

# COMPUTING RESEARCH NEWS

Computing Research Association, Celebrating 30 Years of Service to the Computing Research Community

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## DARPA's New Cognitive Systems Vision

By Ron Brachman and Zachary Lemnios

The impact of the Defense Advanced Research Projects Agency (DARPA) on computing over the past 40 years has been profound. Led by the visionary J.C.R. Licklider and his innovative successors in the Information Processing Techniques Office (IPTO), DARPA initiated work that ultimately put personal computers on millions of desktops and made the global Internet a reality. In fact, the original IPTO, which lasted from 1962 to 1985, was in large part responsible for establishing Computer Science as a field.

DARPA has recently re-energized IPTO (now the Information Processing Technology Office), and has rededicated its attention to modern Computer Science by looking both to its roots and to a dramatic vision of the future. Licklider imagined computers and humans working closely together in a form of symbiosis. The new, 21<sup>st</sup> century IPTO wants to realize this vision by giving computing systems unprecedented abilities to reason, to learn, to explain, and to reflect, in order to finally create systems able to cope robustly with unforeseen circumstances.

IPTO's goal is to create a new generation of *cognitive systems*.

### Mired in Moore's Law?

One benefit of such cognitive systems would be their help in extracting us from a corner into which our success seems to have painted us. The research that has helped the industry follow Moore's "Law" has created processors that are remarkably fast and small, and data storage capabilities that are vast and cheap. Unfortunately, these incredible developments have cut two ways. While today's computers are more powerful than ever, we have been lured by processing power and inexpensive memory into creating systems that are enormously large and complex. Many of today's systems are virtually impossible for humans to understand, use, or maintain.

Beyond the resulting maintenance problem, with the total lifetime cost of systems now heavily dominated by after-production costs, this complexity has also led to serious vulnerabilities. More complexity means greater opportunity for intruders. More elements mean more ways that things can go wrong; systems crash and software rots. And the training burden and level of expertise required

to cope with systems both keep growing. In order to make our systems more reliable, more secure, and more understandable, and to continue making substantial contributions to society, we need to do something dramatically different.

### The Promise of Cognitive Systems

IPTO is attacking this problem by driving a fundamental change in computing systems. By giving systems more cognitive capabilities, we believe we can make them more responsible for their own behavior and maintenance.

Ideally, in the next generation, a computer system will be cognizant of its role in a larger organization or team (and of the overarching goals of that team), capable of acting autonomously, and able to interact rationally with other systems and humans in real time. It will also be able to take care of itself in a self-aware and knowledgeable way. Ultimately, these new capabilities will be the basis for artificial systems that can respond as robustly to surprise as natural systems can.

A cognitive computer system should be able to learn from its experience, as well as by being advised. It should be able to explain what it was doing and why it was doing it, and to recover from mental



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blind alleys. It should be able to reflect on what goes wrong when an anomaly occurs, and anticipate such occurrences in the future. It should be able to reconfigure itself in response to environmental changes. And it should be able to be configured, maintained, and operated by non-experts. All of these potential

Cognitive Systems Vision  
Continued on Page 8

### Inside CRN

Expanding the Pipeline .....	2	Taulbee Historical Data .....	4
Research Lab Salaries .....	3	Federal Budget Cycle Primer .....	4
Digital Fellow's Article .....	3	Professional Opportunities .....	12

## The Intel Research Network: An Innovative Model of Industry-University Collaboration

By Hans Mulder

This is another in a series of CRN articles describing the activities of CRA's industry laboratory members. Others are posted at: <http://www.cra.org/reports/labs>.

Intel has a long history of funding academic research through sponsored programs and grants. Today more than 250 Intel-sponsored research engagements are underway at universities throughout the world. Recently we have developed a bold new approach to conducting joint research with universities in an open collaborative environment. We believe this innovative model will accelerate Intel's exploratory research efforts, while addressing the most pressing concerns of all parties involved in collaborative initiatives between companies and universities.

### Formation of Intel Research

In 1999, David Tennenhouse joined Intel and was charged with launching a new internal organization, Intel Research, to explore the disruptive and emerging technologies that could advance Intel's business and create new markets and opportunities. Tennenhouse had been chief scientist and director of the information technology office at the Defense Advanced Research Projects Agency (DARPA), an organization known for its ability to catalyze innovation by funding highly targeted university research projects.

### The Vision of Proactive Computing

Tennenhouse arrived at Intel with a vision of a future world of proactive computing, in which billions of devices embedded throughout the environment will anticipate people's



Hans Mulder

needs and take action on their behalf. Intel Research set out to translate that vision into reality.

The research model developed for this long-term and exploratory program uses Intel funding to sample the broad array of university research. However, just sponsoring university research would not be sufficient to

Intel Research Network  
Continued on Page 9

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## Expanding the Pipeline

# Award Validates Berkeley's Diversity Programs

By Sheila Humphreys

Berkeley's "EECS Excellence and Diversity Student Programs" were recently awarded the 2002 Women in Engineering Programs Award (WIEP) by WEPAN (Women in Engineering Programs and Advocacy Network).

At a time when diversity programs are under attack, such an award validates Berkeley's programs for women. The passage of Proposition 209 in California, which prohibits programs that confer educational benefits based solely on gender or ethnicity, has led to a perceived shift away from valuing diversity. Further, the continuing economic downturn in California undermines all academic programs, but particularly diversity programs, which lie outside core instructional activities.

