$60,735</td>
<td>$51,500</td>
<td>$61,142</td>
<td>$75,000</td>
<td></td>
</tr>
<tr>
<td>Researcher</td>
<td>10</td>
<td>$40,000</td>
<td>$51,651</td>
<td>$70,000</td>
<td>$54,311</td>
<td>$40,000</td>
<td>$56,257</td>
<td>$70,000</td>
<td></td>
</tr>
<tr>
<td>Postdoc</td>
<td>12</td>
<td>$30,000</td>
<td>$40,222</td>
<td>$60,000</td>
<td>$40,777</td>
<td>$30,000</td>
<td>$41,333</td>
<td>$60,000</td>
<td></td>
</tr>
</tbody>
</table>

### Table 10: Nine-Month Salaries, Comparison with 1997 Survey

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td># Reporting / Surveyed</td>
<td>110 / 146</td>
<td>117 / 146</td>
<td>118 / 168</td>
<td>10 / 17</td>
<td>13 / 17</td>
<td>12 / 18</td>
<td></td>
</tr>
<tr>
<td>Assistant</td>
<td>$57,552</td>
<td>$67,755</td>
<td>$61,418</td>
<td>$66,961</td>
<td>$56,257</td>
<td>$55,891</td>
<td></td>
</tr>
<tr>
<td>Associate</td>
<td>$66,344</td>
<td>$66,542</td>
<td>$66,887</td>
<td>$71,224</td>
<td>$70,457</td>
<td>$71,990</td>
<td></td>
</tr>
<tr>
<td>Full</td>
<td>$89,754</td>
<td>$89,566</td>
<td>$93,313</td>
<td>$91,108</td>
<td>$91,415</td>
<td>$90,822</td>
<td></td>
</tr>
</tbody>
</table>
related technologies was always
government-sponsored. Much of the
research was related to fighting the
Cold War and to building large
computers and supercomputers for
defense purposes. And it also was
related to building a nuclear arsenal.
Now, to verify the nuclear arsenal, we
need to make the peace-time version of
this earlier investment.

Although the investment requires
a relatively small amount of money, I
understand that it is always at the
margin. But if we do a rate-of-return
calculation on how much tax
revenue this will bring in if we can
imagine the industry, it will be an
incredibly good investment compared
with any investment in brick
and mortar. It has a huge potential
payoff. Not only that, but the
investment will be funding educa-
tion, one of the president's top goals.
An educated workforce in technol-
gy, one of the president’s top goals.

Unfortunately, it is not an
investment in education. No matter
how many people we employ in
research and how much we do —
even if we make the research results
available, which we do -- it doesn’t
directly support the university system.
Industry is still a net consumer of
Ph.D. and master’s students, not a
supplier. We do support some research
in universities, but it can’t be on the
scale required and it is not the right
kind of money that is needed to really
build the university system. U
inversities need strong support. They
need longer-term support than
they have received, and they need
support that is less tied to specific peer
review. Most often the greatest ideas
are not what peers would think of as
great. To really see over the horizon,
we need to fund more truly innovative

and a little bit off-the-map research,
similar to what was done in the 1960s
with the moon shot and at Xerox
PA RC. That is why we need the
virtual centers for “Expeditions”
recommended in the PITAC’s report.
These are really about getting a group
of people together to pretend what the
future will be like and imagine what
would be possible, and then trying to
build the environment where those
things are true.

This type of effort takes some
focus, and it requires larger programs
than you can support from a single
NSF grant. The PITAC has encour-
aged DARPA to adopt a more long-
term focus in creating these kinds of
experiments. We are very pleased to
see that DARPA has, in fact, already
issued a BA A (Broad A gency)
A nouncement) seeking proposals
for this kind of “Expedition” idea.

CRN: So there has been a
response to the report’s recommenda-
tions already?
Joy: Yes, but that’s the whole
point of releasing a interim report. It
is part of a process, and we’re halfway
t here. The committee received very
good feedback and we appreciate the
time people spent providing it. We
have been reacting to that feedback
and revising the work. But more
importantly, we are going to try to
build a consensus that this is a good
investment for our country for the
next 20 years.

The report is not about the
companies that want it now. It is not
about the research M cros or Sun or
IBM conduct or don’t conduct. It is
about the fact that 20 or 30 years
ago we didn’t have a M cros or a
Sun or an A pple. The PITAC is
interested in the next generation of
these companies. We need new
companies for new ideas, and we
want the people who are going to start
them and work at them to get an
education so they can continue to
build our economy. The report is
about a commitment to education. It
is not an enormous commitment,
given that this offers the highest
growth and the most disinterested
opportunity available. These are
exactly the kinds of jobs we want to
create.

CRN: W hat specific actions
would you like the computing
research community to take as a result
of this report?
Joy: Not only do we need
the government to help by making this
investment in education and re-
search; we also need the companies in
our industry to take a longer-term
view and to invest more in basic
research. It is unfortunate that the
basic research investment has
decreased. The market has become so

Joy Continued on Page 20
Allegany College
Department of Computer Science

The Department of Computer Science is seeking applications for a position in support of its new track in Applied Computing to begin in the Fall of 1999. Applicants must demonstrate a commitment to excellence in teaching and continue contributing to the discipline.

Qualifications for a tenure-track position include a Ph.D. in Computer Science or Software Engineering, alternative credentials in Software Engineering, or a Master’s degree with demonstrable experience teaching in the discipline. Preference will be given to candidates with interdepartmental interests for Summer 1999. Candidates will work with Argonne scientists on the development of innovative teaching methods and curricula. Applicants should forward a resume, position description, and three letters of recommendation to Prof. Steven P. Reiss, Chair, Department of Computer Science, Argonne National Laboratory, Argonne, IL 60439; reiss@mcs.anl.gov; 630-252-7211. The deadline date is February 15, 1999.

Argonne National Laboratory
Computational Science, Mathematics, and Computer Science (MCS) Division

Belt Laboratories, Lucent Technologies

Scientific Computing Research Department
Member of Technical Staff

The Scientific Computing Research Department at Bell Laboratories, Murray Hill, New Jersey, wishes to hire a Member of Technical Staff. We are seeking applications from recent graduates interested in research in high performance scientific computation. Preference will be given to candidates working on parallel and grid computing projects for whom research on complex mathematical and physical systems is a core area.

Applications should be directed to: David L. Ewing, Chair, Scientific Computing Research Department, Bell Laboratories, Murray Hill, New Jersey, 07974-2070. Interested candidates should send a resume, position description, and three letters of recommendation to: Prof. Steven P. Reiss, Chair, Department of Computer Science, Argonne National Laboratory, Argonne, IL 60439; reiss@mcs.anl.gov; 630-252-7211. The deadline date is February 15, 1999.

Bell Laboratories, Lucent Technologies

Scientific Computing Research Department
Member of Technical Staff

The Scientific Computing Research Department at Bell Laboratories, Murray Hill, New Jersey, wishes to hire a Member of Technical Staff. We are seeking applications from recent graduates interested in research in high performance scientific computation. Preference will be given to candidates working on parallel and grid computing projects for whom research on complex mathematical and physical systems is a core area.

Applications should be directed to: David L. Ewing, Chair, Scientific Computing Research Department, Bell Laboratories, Murray Hill, New Jersey, 07974-2070. Interested candidates should send a resume, position description, and three letters of recommendation to: Prof. Steven P. Reiss, Chair, Department of Computer Science, Argonne National Laboratory, Argonne, IL 60439; reiss@mcs.anl.gov; 630-252-7211. The deadline date is February 15, 1999.

Bucknell University
Department of Computer Science

Applications are invited for a tenure-track position beginning in the Fall of 1999. Analysis and Design of Algorithms is a core area of the department.

Interested applicants should submit a curriculum vitae and a description of their research and teaching. Applications should be directed to: Prof. Steven P. Reiss, Chair, Department of Computer Science, Argonne National Laboratory, Argonne, IL 60439; reiss@mcs.anl.gov; 630-252-7211. The deadline date is February 15, 1999.

Brown University
Department of Computer Science

Applications are invited for a tenure-track position beginning in the Fall of 1999. A Ph.D. in Computer Science is required. Applications should be directed to: Prof. Steven P. Reiss, Chair, Department of Computer Science, Argonne National Laboratory, Argonne, IL 60439; reiss@mcs.anl.gov; 630-252-7211. The deadline date is February 15, 1999.

Barnes & Noble

Professional Opportunities

Send copy and payment for Professional Opportunities advertisements to:

COMPUTING RESEARCH NEWS
CRN Advertising Policy
Send copy and payment for Professional Opportunities advertisements to:

Contact: Jan Griffin, MCS Division, Argonne National Laboratory, Argonne, IL 60439; Griffin@ecs.anl.gov; 630-252-7211; fax: 630-252-3768.

The deadline date is February 15, 1999.

Graduate Associates

Student will work with Argonne scientists on the development of innovative teaching methods and curricula. For further information, see www-bf/education/mcs/training/education openness/graduate.html or contact Jan Griffin at Griffin@ecs.anl.gov.

The deadline date is February 15, 1999.

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The deadline date is February 15, 1999.
Colgate University

Department of Computer Science

The Department of Computer Science invites applications for a tenure-track position at the Assistant Professor level for the academic year 1999-2000. The Department is particularly interested in candidates with research interests in computer animation, computer graphics, and related fields.

Colgate University is an affluent private university located in Hamilton, NY. Candidates are expected to have strong teaching and research records. The department is committed to excellence in teaching and research. The position is available immediately and will continue until the positions are filled. Review of applications will begin February 1, 1999, and continue until the position is filled. Interested candidates should send a letter of interest, current curriculum vitae, and three letters of recommendation to: Faculty Search Committee, Computer Science Department, Colgate University, One Cardinal Drive, Hamilton, New York 13346. Colgate is an Equal Opportunity/Affirmative Action Employer. Women and minorities are encouraged to apply.

Cornell University

Department of Computer Science

The Department of Computer Science invites applications for a tenure-track position in the area of Data Management and Information Systems. The Department is seeking candidates with research interests in database management, information systems, data mining, and related areas.

Cornell University is a world-renowned university located in Ithaca, New York. The University is committed to excellence in teaching and research. The position is available immediately and will continue until the positions are filled. Review of applications will begin February 1, 1999, and continue until the positions are filled. Interested candidates should send a letter of interest, current curriculum vitae, and three letters of recommendation to: Faculty Search Committee, Computer Science Department, Cornell University, Ithaca, NY 14853. Cornell is an Equal Opportunity/Affirmative Action Employer. Women and minorities are encouraged to apply.

Dartmouth College

Department of Computer Science

The Department of Computer Science seeks candidates with research interests in computational neuroscience, machine learning, and related areas.

Dartmouth College is a world-renowned university located in Hanover, New Hampshire. The Department is committed to excellence in teaching and research. The position is available immediately and will continue until the positions are filled. Review of applications will begin February 1, 1999, and continue until the positions are filled. Interested candidates should send a letter of interest, current curriculum vitae, and three letters of recommendation to: Faculty Search Committee, Computer Science Department, Dartmouth College, Hanover, New Hampshire 03755.

Florida International University

School of Computer Science

The School of Computer Science seeks candidates with research interests in software engineering, software architecture, and related areas.

Florida International University is a highly selective university located in Miami, Florida. The School is committed to excellence in teaching and research. The position is available immediately and will continue until the positions are filled. Review of applications will begin February 1, 1999, and continue until the positions are filled. Interested candidates should send a letter of interest, current curriculum vitae, and three letters of recommendation to: Faculty Search Committee, Department of Computer Science, Florida International University, Miami, Florida 33199.
Professional Opportunities

Florida State University

Department of Computer Science

We are seeking an individual with a record of exceptional administrative experience, and a strong teaching record to apply as Chair of the Department.

Applications are invited for a tenure-track position as Assistant Professor in the Department of Computer Science at George Mason University. The successful candidate will be expected to start on August 1, 1999. The position is tenure-track and carries a three-course teaching load. The successful candidate is expected to have a Ph.D. in Computer Science or a closely related field, and an outstanding record of research and publishing.