The WIEP Award recognizes Berkeley's "sustained national impact" in several areas, including: 1) attracting women to electrical engineering and computer science at Berkeley; 2) providing orientation and sustained academic support to women students in EECS; 3) fostering a sense of community for undergraduates and graduate women; 4) encouraging undergraduate women to apply for graduate programs through research; 5) conducting outreach to pre-college women; and 6) developing new policies to serve women students. In this article, we limit the discussion to our efforts and successes in fostering a sense of community and engaging undergraduate women and minorities in research.

### Background

The box above shows highlights of the EECS women's programs, from the appointment of Professor Susan Graham in 1971 to the formal creation of a diversity program in 1986 by Professor Eugene Wong, and now the 25<sup>th</sup> anniversary of our women's graduate group, WICSE, this year. Our programs have been greatly enriched by synergy with all of CRA-W's programs, including research programs DMP, CREW, and the Distinguished Lecturer Series, as well as the Hopper and Tapia Conferences and CRA's Outstanding Undergraduate Awards and Career Mentoring Workshops.

### Fostering Community: WICSE and the Alumnae Connection

Twenty-five years ago a group of women students founded the graduate group WICSE (Women in Computer Science and Engineering), which continues to form the cornerstone of our programs for graduate women. The effectiveness of WICSE derives in part from its continuity, departmental support, and meaningful contact with CS alumnae and other prominent women in CS. The EECS Department provides WICSE

Berkeley Milestones	
1971	Susan Graham appointed Assistant Professor of Computer Science.
1977	WICSE (women's graduate group) founded by CS graduate students.
1978	Working in Engineering and Computer Science: A conference for women attended by 800 students.
1983	Computer Science Reentry Program Established by Computer Science Division to increase number of women graduate students.
1986	EECS (Prof. Eugene Wong) creates "Excellence and Diversity Student Programs."
1987	WICSE 10 <sup>th</sup> Anniversary: MIT Professor Dresselhaus, speaker.
1992	AUWICSEE founded by women undergraduates; Professor Katherine Yelick appointed.
1994	Faculty pass Parent Policy allowing graduate student parents to modify their academic program.
1996	CS Reentry Program phased out because of Proposition 209.
2000	CS sends 15 students to Grace Hopper Celebration of Women in Computing.
2001	Jennifer Mankoff appointed Assistant Professor of CS; Berkeley establishes a Virtual Development Center.
2002	WICSE celebrates 25th year Maria Klawe visits CS as Regents' Lecturer. CS sends 22 students to Hopper Conference; Barbara Grosz visits as McKay Professor in Computer Science.

with staff assistance, space, facilitation of conference travel, a guaranteed voice at the annual Faculty Retreat, and funding to support its activities.

Since 1977, WICSE has helped to organize six major conferences for women in CS and engineering. WICSE members have been active at each of the four Grace Hopper conferences, their numbers increasing from seven in 1994 to 22 who attended the 2002 conference in Vancouver. WICSE guest speakers over the past three years have brought our students in contact with women at the forefront of CS. Past speakers include Ruzena Baczy, Fran Berman, Susan Eggers, Deborah Estrin, Barbara Liskov, Maria Klawe, Valerie Taylor, and Tandy Warnow, among others.

Recently, we followed up on our women CS Ph.D.s for the purpose of raising our students' awareness of them. Of the 137 alumnae respondents, 50 are teaching in research universities. Berkeley CS graduates hold tenured and tenure-track positions in most major programs, including Harvard, Carnegie Mellon, MIT, Stanford, UIUC, Washington, Wisconsin, UC Berkeley, UC Davis, UCLA, UC Irvine, University of Illinois, Georgia Tech, Northwestern, and UT Austin. An updated web page with links to these alumnae provides a virtual network for the Berkeley students aspiring to follow their path.

WICSE's core activity is a weekly lunch meeting, which ensures that women students gather on a regular basis. AUWICSEE, the Association of Undergraduate Women in Computer Science and Engineering, was established 10 years ago. A Mentoring Lunch is held once a month for WICSE and AUWICSEE to meet together. New policies have been one result of regular gatherings of women students. For example, in the

mid-'90s a number of women graduate students struggled with graduate degree timelines and expectations while dealing with infant care. The Parent Policy, championed by WICSE members at a CS Faculty Retreat, was first adopted by our faculty and later by the entire Berkeley campus. This policy provides a safety net for graduate students who are parents, allowing them the flexibility of slowing down their degree progress without losing financial aid or research momentum.

### Undergraduate Research Programs

When the Computer Science Reentry Program was unfortunately phased out in 1996 due to Proposition 209, alternative means of bringing more women into graduate study had to be considered. Thus, we initiated new programs to encourage undergraduate women to engage in research. A series of workshops was created to address basic issues of how to find academic-year and summer research, approach faculty to ask for research, develop a project, and present research. We instituted undergraduate research poster sessions, now scheduled each semester, and enthusiastically advertised NSF Research Experiences for Undergraduates Programs, as well as the CRA-W DMP and CREW programs.

Berkeley's Diversity Programs  
Continued on Page 7

### Computing Research Association

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# Results of CRA Industrial Salary Survey of CS Research Labs

By David Waltz

In November 2001, CRA conducted its fifth Industrial Salary Survey of CS Research Laboratories. Eleven organizations representing 689 researchers responded. (In 2000, fourteen organizations with 1,189 researchers participated.) Of these 689 researchers, 72 percent held Ph.Ds, 24 percent M.S. degrees, 4 percent B.S. degrees, and <0.1 percent other degrees.

Organizations were asked to provide data about *base salary*, *total cash compensation* (which includes items such as bonuses), and *total non-cash compensation* (e.g., the value of stock options). Respondents were asked to report means and medians for each category. Companies that completed the survey received detailed results in January 2002. A summary of the results is presented in Tables 1, 2 and 3.