The Department of Computer Science at George Mason University invites applications for a position as Assistant Professor of Computer Science for Fall 1999. The successful candidate will be expected to start on August 1, 1999. The position is tenure-track and carries a three-course teaching load. The successful candidate is expected to have a Ph.D. in Computer Science or a closely related field, and an outstanding record of research and publishing.

The School of Computer Science at Indiana University seeks applications for a tenured position at the rank of Professor. The successful candidate will be expected to start on August 1, 1999. The position is tenure-track and carries a three-course teaching load. The successful candidate is expected to have a Ph.D. in Computer Science or a closely related field, and an outstanding record of research and publishing.

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Job from Page 11

Computing Research News January 1999

Professional Opportunities

The North Carolina State University Department of Computer Science invites applications for a tenure-track Assistant Professor in the area of computer science beginning Fall 1999. We are seeking candidates who have worked on high performance computing, algorithm design and analysis, parallel computing, real-time embedded computing, computer networks, operating systems, computer security, or mobile wireless computing. The department is involved in both theoretical and experimental and methodological interests in the areas of computer science. The successful candidate will have a Ph.D. in Computer Science or a related field. We encourage applicants with strong research and teaching experience to apply. The university strongly supports and encourages research and teaching at the Ph.D. level. We are committed to complement our established research strengths and interests in the areas of networking and distributed systems. A number of faculty have an interest in multimedia networking, optical networks, network security, real-time communication, and client-server system testing, distributed database systems, and object-oriented programming. Their work is supported by NSF, DARPA, AFOSA, Lucent, Ericsson, Fujitsu, IBM, Nortel, NSA, and the State of North Carolina. The Department is in a period of rapid growth and advancement and is positioning itself to be at the forefront of selected areas in computer science. The candidate will have access to our state-of-the-art high-performance ATM-based network and the North Carolina Supercomputer and Internet 2 facilities. Tallahassee is located in Tallahassee, which forms one of the world-renowned Research Triangle Park. The University is located in the Research Triangle Park, recognized as one of the best places to live in the U.S. It is a living laboratory for the AT&T, Bellcore, IBM, HP, and Lucent, and Strategic, computer software, and electrical engineering industries. The University offers a comprehensive benefits package and competitive startup packages, and low-cost housing. Interested candidates are encouraged to apply. Women and minorities are encouraged to apply. Applications should be submitted to the department, in the form of a letter including a summary of research, teaching, and service accomplishments, a curriculum vitae, a statement of career objectives, key publications, and three letters of recommendation. The University is an Equal Opportunity/ Affirmative Action Employer.

Northern Illinois University Department of Computer Science invites applications for a tenure-track Assistant Professor position beginning Fall 1999 at Northern Illinois University. Applications are being solicited for a tenure-track assistant professor position at Northern Illinois University. We are particularly interested in candidates with research interests in low-cost miniaturized power sources, software development, and mobile computing. The successful candidate will be expected to begin teaching in the Fall 1999. Interested candidates are encouraged to submit a letter of application, curriculum vitae, a statement of research, teaching, and service objectives, and three letters of recommendation to: Assistant Professor Search Committee, Department of Computer Science, Northern Illinois University, DeKalb, Illinois 60115. The position opens immediately and continues to be advertised until filled.

North Carolina State University Department of Computer Science invites applications for a tenure-track Assistant Professor in the area of computer science beginning Fall 1999. We are seeking candidates who have worked on high performance computing, algorithm design and analysis, parallel computing, real-time embedded computing, computer networks, operating systems, computer security, or mobile wireless computing. The department is involved in both theoretical and experimental and methodological interests in the areas of computer science. The successful candidate will have a Ph.D. in Computer Science or a related field. We encourage applicants with strong research and teaching experience to apply. The university strongly supports and encourages research and teaching at the Ph.D. level. We are committed to complement our established research strengths and interests in the areas of networking and distributed systems. A number of faculty have an interest in multimedia networking, optical networks, network security, real-time communication, and client-server system testing, distributed database systems, and object-oriented programming. Their work is supported by NSF, DARPA, AFOSA, Lucent, Ericsson, Fujitsu, IBM, Nortel, NSA, and the State of North Carolina. The Department is in a period of rapid growth and advancement and is positioning itself to be at the forefront of selected areas in computer science. The candidate will have access to our state-of-the-art high-performance ATM-based network and the North Carolina Supercomputer and Internet 2 facilities. Tallahassee is located in Tallahassee, which forms one of the world-renowned Research Triangle Park. The University is located in the Research Triangle Park, recognized as one of the best places to live in the U.S. It is a living laboratory for the AT&T, Bellcore, IBM, HP, and Lucent, and Strategic, computer software, and electrical engineering industries. The University offers a comprehensive benefits package and competitive startup packages, and low-cost housing. Interested candidates are encouraged to apply. Women and minorities are encouraged to apply. Applications should be submitted to the department, in the form of a letter including a summary of research, teaching, and service accomplishments, a curriculum vitae, a statement of career objectives, key publications, and three letters of recommendation to: Assistant Professor Search Committee, Department of Computer Science, Northern Illinois University, DeKalb, Illinois 60115. The position opens immediately and continues to be advertised until filled. For more information, see our website at http://www.cse.nmsu.edu/, and write to webmaster@nmsu.edu. Closing date for applications is January 15, 1999. For more information, see our website at http://www.cse.nmsu.edu/, and write to webmaster@nmsu.edu. Closing date for applications is January 15, 1999. To apply, please send a letter indicating your interest and will encourage to the Chair, Department of Computer Science, Northern Illinois University, DeKalb, Illinois 60115. Related information may be obtained by contacting the department chair, Dr. Thomas E. Lord, Chair, Department of Computer Science, Northern Illinois University, DeKalb, Illinois 60115. A Ph.D. in Computer Science is required. The Chair expects applications from candidates who are currently employed as Assistant Professors at major research universities. The successful candidate will be expected to begin teaching in the Fall 1999. Interested candidates are encouraged to submit a letter of application, curriculum vitae, a statement of research, teaching, and service objectives, and three letters of recommendation to: Assistant Professor Search Committee, Department of Computer Science, Northern Illinois University, DeKalb, Illinois 60115. The position opens immediately and continues to be advertised until filled. For more information, see our website at http://www.cse.nmsu.edu/, and write to webmaster@nmsu.edu. Closing date for applications is January 15, 1999. For more information, see our website at http://www.cse.nmsu.edu/, and write to webmaster@nmsu.edu. Closing date for applications is January 15, 1999. To apply, please send a letter indicating your interest and will encourage to the Chair, Department of Computer Science, Northern Illinois University, DeKalb, Illinois 60115. Related information may be obtained by contacting the department chair, Dr. Thomas E. Lord, Chair, Department of Computer Science, Northern Illinois University, DeKalb, Illinois 60115. A Ph.D. in Computer Science is required. The Chair expects applications from candidates who are currently employed as Assistant Professors at major research universities. The successful candidate will be expected to begin teaching in the Fall 1999. Interested candidates are encouraged to submit a letter of application, curriculum vitae, a statement of research, teaching, and service objectives, and three letters of recommendation to: Assistant Professor Search Committee, Department of Computer Science, Northern Illinois University, DeKalb, Illinois 60115. The position opens immediately and continues to be advertised until filled.
Professional Opportunities