Table 1 (a comparison of base compensation) is non-problematic, but Tables 2 and 3 need explanation. In both 2000 and 2001, significant amounts of reported income came from non-cash compensation, primarily stock options. We calculated the value of this non-cash compensation assuming stock prices would appreciate at 15 percent per year. The large resulting 2001 non-cash compensation values raised apparent total compensation significantly, even though options were granted to fewer than 10 percent of the researchers (from 3 of 11 reporting organizations). However, it is highly likely that *all* options granted in 2001 are worthless today (i.e., far below the option exercise price), making Table

3 very misleading. Consequently the interpretive conclusions below are drawn from Table 2, our best estimate of actual realized income. (Caveat: Clearly the comparison in Table 2 isn't perfect—it is likely that some options granted in 2000 also proved worthless, so the total compensation for 2000 is probably overstated somewhat.)

## Observations

The main finding of the 2000 survey was that compensation—both base and total—had soared across the board. In 2001, there were some gains in base salaries, but total compensation dropped significantly except for new Ph.Ds.

More specifically, I would like to highlight four year-on-year changes in 2001:

1) total compensation dropped significantly—14% to 21%—for researchers with 1 or more years of experience.

2) mean and median base compensation rose for researchers with 1 to 15 years of experience, with the largest increases—6% to 8%—for those with 6 to 10 years' experience.

The net effect of these first two trends is a large shift away from variable compensation. Variable compensation, which accounted for about one-third of total compensation in 2000, shrank to less than 10 percent in 2001.

3) starting base salaries decreased slightly (-5% for the median, -2.4% for the mean), although starting total compensation did not show a clear

**Survey Results**  
Continued on Page 20

**Table 1. Base Salaries in Industrial Research Labs by Years of Post-PhD Experience (thousands of dollars)**

	2000		2001	
	Median	Mean	Median	Mean
New PhD	102.6	101.2	97.5	98.8
1-5 Years	104.0	101.7	105.2	107.1
6-10 Years	114.8	118.8	124.3	126.3
11-15 Years	122.0	132.6	134.2	134.3
16+ Years	145.6	145.6	138.0	139.3

**Table 2. 2000 Total Compensation\* and 2001 Total Cash Compensation\*\* by Years of Post-PhD Experience (thousands of dollars)**

	2000		2001	
	Median	Mean	Median	Mean
New PhD	103.8	117.6	105.7	107.1
1-5 Years	132.3	133.2	113.1	114.9
6-10 Years	164.2	170.0	133.6	136.5
11-15 Years	182.9	170.0	143.7	145.0
16+ Years	169.9	186.6	147.2	150.2

\*Total Compensation is base salary plus additional cash (e.g., bonus) and non-cash (e.g., stock options) items.

\*\*Total Cash Compensation is base salary plus additional cash (e.g., bonus) items.

**Table 3. 2000 Total Compensation\* and 2001 Total Compensation\* by Years of Post-PhD Experience (thousands of dollars)**

	2000		2001	
	Median	Mean	Median	Mean
New PhD	103.8	117.6	113.2	113.8
1-5 Years	132.3	133.2	135.0	141.0
6-10 Years	164.2	170.0	173.4	182.1
11-15 Years	182.9	170.0	184.0	190.4
16+ Years	169.9	186.6	197.0	205.1

\* Total Compensation is base salary plus additional cash (e.g., bonus) and non-cash (e.g., stock options) items.

# The International Trading Agent Competition: Focus on RoxyBot

By Amy Greenwald

Amy Greenwald, Brown University, is the fifth CRA Digital Government Fellow. The following article is a synopsis of her presentation to the Auctions Division at the Federal Communications Commission on May 7, 2002.

Suppose you want to buy a used Canon AE-1 SLR camera at an online auction. It would be quite a daunting task to manually monitor prices and make bidding decisions at all web sites currently offering the camera—especially if accessories like a flash and tripod are sometimes bundled with the camera, and sometimes auctioned separately. But for the next generation of automated trading agents this will be a routine task.

Simultaneous auctions, which arise naturally on Internet sites such as eBay.com and amazon.com, are a challenge to bidders, particularly when complementary and substitutable goods are on offer. Complementary goods are items such as a

flash, a tripod, and a case that would complement a camera—but a bidder desires any of the former only if s/he is certain to acquire the latter.

Substitutable goods are goods such as the Canon AE-1 and the Canon A-1—a bidder desires one or the other, but not both. In combinatorial auctions, bidders bid on combinations of items, such as “camera and flash for \$295”; in these auctions, the (NP-complete) problem of determining how to allocate goods so as to maximize revenue falls in the hands of the auctioneer. In simultaneous auctions, however, the complexity burden lies with the bidders.

The international trading agent competition (TAC) challenges its entrants to design online agents capable of bidding in simultaneous auctions for substitutable and complementary goods. TAC was conceived of by Mike Wellman and the AI laboratory at the University of Michigan. This year, for the third rendition of

the competition, the TAC software platform was redesigned by the Intelligent Systems Laboratory at the Swedish Institute of Computer Science, led by Erik Aurell.

## Rules

The TAC competition (<http://www.sics.se/tac> and <http://tac.eecs.umich.edu>) consists of a series of game instances, each of which pits eight autonomous bidding agents against one another. Each TAC agent simulates a travel agent with eight clients who were interested in traveling from TACTown to Boston and home again during a five-day period. Each client is characterized by a random set of preferences for the possible arrival and departure dates, hotel rooms (The Grand Hotel and Le Fleabag Inn), and entertainment tickets (symphony, theater, and baseball). A TAC agent's score in a game instance is the difference between the total utility it obtains for its clients,



Amy Greenwald

based on its clients' preferences, and the agent's expenditures. To minimize the effects of randomization, agents' scores are averaged across several game instances during TAC competitions.