January 1999

Computing Research News

Oklahoma State University Computer Science Department

The Oklahoma State University (OSU) Computer Science Department is seeking applications from qualified candidates for the position of Professor and Department Head. The term of initial appointment will begin in Fall 1999.

The OSU Computer Science Department is seeking applications from qualified candidates with teaching and research experience in any areas of Computer Science, broadly construed, including operating systems, multimedia, databases, programming languages and environments, distributed systems, networking, and graphics and animation. Outstanding candidates from other areas of computer science may also be considered.

Send applications to
Chair, Search Committee
Computer Science Department
Oklahoma State University
Stillwater, OK 74078-0501

Tel: 405-744-7685
Fax: 405-744-7638
E-mail: search@cs.okstate.edu

Review of applications will begin January 15, 1999, but applications will be accepted until the position has been filled.

The OSU Computer Science Department is an Equal Opportunity/Affirmative Action Employer.

Oklahoma State University Computer Science Department

Faculty Search

Applications are invited for anticipated full-time, tenure-track and visiting positions at the Assistant Professor level. The term of initial appointment will begin in Fall 1999.

The OSU Computer Science Department is seeking applications from qualified candidates with teaching and research experience in any areas of Computer Science, broadly construed. Outstanding candidates from other areas of computer science may also be considered.

Send applications to
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Computer Science Department
Oklahoma State University
Stillwater, OK 74078-0501
Tel: 405-744-7685
Fax: 405-744-7638
E-mail: search@cs.okstate.edu

Review of applications will begin January 15, 1999, but applications will be accepted until the position has been filled.

The OSU Computer Science Department is an Equal Opportunity/Affirmative Action Employer.

Portland State University Computer Science Department

Software Engineering

Applications are invited for anticipated full-time, tenure-track, and visiting positions in the Oregon Graduate Institute's Software Engineering Program. These positions are filled. Please send a statement of interest to:

Chair, Search Committee
Computer Science Department
Portland State University
Portland, OR 97207-0751

To apply, please indicate whether you are applying for a tenure-track or visiting position. Tel. 503-725-8129; Fax. 503-725-8130; E-mail: faculty-search@cs.pdx.edu

The Department of Computer Science at Portland State University is an Equal Opportunity/Affirmative Action Employer.

Princeton University Department of Computer Science

Princeton University invites applications for Assistant Professor, tenure-track positions. We are entertaining applications in all areas of computer science. Candidates for most senior ranks with exceptional records of research will also be considered.

Applications must demonstrate superior research and scholarship potential as well as teaching ability. A Ph.D. or equivalent in Computer Science or related areas is required. Successful candidates at all ranks are expected to pursue an active research program and to contribute significantly to the teaching programs of the department.

Applications should include a resume and the names of at least three people who can comment on the applicant's professional qualifications. A postcard should be sent to:

Chair, Search Committee
Dept. of Computer Science
Princeton University
35时间和Chair St.
Princeton, NJ 08544-2007
E-mail: search@cs.princeton.edu

The deadline for consideration applications in January 1999. Princeton
Professional Opportunities

Southwestern Texas State University (SWT) Department of Computer Science

Applications are invited for three newly created tenure-track faculty positions at the Assistant Professor level to begin Fall, 1999. A Ph.D. in Computer Science or Computer Engineering and a commitment to excellence in teaching and research are required.

The Department of Computer Science, with approximately 2,500 undergraduate, and 310 students, is located in San Marcos, Texas. The University is located close to both Austin and San Antonio. In proximity to the university, the department and the university have enjoyed strong relationships with potential employers where more information see http://www.swt.edu.

An application review will begin February 15, 1999. Candidates will continue until the positions are filled.

Princeton University Department of Computer Science

Faculty Opening

The Department of Computer Science invites applications for a tenure-track position at the Assistant Professor level to begin Fall 1999. Applicants must have an MS or Ph.D. in Computer Science, or a closely related discipline, and a strong commitment to excellence in research and teaching.

Applicants are expected to have a strong commitment to research and teaching, and to have made an intellectual contribution to the field.

Applications are being received for faculty positions. A Ph.D. is required, with a strong commitment to research and teaching.

Applications are invited for two tenure-track positions at the Assistant Professor level. A Ph.D. in Computer Science or equivalent is required, with a strong commitment to excellence in research and teaching. The ideal candidate will have a strong commitment to teaching at the graduate and undergraduate levels. Excellent support will be provided to the successful applicant for establishing and expanding their research programs.

Salary is competitive and depends on background and excellence in teaching and research. Salary is competitive and depends on background and excellence in teaching and research. Salary is competitive and depends on background and excellence in teaching and research.