In order to obtain utility for a client, an agent constructs a complete travel package for that client by purchasing airline tickets to and from TACTown and securing hotel reservations. It is also possible to obtain

**Trading Agent Competition**  
Continued on Page 10

# Historical Trends from Taulbee Surveys: Early Employment of Doctorates

By Jay Vegso

This is the fourth in a series of articles on data trends from CRA's Taulbee Survey and its antecedents, which stretch back to 1970.

The Taulbee Survey tracks demographic data and salaries at doctorate-granting computer science and computer engineering (CS/CE) departments in the United States and Canada. Earlier articles dealt with faculty salaries, the proportion of women among degree recipients and faculty members, and the ethnicity of Ph.D. students and recipients. This article concerns the employment of computer science and computer engineering doctorates in the first year after they received their degrees.

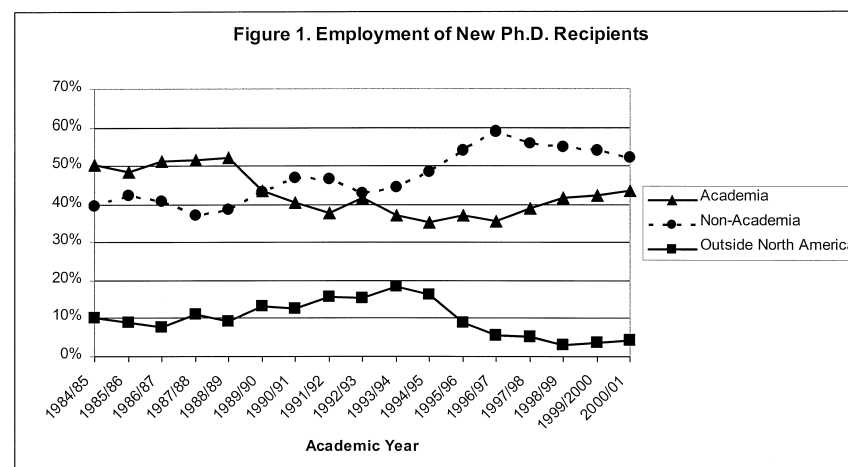
The Taulbee Survey, which is conducted each fall, asks for the current employment status of those who received Ph.D. degrees during the previous academic year (AY). Due to changes in the survey, including the addition of new employment

categories, it is difficult to trace employment trends before AY1984/85.

Table 1 shows the results from AY1984/85 onward as percentiles, since these are more useful for tracking trends than raw numbers. These figures exclude the approximately 15 to 20 percent of doctorates whose employment status was unknown each year, as well as those who were listed as unemployed (which average to only 1 percent).

Figure 1 illustrates the proportion of doctorates who were employed outside of academia (i.e., if self-employed, or in industry or government), within academia (i.e., in Ph.D.- and non-Ph.D.-granting CS/CE departments, as well as in non-CS/CE departments), and outside North America.

Two trends in particular are worth noting. The first is that starting with the AY1990/91 graduates, a greater proportion of students found early



employment outside of academia than in it. This trend increased particularly during the early 1990s, peaking with the AY1996/97 graduates. Since then, however, the share of doctorate-holders going into non-academic jobs has decreased, while the proportion going into academia has increased.

Another interesting trend is the decrease since the mid-1990s in the

proportion of doctorates who found early employment outside of the United States and Canada. This has occurred even as the proportion of doctorates granted to nonresident aliens steadily increased over the same period—45 percent of CS/CE doctorates granted in AY2000/01 were to nonresident aliens, 47 percent the year before that. ■

**Table 1. Employment of New Ph.D. Recipients**

Ph.D. Received in Academic Year	Ph.D.-Granting CS/CE Dept.	Non-Ph.D.-Granting CS/CE Dept.	Non-CS/CE Dept.	Industry	Government	Self-Employed	Outside U.S./Canada
1984/1985	36%	10%	4%	34%	4%	2%	10%
1985/1986	39%	7%	3%	37%	5%	1%	9%
1986/1987	39%	9%	4%	37%	4%	1%	8%
1987/1988	40%	9%	3%	33%	4%	0%	11%
1988/1989	39%	10%	4%	34%	4%	1%	9%
1989/1990	30%	11%	3%	38%	3%	2%	13%
1990/1991	29%	10%	2%	42%	3%	2%	13%
1991/1992	25%	9%	3%	41%	4%	2%	16%
1992/1993	26%	12%	4%	37%	4%	2%	15%
1993/1994	24%	9%	3%	38%	4%	2%	18%
1994/1995	26%	8%	1%	41%	5%	2%	16%
1995/1996	31%	3%	2%	49%	3%	2%	9%
1996/1997	30%	4%	2%	54%	3%	2%	5%
1997/1998	35%	3%	1%	50%	4%	2%	5%
1998/1999	38%	3%	0%	49%	2%	3%	3%
1999/2000	38%	3%	1%	50%	3%	1%	4%
2000/2001	39%	4%	0%	49%	2%	1%	4%

## The Federal Budget Cycle—A Primer

By Peter Harsha

This is the first of a two-part series explaining the Federal budget process. Part 2, *The President's Budget in Congress*, will appear in the January 2003 issue of CRN.

### Part One—Writing the President's Budget

On February 4, 2002, President George W. Bush unveiled his fiscal year 2003 budget proposal, a plan for spending nearly \$2 trillion packaged in a flag-bedecked stack of documents more than five inches tall.

The stack—a compendium of justifications and accounting for every dollar of federal spending at every federal agency and office—represented the culmination of nearly a year of work by the executive branch and its agencies, but only the

beginning of the annual cycle of debate and legislation necessary to fund the operations of government.

At this writing, the final budget for FY 2003 has not yet been decided and is unlikely to be resolved until Congress returns to Washington after the November 5th Congressional elections. Work on legislation to create a new Department of Homeland Security (still unresolved) and disagreements among the House leadership about a final total spending number—in essence, a decision about how much to exceed the President's budget request in appropriations—delayed consideration of all 13 of the annual appropriations bills necessary to fund the federal government in FY 2003, and have made the post-election return necessary. Until Congress

returns, it is impossible to know the final disposition of many of the programs important to computing research. Instead, this lull in activity provides an opportunity to examine the mechanics of the budget process—how the administration produces its plan, and how the Congress disposes of it.

### The President's Budget

Work began on the President's FY 2003 budget almost a year prior to its introduction last February. Indeed, shortly after the release of the current FY 2003 budget, analysts at the White House's Office of Management and Budget (OMB) had already opened the book on the FY 2004 budget by producing guidance for federal agency officials charged with

drafting budgets for their own agencies. Although each agency draws up its own budget request, OMB must approve all agency budgets before they can be included in the President's budget. The process of creating an agency budget and having it vetted by OMB will take the bulk of the year, and will require input from a number of sources.

For federal research and development agencies, the budget process is coordinated through the White House's Office of Science and Technology Policy (OSTP), headed by the President's Science Advisor (currently Dr. John Marburger), in addition to the normal vetting by OMB. OSTP runs the coordinating

Federal Budget Cycle  
Continued on Page 11

# Homeland Security

By Peter A. Freeman

Homeland security is perhaps the most urgent and immediate issue facing our nation today.

There are, of course, many issues facing us, as there always seem to be in the world in which we live—health care, quality of education, erosion of privacy, economic stability, world peace. While our field contributes to addressing all of these issues, it appears that we in computing are in a unique position to contribute to homeland security in a more direct and immediate way than we can to any other single, compelling issue.

Very simply, this is because in the war on terrorism in which we are now engaged, information is at the heart of all efforts to protect us from a usually unknown and often unknowable enemy. Obtaining relevant information in a timely manner and then disseminating it to those who can act on it to protect us is the core of all homeland defense efforts, ranging from airport screening to determining if the spread of an infectious disease is actually bio-terrorism. Devising algorithms to process information and designing the machines to implement those algorithms (to use a very simple, but not complete, definition of computing research) is, of course, what we do.

Many branches of the U.S. Government are now focused on contributing to homeland security, and as they work on carrying out their missions they are discovering a pressing need for new technology, new ideas, and a new set of people who understand cutting-edge science and engineering. NSF, for the past

year, has been trying to serve as a middleman to put agencies with a need in touch with those in the community whose research and knowledge may be able to address those needs. Our near-term strategy is to highlight the value of basic research by making linkages between our basic research and mission agency needs. This is working successfully and will benefit basic research over the long term.

On the one hand, researchers often don't understand the needs of those in operational agencies, but could make an impact if they did. On the other, the operational agencies need the depth of expertise that exists in the NSF community. Many CISE researchers have been delighted at the opportunity to contribute, and the mission agencies have been pleased to have access to leading research.

NSF has been making connections in a variety of ways, including holding workshops that include PI's and government personnel, bringing government technology managers together to discuss their research needs so that we and others can start relevant funding programs, making presentations at conferences and workshops, and having NSF personnel work closely with other agencies as they explore new technology relevant to their missions. Areas include biology, physics, electrical engineering, social science, and many areas of computer science and engineering. Commensurate with my opening comments, an area of high interest to many agencies is the general area of knowledge discovery

and dissemination; but there is hardly an area covered by the programs of CISE that isn't of interest.

As you might expect, the work of some of the agencies requesting assistance is heavily classified. NSF does not intend to do so, but the organic act that created NSF and provides our basic mission clearly indicates our responsibility to support national defense: "To promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense."

We have noted an eagerness on the part of many in the community to contribute to homeland defense, including in some cases obtaining security clearances so they can be of maximum assistance. In a similar manner, agencies are not only eager to tap into the great reservoir of ideas and people in the S&E research community, but in some cases are quite willing to fund unclassified, basic research. A certain amount of this funding has already taken place through supplements to existing NSF grants using funds supplied by other agencies. We anticipate more of this in the coming year.

NSF has also been trying to refocus programs and develop new programs, where appropriate, that can contribute to homeland security. Some of these are obvious, such as network security, trusted systems, data mining, and database security. On the whole, however, we are trying to keep our focus on the long-term research that is the hallmark of NSF. This is entirely consistent with the prevailing view that homeland

security is an issue that will be with us for many years and for which many new and fundamental discoveries are needed.

All of us in computing have an opportunity to contribute to our society in a direct and meaningful way because of the centrality of our discipline to homeland security efforts. If you are invited to participate in a workshop on the topic or asked to meet with an operational agency, I encourage you to do so. If you have an idea that you think could contribute to some aspect of homeland security, I urge you to bring that to the attention of the appropriate people.

As you might imagine, that may not be an easy task, but we at NSF may be able to help. I suggest you first talk with your Program Director or someone else at NSF who knows you and your work, or an equivalent person at DARPA or in other agencies. They should be able to help you locate the right place to take your idea. If they are not able to do this, then feel free to contact Dr. Gary Strong (gstrong@nsf.gov) or me.

Our field, in many ways, is helping create the world of the future. It is fitting that we also have the opportunity and responsibility to help make that world a more secure place. I strongly encourage you to help do that through your research and educational activities.