Applications are invited for faculty positions at the Assistant Professor level. A Ph.D. in Computer Science or equivalent is required, with a strong commitment to excellence in research and teaching. The ideal candidate will have a strong commitment to teaching at the graduate and undergraduate levels. Excellent support will be provided to the successful applicant for establishing and expanding their research programs.

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Applications from women and minority candidates are encouraged.

The position is available beginning Autumn 1999 and is offered jointly in the Linguistics and Computer Science Departments. Further information about these departments can be found at http://www.cs.stanford.edu, respectively.

Applications should include a curriculum vitae, statements of research and teaching interests, and the names of five references. The application should be sent to:

Professor John Mitchell
Search Committee Chair
Clio Lab, Room 449
Computer Science Department
Stanford University
Gates 23
CA 94305-9025

The interview process will begin on January 15, 1999, but applications will be accepted until Position is filled. Stanford University is an Equal Opportunity Employer.

Applications are invited for a tenure-track position at the Assistant Professor rank. Swarthmore College is a selective, liberal arts college located in a suburb ten miles outside of Philadelphia, Pennsylvania. The position will be available in Autumn 1999.

The appointment will be made at the Lecturer level. The University at Buffalo is New York's flagship public university located in a suburban community with a population over 1.1 million. Geographic Information and Analysis, the Laboratory will be associated with the Computer Science/Engineering or related field. The University at Buffalo manages and operates extensive computing resources which collaboration with industry is encouraged.

The University is an Equal Opportunity/Affirmative Action Employer. Qualified individuals from underrepresented groups are urged to apply.
Professional Opportunities

Texas A&M University
Department of Computer Science

The Department of Computer Science at Texas A&M University invites applications for a YAHOO! Endowed Chair in Information Technology. This endowed chair will provide leadership for research and instructional programs in computer research. The chairholder will provide vision and leadership to these programs and will be a member of the College of Science and Technology and the School of Computer Science. The Department of Computer Science at Texas A&M University has long enjoyed a strong reputation in both research and teaching. Today, the Brut Ning College of Engineering is one of the largest and best endowed in the nation, and it ranks among the top ten in every significant national ranking.

This is an endowed position within the Department of Computer Science in one of the fastest-developing departments in the College of Engineering. The College is a national leader in software engineering, information technology, and algorithm design. It has a strong computer science program as well as major sports events.

The Chair will be responsible for the sale of new curriculum and instructional materials. Duties of the position include teaching computer science at the university level, developing a strong research program along with external research funds during the 1996-97 academic year. For more information, visit the Texas A&M University website.

Applications will be accepted until March 1, 2000. Salary will be commensurate with employer, we welcome diversity in the workplace and will continue to consider applicants until all positions are filled.

University of California, Irvine
Department of Computer Science

Applications are invited for a tenure-track faculty position at the assistant professor level in the Department of Computer Science. The position is located in the Irvine, California, campus (UCI). The Department of Computer Science at UC Irvine is one of the leaders in the academic computer in California, and the only virtual-reality immersive display (CAVE) and the Multimedia and Information Systems (RIMS), which manages the SGI Origin 200. Salary will be commensurate with qualifications and experience. Send curriculum vitae, the names of three references, and up to three copies of reprints or copies of important publications. A Ph.D. or equivalent is required. The position is open until filled. For more information about the department, see our website at http://www.cs.uci.edu. Send application inquiries to: Randi Goyal, Chair, Department of Computer Science, University of California, Irvine, 124 Lifesci, Irvine, CA 92697-4071. E-mail: goyal@ics.uci.edu

University of Arizona
Department of Computer Science

Applications are invited for a tenure-track faculty position at the assistant professor level in the Department of Computer Science. The position is located in the Tucson, Arizona, campus and will continue to consider applications until all positions are filled. A complete application includes a cover letter discussing teaching and research interests, curriculum vitae, and names and addresses of three references. Applications will be considered until the review of applications on January 15, 1999, and reviewed until all positions are filled.

University of California, Davis
Department of Computer Science

Applications are invited for a tenure-track assistant professor position in the Department of Computer Science at the University of California, Davis. Duties include teaching computer science undergraduate and graduate courses, research, and service.

Applications are invited for a tenure-track faculty position at the assistant professor level in the Department of Computer Science. The position is located in the Davis, California, campus. The Department of Computer Science at UC Davis is an EEO/AA employer - M/W/D/V.

University of Colorado at Boulder
Department of Computer Science

Applications are invited for a tenure-track assistant professor position in the Department of Computer Science. The position is located in the Boulder, Colorado, campus. The Department of Computer Science at the University of Colorado at Boulder is one of the nation's top twenty universities in research and is host to a wide range of multidisciplinary programs. The department is primarily seeking candidates in the areas of software engineering, computer systems, and algorithm design. The Department of Computer Science at the University of Colorado at Boulder is an AA/EO employer - M/W/D/V.

University of Illinois at Urbana-Champaign
Department of Computer Science

Applications are invited for a tenure-track assistant professor position in the Department of Computer Science. The position is located in the Urbana, Illinois, campus. The Department of Computer Science at the University of Illinois at Urbana-Champaign is one of the nation's top twenty universities in research and is host to a wide range of multidisciplinary programs. The department is primarily seeking candidates in the areas of software engineering, computer systems, and algorithm design. The Department of Computer Science at the University of Illinois at Urbana-Champaign is an AA/EO employer - M/W/D/V.

University of Kansas
Department of Computer Science

Applications are invited for a tenure-track assistant professor position in the Department of Computer Science. The position is located in the Lawrence, Kansas, campus. The Department of Computer Science at the University of Kansas is an Equal Opportunity/ Affirmative Action employer.

University of Kentucky
Department of Computer Science

Applications are invited for a tenure-track assistant professor position in the Department of Computer Science. The position is located in the Lexington, Kentucky, campus. The Department of Computer Science at the University of Kentucky is located in New Orleans, LA 70118. Applications will be accepted until the positions are filled.