*Peter Freeman (pfreeman@nsf.gov) is Assistant Director—CISE at the National Science Foundation. ■*

## CRA Forms Grand Challenges Steering Committee

Following the success of the first CRA Grand Challenges Conference in Computer Science and Computer Engineering held in June 2002, the CRA board of directors voted to incorporate such conferences as an ongoing CRA activity. The board has appointed a steering committee to provide direction for future conferences.

Chaired by CRA board member David Patterson (UC Berkeley), other committee members include Randy Bryant (Carnegie Mellon), Barbara Grosz (Harvard), Mary Jane Irwin (Penn State), Christos Papadimitriou (UC Berkeley), and Bob Sproull (Sun Microsystems).

The steering committee's mandate is to:

- Clarify the objectives of the conferences.
- Define a process for soliciting, reviewing, and accepting conference topic proposals.
- Provide policies and guidance for conference organizing committees.
- Assure appropriate evaluation of each conference.
- Provide institutional memory for Grand Challenges Conferences.

CRA's current plan is to hold a Grand Challenges Conference every other year, alternating years with the CRA Conference at Snowbird. To start this cycle, a second conference is planned for late spring/summer 2003, contingent upon funding.

Each Grand Challenges Conference will have its own organizing committee. This group will work with CRA to write the proposal for funding and to run the conference. The CRA steering committee will help conference organizers to sharpen their ideas, and will provide critical feedback and advice.

The purpose of these conferences is to provoke "out-of-the-box" thinking as a way of articulating the grand challenges in computer science and engineering in a compelling way. Information about the first Grand Challenges Conference, whose theme was *systems*, is posted on the CRA website at: <http://www.cra.org>. ■

## More on Computing > Computer Science

By Jim Foley

The September issue of *CRN* carried a piece I wrote entitled "Computing > Computer Science." Three things have happened since that article was published:

1. I updated my original article based on discussions with colleagues Elizabeth Mynatt and Janet Kolodner at Georgia Tech.
2. Bob Glass (Editor-Emeritus, *Journal of Systems and Software*; Editor/Publisher, *The Software Practitioner*) responded to me with the view that the discipline of computing consists of three major fields: computer science, information systems, and software engineering.

The updated article and Bob's comments can be found at: <http://www.cra.org/reports/computing/>

3. CRA recommended to the National Research Council that in the next assessment of doctoral programs, there be a sixth category called "Computer and Information Science and Engineering" parallel to the five current categories: Engineering, Physical Sciences and Math, Arts and Humanities, Social and Behavioral Sciences, and Biological Sciences. Computer Science would fall in this new category. (See related story in this issue "CRA Comments on Proposed NRC Study of U.S. Ph.D. Programs.") We used the CISE acronym rather than Computing because CISE is already well known to the NSF-supported research community. But the spirit is the same—there is a larger discipline that includes computer science. ■

*Jim Foley is chair of the CRA board.*

# CRA Comments on Proposed NRC Study of U.S. Ph.D. Programs

The National Research Council is once again undertaking a study of Ph.D. programs at research universities in the United States. The last study, commonly referred to as the "NRC Rankings," was released in 1995 (<http://bob.nap.edu/html/researchdoc>). According to the NRC, the purpose of the current study is primarily to provide university administrators and faculty with a set of common measures, both quantitative and reputational. Additional information about the assessment is available on the Web at: [http://www7.nationalacademies.org/bhew/ResDocs\\_about.html](http://www7.nationalacademies.org/bhew/ResDocs_about.html).

The Computing Research Association was invited by the NRC's Committee to Examine the Methodology for the Assessment of Research-Doctorate Programs ([http://www7.nationalacademies.org/bhew/ResDocs\\_cmte.html](http://www7.nationalacademies.org/bhew/ResDocs_cmte.html)) to provide comments and suggestions on the proposed assessment prior to the committee's meeting on September 30. Reprinted below is the text of the letter submitted to the chair of the NRC committee, Dr. Jeremiah P. Ostriker, by CRA board chair, Jim Foley.

*The Computing Research Association (CRA) welcomes the opportunity to provide input to the National Research Council's assessment of doctoral programs at research universities. CRA is an association of more than 200 North American academic departments, six computing societies (American Association for Artificial Intelligence,*

*Association for Computing Machinery, Canadian Association of Computer Science, IEEE Computer Society, Society for Industrial and Applied Mathematics, and USENIX Association), and twenty-three industrial laboratories and institutes all engaging in computing research. CRA's mission focuses on representing and strengthening research and graduate education in the computing fields. CRA's members are very aware of the NRC rankings and the importance of the results.*

*Your letter asks "...how might the next [NRC] study incorporate interdisciplinary programs [and] identify emerging areas that were not included in the 1995 study?" Since 1995, the year the last NRC rankings were released, computing has experienced great change. The emergence of new research areas, sub-disciplines, and interdisciplinary fields within the computer science and engineering fields has reached a critical mass and now requires a new categorization and new methods of assessment. For example, a brief survey of CRA member departments finds computing programs housed in nine different college units from Arts and Sciences to Engineering to Information Technology and Engineering. Our IT Deans' group includes Deans from about 40 computing units that report directly to a Provost or similar official. The names of these units [<http://www.cra.org/Activities/itdeans/participants.html>] reflect the breadth of computing. Also, the attached article "Computing > Computer Science" [see p. 6 at*

<http://www.cra.org/CRN/issues/0204.pdf>] is my own take on the intellectual breadth of computing.

*CRA suggests that the committee establish the high-level category "Computer and Information Science and Engineering" under which doctoral programs in computer science, computer engineering, information science, information technology, human-computer interaction, computational science, etc., would be assessed and ranked. In addition, some multidisciplinary programs such as bio-informatics and other "x"-informatics programs may be appropriately housed under this new category.*

*Our suggestion mirrors the policy of the National Science Foundation which, in 1986, reorganized to create CISE—the Directorate for Computer and Information Science and Engineering—in recognition of computing as an important cluster of disciplines on a par with the traditional disciplines housed in the other Directorates of Engineering, Math and the Physical Sciences, the Biological Sciences, and the Social, Behavioral and Economic Sciences.*

*In response to the question of how the next NRC study should assess the scholarly reputation of doctoral programs, CRA endorses a rigorous evaluation process that takes into account the differences between computing and other research disciplines in terms of publication modalities. Attached is the CRA white paper "Best Practices in Evaluating Computer Scientists and Engineers for Promotion and Tenure" [[http://www.cra.org/reports/tenure\\_review.html](http://www.cra.org/reports/tenure_review.html)]. As noted in this paper,*

*although "...standard publication is one indicator of academic achievement, other forms of publication, specifically conference publication, and the dissemination of artifacts [such as computer programs and systems] also transmit ideas. Conference publication is both rigorous and prestigious. Assessing artifacts requires evaluation from knowledgeable peers. Quantitative measures of impact are possible, but they may not tell the entire story." CRA strongly recommends that the committee take these differences in academic culture and procedure into consideration when judging a program's "scholarly reputation."*

*In conclusion, CRA recommends that the committee:*

1. create the new category "Computer and Information Science and Engineering" to properly capture and classify Ph.D. programs in the widening areas of computing education and research, and
2. specify a rigorous evaluation of computing programs that takes into account the assessment practices of computer science and engineering. [end of letter text]

According to the NRC, the first phase of the NRC study will investigate new measures and methodologies so that the second phase, to be conducted in 2003-05, may accurately reflect changes in scholarship and graduate education that have occurred over the past 20 years. ■

## CRA Welcomes New Staff

Two new employees have recently joined the CRA staff, filling the vacancies created by the departures of Diane Long (Administrative Assistant) and Patrick McMullen (Program Associate).

Susanne Pile <[administrator@cra.org](mailto:administrator@cra.org)> has assumed the position of Administrative Assistant. Among other responsibilities, she will coordinate the professional opportunities section of *Computing Research News*.

For the past five years, Susanne has been employed by a consulting firm in Arlington, Virginia, first as a training coordinator and recently as an Administrative Assistant. A native of Trinidad, she lives in Maryland with her 5-year-old son.



Susanne Pile



Andrew (Drew) Sutter

Andrew (Drew) Sutter <[sutter@cra.org](mailto:sutter@cra.org)> has joined

CRA as a program associate. He will work primarily on projects that involve statistics and use of social science methodologies, such as field work on our empirical studies of recruitment and retention, formal evaluation of effectiveness of CRA programs, and Taulbee and industrial salary surveys.

Drew received a bachelor's degree from the University of Virginia in sociology and history. His work experience includes six years as a Research Associate at the American Sociological Association where he was extensively involved with develop-

ment, implementation, and data analysis of all surveys by the Research Program. He also managed a small-grants program co-sponsored by ASA and the National Science Foundation and was a key member of a team designing improvements in the overhaul of the master ASA database of individuals and institutions. ■

### COMPUTING RESEARCH NEWS

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### Berkeley's Diversity Programs from Page 2

One of our DMP students, Emily Chung, received Honorable Mention in the CRA Outstanding Undergraduate competition in 2001.

#### Focus on Minorities

Since 1990, EECS has operated a summer research program, SUPERB-IT (Summer Undergraduate Program in Engineering Research at Berkeley-Information Technology). A minority-serving program, the goal of SUPERB is to develop competitively qualified graduate applicants through undergraduate research. Founded by our own African American EECS graduate students, SUPERB has been supported by the NSF REU Program. Ours is one of the very few REU sites focusing on underrepresented students. Of students in the SUPERB program, 41 percent are women, compared with an 18 percent enrollment of undergraduate women in the EECS Department. African Americans have comprised almost half of our REU students, and more than 20 percent come from underrepresented institutions. Cited by NSF as an "exemplary program," SUPERB has brought 113 students to Berkeley since 1990. They joined CS and EE graduate research groups, with mentorship provided by faculty and graduate student researchers.

#### Leveraging Summer Research

Results are clearly positive: 66 percent of former SUPERB students have pursued a graduate degree. The positive correlation between undergraduate research and the pursuit of graduate degrees in science and engineering is well known. Since 1990, 113 students participated in SUPERB and have been mentored by 56 EECS faculty. Of these students, 78 percent were underrepresented ethnic minorities. Four SUPERB alumni have received doctorates as well as MS degrees, and nine doctorates are pending just at Berkeley. SUPERB has contributed significantly to the diversity of the graduate student body both here and elsewhere. SUPERB continues to bring women and minority students to our graduate program. Five of the women entering our graduate program in 2001 and 2002 are SUPERB alumnae, including a student from Howard University.

#### Changing the Climate

A long-standing program like SUPERB has a positive effect on the departmental climate. In 1990, matching students to faculty research groups was difficult; now, after 12 years, CS faculty are receptive to SUPERB students. Fifty percent of the faculty who have mentored SUPERB students are *repeaters*, attesting to their enthusiasm for the program. Both graduate students and faculty have discovered talented students from universities unfamiliar to them. Further, two women students from two other nearby institutions have continued their research with their Berkeley faculty during their senior year.