University of Maryland, College Park
Department of Computer Science

Applications are invited for a tenure-track assistant professor position in the Department of Computer Science. The position is located in the College Park, Maryland, campus. The Department of Computer Science at the University of Maryland, College Park, is an AA/EO employer.

University of Massachusetts
Department of Computer Science

Applications are invited for a tenure-track assistant professor position in the Department of Computer Science. The position is located in the Amherst, Massachusetts, campus. The Department of Computer Science at the University of Massachusetts is an AA/EO employer.

University of Rochester
Department of Computer Science

Applications are invited for a tenure-track assistant professor position in the Department of Computer Science. The position is located in the Rochester, New York, campus. The Department of Computer Science at the University of Rochester is one of the nation's top twenty universities in research and is host to a wide range of multidisciplinary programs. The department is primarily seeking candidates in the areas of software engineering, computer systems, and algorithm design. The Department of Computer Science at the University of Rochester is an AA/EO employer - M/W/D/V.

University of Southern California
Department of Computer Science

Applications are invited for a tenure-track assistant professor position in the Department of Computer Science. The position is located in the Los Angeles, California, campus. The Department of Computer Science at the University of Southern California is an AA/EO employer - M/W/D/V.

University of Washington
Department of Computer Science

Applications are invited for a tenure-track assistant professor position in the Department of Computer Science. The position is located in the Seattle, Washington, campus. The Department of Computer Science at the University of Washington is one of the nation's top twenty universities in research and is host to a wide range of multidisciplinary programs. The department is primarily seeking candidates in the areas of software engineering, computer systems, and algorithm design. The Department of Computer Science at the University of Washington is an AA/EO employer - M/W/D/V.
University of Central Florida
School of Computer Science

The School of Computer Science at the University of Central Florida in Orlando, Florida, is offering an opportunity in computer-oriented, non-full-time teaching and research positions starting in August 1999. The position is a 9-month faculty appointment with associated teaching and research responsibilities. The successful candidate is expected to deliver both conventional and distance learning courses for majors as well as service courses. The candidate should have a Ph.D. in computer science, computer engineering, or a related field. Please send a cover letter and a complete resume to Prof. Ren Su, Department of Electrical and Computer Engineering, University of Central Florida, Orlando, FL 32819. The University of Central Florida is an Equal Opportunity/Affirmative Action Employer. Women are particularly encouraged to apply.

University of Colorado at Boulder
Department of Electrical and Computer Science

The Department of Electrical and Computer Science at the University of Colorado at Boulder invites applications for tenure-track faculty positions which will begin as early as August 1999. The position anticipates hiring at the associate professor level, but applications for higher levels will be considered. The department is especially interested in digital signal processing and implementation. This includes all areas within computer engineering, communications, and digital signal processing. Specialties of particular interest include: communication hierarchies, mass storage, parallel processing, and parallel and distributed computing. Networks and distributed systems. Related areas such as VLSI design, signal processing, digital signal processing, embedded systems, and power and packaging are also of interest. Candidates with experience in more than one area are particularly welcome to apply. The department anticipates hiring as many as two faculty members in the area of computer engineering, communications, and digital signal processing. The position will begin as early as August 1999. The university provides competitive salaries, a university retirement system, and a comprehensive benefits package. The position is a 9-month faculty appointment with associated teaching and research responsibilities. For more information about the department, please visit the website at http://www.colorado.edu.

University of Delaware
Department of Computer and Information Sciences

University of Delaware, a state-related, land-grant, sea-grant, and urban-based university with a strong emphasis in engineering and the sciences, offers a position in the Department of Computer and Information Sciences at the assistant professor level, but applications at the associate and full professor levels are also encouraged. The goal of this position is to expand the research and teaching program in digital signal processing, image and video processing, and area-related applications and nominations for Assistant/Associate/Full Professor will be considered. The University of Delaware is an Equal Opportunity/Affirmative Action employer. The department anticipates hiring as many as two faculty members in this area of computer engineering, communications, and digital signal processing. The position will begin as early as August 1999. The university provides competitive salaries, a university retirement system, and a comprehensive benefits package. The position is a 9-month faculty appointment with associated teaching and research responsibilities. For more information about the department, please visit the website at http://www.cis.udel.edu.

University of Delaware
Department of Computer and Information Sciences

University of Delaware Department of Computer and Information Sciences invites applications for positions throughout the department. Applications for assistant professor level and above will be considered. Experience in research and teaching interests in the area of computer engineering, communications, and digital signal processing, embedded computing, hardware/software co-design, multimedia technologies, and in the areas of distributed architectures and systems. The department anticipates hiring as many as two faculty members in this area of computer engineering, communications, and digital signal processing. The position will begin as early as August 1999. The university provides competitive salaries, a university retirement system, and a comprehensive benefits package. The position is a 9-month faculty appointment with associated teaching and research responsibilities. For more information about the department, please visit the website at http://www.cis.udel.edu.

University of Delaware
Department of Mathematics and Computer Science

The University of Delaware, a public research university in the United States, is an integral part of the University of Delaware system. The University of Delaware system is a major research institution that encompasses over 100 university facilities in various locations across the state. The University of Delaware system is a major research institution that encompasses over 100 university facilities in various locations across the state. The University of Delaware system is a major research institution that encompasses over 100 university facilities in various locations across the state.

Professional Opportunities Ads Available on Web Not all departments and organizations choose to run their Professional Opportunities ads on the Web. Therefore, the link (http://www.cra.org/jobs/) is not the definitive listing. The Association for Computing Machinery and Computer Sciences (ACM) encourages all job seekers to use the ACM Professional Opportunities page at http://www.acm.org/jobs. If you would like to subscribe to the ACM Professional Opportunities page, send an email message to dc@acm.org with the subject line "subscribe ACM Professional Opportunities.

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Jobs Continued on Page 18
University of Denver
Department of Computer and Information Science and Engineering

Applications are invited for a joint tenure-track position at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, to carry out independent research, and to contribute to the University of Denver’s mission. The successful candidate will work in an interdisciplinary area with close ties to computer science, computer engineering, and electrical engineering.

The University of Denver is an Equal Opportunity/Affirmative Action employer.

University of Florida
Department of Electrical Engineering

A full-time faculty position at the rank of Assistant Professor is available immediately. The successful candidate is expected to carry out independent, original research in the area of computer networks. The candidate is expected to be involved in teaching at all levels and to advise undergraduate and graduate students.

The University of Florida is an Equal Opportunity/Affirmative Action employer.

University of Houston
Department of Computer Science and Engineering

Several positions for tenure-track faculty members in the Computer Science Department are available. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of Houston’s mission.

The University of Houston is an Equal Opportunity/Affirmative Action employer.

University of Iowa
Department of Computer Science

Two full-time faculty positions are available at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of Iowa’s mission.

The University of Iowa Department of Computer Science is seeking candidates with expertise in the areas of computer engineering, software engineering, and artificial intelligence.

The University of Iowa is an Equal Opportunity/Affirmative Action employer.

University of Maryland
Department of Computer Science

Two full-time faculty positions are available at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of Maryland’s mission.

The University of Maryland, College Park, is an Equal Opportunity/Affirmative Action employer.

University of Michigan
Department of Electrical Engineering and Computer Science

Several full-time faculty positions are available at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of Michigan’s mission.

The University of Michigan is an Equal Opportunity/Affirmative Action employer.

University of Minnesota
Department of Computer Science and Engineering

Several full-time faculty positions are available at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of Minnesota’s mission.

The University of Minnesota is an Equal Opportunity/Affirmative Action employer.

University of North Dakota
Department of Computer Science

Applications are invited for a tenure-track position at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of North Dakota’s mission.

The University of North Dakota is an Equal Opportunity/Affirmative Action employer.

University of Denver
2500 E. 16th Ave., Denver, CO 80218-0289

University of Florida
PO Box 116000, Gainesville, FL 32611-6000
Tel. 352-392-1487

University of Houston
CCLC 925, University of Houston, Houston, TX 77201-2008
Tel. 713-743-7374

University of Iowa
CSE-118, 140 NSF St., Iowa City, IA 52242
Tel. 319-335-1741

University of Maryland
College Park, MD 20742-3255
Tel. 301-405-3000
www.ece.umd.edu

University of Michigan
Ann Arbor, MI 48109-2122
Tel. 734-764-1414

University of Minnesota
University of Minnesota
PO Box 127, Minneapolis, MN 55415
Tel. 612-624-3560

University of North Dakota
Bismarck, ND 58501
Tel. 701-255-1010

University of Denver
2500 E. 16th Ave., Denver, CO 80218-0289

University of Florida
PO Box 116000, Gainesville, FL 32611-6000
Tel. 352-392-1487

University of Houston
CCLC 925, University of Houston, Houston, TX 77201-2008
Tel. 713-743-7374

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CSE-118, 140 NSF St., Iowa City, IA 52242
Tel. 319-335-1741

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Bismarck, ND 58501
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Computer Research News
January 1999

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Professional Opportunities

University of Denver
Department of Computer and Information Science and Engineering

The University of Denver Department of Computer and Information Science and Engineering invites applications for a three-year, renewable, full-time, tenure-track faculty position at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of Denver’s mission. The successful candidate will work in an interdisciplinary area with close ties to computer science, computer engineering, and electrical engineering.

The University of Denver is an Equal Opportunity/Affirmative Action employer.

University of Florida
Department of Computer Science and Engineering

The University of Florida College of Computing Research News January 1999

The University of Florida is an Equal Opportunity/Affirmative Action employer.

University of Houston
Department of Computer Science

The University of Houston Department of Computer Science invites applications for a three-year, renewable, full-time, tenure-track faculty position at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of Houston’s mission.

The University of Houston is an Equal Opportunity/Affirmative Action employer.

University of Iowa
Department of Computer Science

The University of Iowa Department of Computer Science invites applications for a three-year, renewable, full-time, tenure-track faculty position at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of Iowa’s mission.

The University of Iowa Department of Computer Science is seeking candidates with expertise in the areas of computer engineering, software engineering, and artificial intelligence.

The University of Iowa is an Equal Opportunity/Affirmative Action employer.

University of Maryland
Department of Computer Science

The University of Maryland Department of Computer Science invites applications for a three-year, renewable, full-time, tenure-track faculty position at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of Maryland’s mission.

The University of Maryland Department of Computer Science is seeking candidates with expertise in the areas of computer engineering, software engineering, and artificial intelligence.

The University of Maryland, College Park, is an Equal Opportunity/Affirmative Action employer.

University of Michigan
Department of Electrical Engineering and Computer Science

The University of Michigan Department of Electrical Engineering and Computer Science invites applications for a three-year, renewable, full-time, tenure-track faculty position at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of Michigan’s mission.

The University of Michigan is an Equal Opportunity/Affirmative Action employer.

University of Minnesota
Department of Computer Science and Engineering

The University of Minnesota Department of Computer Science and Engineering invites applications for a three-year, renewable, full-time, tenure-track faculty position at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of Minnesota’s mission.

The University of Minnesota is an Equal Opportunity/Affirmative Action employer.

University of North Dakota
Department of Computer Science

The University of North Dakota Department of Computer Science invites applications for a three-year, renewable, full-time, tenure-track faculty position at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of North Dakota’s mission.

The University of North Dakota is an Equal Opportunity/Affirmative Action employer.

Applicants should send a curriculum vitae, documentation of teaching excellence, and research interests to:

Chair, Tempary Faculty Recruiting
Department of Computer Science and Engineering
University of Minnesota
PO Box 127, Minneapolis, MN 55415

Salary and rank are open and are based on qualifications. Review of completed applications will begin January 15, 1999, but the search will continue until the position is filled. The University of Minnesota is an equal opportunity educator and employer.

University of New Hampshire
Department of Electrical and Computer Engineering

The Department of Electrical and Computer Engineering at the University of New Hampshire is seeking qualified candidates for a full-time, one year, tenure-track position at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of New Hampshire’s mission.

The University of New Hampshire is an Equal Opportunity/Affirmative Action employer.

Applications should be addressed to:

Attention: Recruiting Committee
Department of Electrical and Computer Engineering
University of New Hampshire
1255 Mountain Avenue
Durham, NH 03824

Applications should be submitted online at http://www.ece.unh.edu/.

The application and the three reference letters should be received by March 30, 1999. The position will remain open until filled. Further information about UNH and the Department of Electrical and Computer Engineering can be found at http://www.cs.unh.edu.

Applicants should send a letter of interest, curriculum vitae, documentation of teaching excellence, and research interests to:

Professor Johnsson
Department of Electrical and Computer Engineering
University of New Hampshire
Durham, NH 03824

Salary and rank are open, and are based on qualifications. Review of completed applications will begin January 15, 1999, but the search will continue until the position is filled. The University of New Hampshire is an equal opportunity educator and employer.

University of North Dakota
Department of Computer Science

The University of North Dakota Department of Computer Science invites applications for a full-time, one year, tenure-track position at the rank of Assistant Professor. A successful candidate is expected to participate in teaching at any level, carry out research, and contribute to the University of North Dakota’s mission.

The University of North Dakota is an Equal Opportunity/Affirmative Action employer.

Applications should be addressed to:

Chair, Tempary Faculty Recruiting
Department of Computer Science
University of North Dakota
PO Box 60006, Grand Forks, ND 58202-6006

Salary and rank are open and are based on qualifications. Review of completed applications will begin January 15, 1999, but the search will continue until the position is filled. The University of North Dakota is an equal opportunity educator and employer.
University of North Dakota

As an Equal Opportunity/Affirmative Action Employer, the University of North Dakota invites applications for several tenure-track and limited term faculty positions, Tutors, and Research Associates.

Applications will be accepted until March 1, 1999. Please send a letter of application, resume, statement of teaching philosophy, copies of available students, and an online introductory to Professor Eugene Fiume, Chair, Department of Computer Science, University of Toronto, Toronto, Ontario, M5S 3G4.

University of Oregon

Applications will be accepted until positions are filled. Application form is available at http://www.csd.uwo.ca/ for more information.

University of Pennsylvania

The University of Pennsylvania invites applications for several tenure-track and tenured positions at all levels. The Department is an international leader in research and education with an unparalleled tradition of excellence in computer science. Faculty members enjoy an extremely strong international reputation in their areas of expertise and a remarkable involvement in international organizations, and appointments as well as faculty with similar research interests in computer science journals. The Department is currently undertaking a major upgrade and expansion of its facilities in complement and research support.

Applications are due by January 9, 1999. Professor Fiume, Chair,

Chair, Faculty Search Committee

University of Rochester

Applications are due by January 9, 1999. Professor Fiume, Chair,

Chair, Faculty Search Committee

University of South Carolina

The University of South Carolina has about 500 undergraduate majors and more than 100 graduate students and 10 full-time faculty. The University is expanding its department with additional cultural opportunities, including career opportunities for research into a broad range of topics in computer science.

The department offers B.S., M.S., and Ph.D. degrees. The University of South Carolina offers a range of computer science courses for beginning and advanced students, and includes a strong graduate program in computer science.

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Chair, Faculty Search Committee

University of Tulsa

The University of Tulsa invites applications for a tenure-track position in Computer Science, beginning in Fall 1999. Minimum qualifications are a Ph.D. in Computer Science and a strong commitment to teaching and research. Responsibilities include teaching four courses per semester at the undergraduate and graduate levels, contributing scholarly activity, and providing service to the University and the community. Candidates with research interests in all areas of computer science will be considered, and those in computer security, distributed computing, and computer networking are particularly encouraged to apply.

Professor Fiume, Chair

Universities of Delaware

The Universities of Delaware are Equal Opportunity/Affirmative Action Employers. Minority and women candidates are strongly encouraged to apply.

University of Washington

Applications will be accepted until positions are filled. Application form is available at http://www.csd.uwo.ca/ for more information.

University of Western Ontario

Applications should be received by January 9, 1999. The search will continue until a suitable candidate is found.

Applications are due by January 9, 1999. Professor Fiume, Chair,

Chair, Faculty Search Committee

Professional Opportunities

Computer Science

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Professor Fiume, Chair

Universities of Delaware

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University of Washington

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Chair, Faculty Search Committee

University of Western Ontario

Applications should be received by January 9, 1999. The search will continue until a suitable candidate is found.
University of Western Ontario Faculty of Science and the Department of Computer Science

The Faculty of Law and the Department of Computer Science at the University of Western Ontario are embarking on a multi-year effort to significantly enhance the University of Wisconsin-Madison is recruiting exceptional candidates at the senior (Associate or Full Professor) level in order to strengthen its computer science research programs and to attract outstanding graduate students. The areas of interest are artificial intelligence, computer vision, optimization, computer networking, and software systems. For further information about the positions or to apply, please visit the Computer Science Department’s website at http://www.cs.uwm.edu. All applications and letters of reference must be received on or before February 1, 1999. A senior appointment is possible in 1999/2000. Questions may be directed via e-mail to Bob Neveln, Computer Science Coordinator at bneveln@cs.widener.edu. Widener University Department of Computer Science Department Chair

The Department of Computer Science at Widener University seeks candidates with an interest in computer science education for an Assistant Professor position beginning in the 1999-2000 academic year. We are especially interested in candidates that have experience in computer science education. Candidate applications must contain a cover letter, a complete curriculum vitae, and three letters of reference. These applications and letters of reference must be postmarked or E-mailed by February 1, 1999. A Ph.D. in Computer Science or a closely related discipline is required. A Ph.D. in Computer Science or a closely related discipline is required.

Joy from page 8 competitive that everyone is doing only development and a little bit of advanced development. A lot of companies are not investing in basic research at all. They have an opportunity and an obligation to put something back, and to create foundations and sponsor university research.

I welcome public/private partnerships to do the necessary things, and think this can be part of new programs down the road. Look at all the people that are waiting to get involved in computing. It would be great if oil would pay. There are also people interested in computing who have never been given the opportunity to take a class in computer science.

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