#### Giving CS a Context: The Berkeley Virtual Development Center

Our newest program for women is the Virtual Development Center (VDC) established by EECS in January 2001 in partnership with the Institute for Women and Technology. Our VDC focuses on the technology needs of disabled women. The motivation to create such a center is to offer to students, especially women, a needed *context* for understanding the applications of their theoretical studies.

The VDC course "User Interface Design and Development" was taught by CS Professor James Landay. About 40 percent of the students enrolled in this class in spring 2002 were women, a much higher ratio of women to men than is customary in CS classes. The students used contextual inquiry methods to solicit input from a group of disabled women from the community; they brainstormed with that community about what technology products would be useful to them. Twelve teams of students developed innovative projects, which are posted at: <http://guir.berkeley.edu/courses/cs160/spring2002/projects.htm>

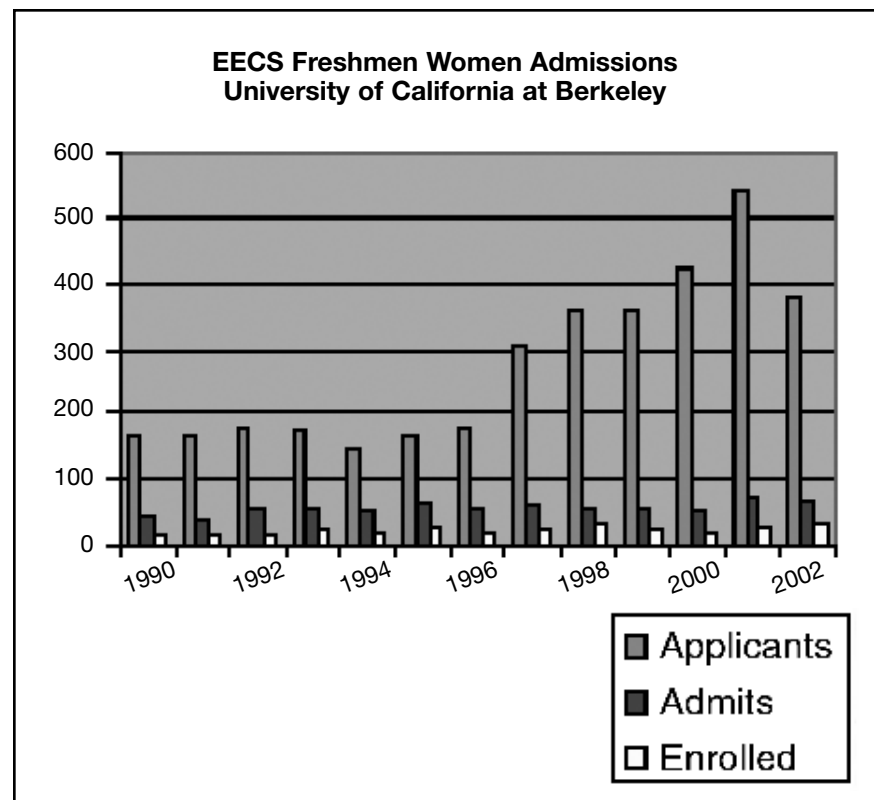
Students commented on the value of directly connecting the special users' needs to the design process, instigated by the VDC's focus. One student wrote:

*I really feel that designing for the disabled teaches a lot more about other people, and it really teaches about good user-centered design since the designers can't shoot from the hip and use their own experience, but rely more upon the user's feedback.*

#### The Admissions Bottleneck

Contrary to popular opinion, it is not lack of interest in CS by talented high school women that presents a serious challenge, impeding our efforts to diversify the computer science pipeline. Rather, it is the difficulty they face in gaining admission to UC Berkeley. The table on page 8 shows how the number of freshmen applicants who are women has hovered around 350 for the past five years, with a fairly constant number of women admitted. The selectivity is so high that only 19 percent of freshman applicants were admitted in fall of 2002. Our 45 percent yield rate (admitted students who choose to enroll at Berkeley) reflects effective recruitment. Although the percentage of undergraduate women enrolled in EECS has slowly crept to 18 percent, this percentage will not increase significantly unless more applicants gain admission. The percentage of undergraduate women in CS in our Letters and Science Program is 23 percent (compared with 18 percent in the EECS Engineering Program). In seeking to broaden the definition of qualified applicants, a group

of faculty and staff lobbied to remove from consideration the criterion of "prior computing experience," since it affects women applicants disproportionately. Other CS programs, for example at Carnegie Mellon University, have investigated broader admissions criteria with very positive results.



Sheila Humphreys ([humphrys@eecs.berkeley.edu](mailto:humphrys@eecs.berkeley.edu)) is Academic Coordinator for Student Matters, Center for Undergraduate Matters, Department of Electrical Engineering and Computer Sciences, University of California at Berkeley. ■

## FEBRUARY 12 DEADLINE FOR CRA SERVICE AWARD NOMINATIONS

The Computing Research Association invites nominations for the CRA Distinguished Service Award and the A. Nico Habermann Award for the year 2003.

#### Distinguished Service Award

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

#### A. Nico Habermann Award

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

For a list of previous winners of these awards, see: <http://www.cra.org/main/cra.awards.html>

#### Nomination Procedure

The deadline for receipt of nominations is **February 12, 2003**. Nominations should not exceed two pages in length and should describe the contributions on which the nomination is based. Letters in support of the nomination are welcome but not required. Questions or comments may be addressed to [awards@cra.org](mailto:awards@cra.org).

Send nominations electronically to: [awards@cra.org](mailto:awards@cra.org) (in plain text or as a Word attachment). Alternatively, mail or fax to:

CRA Service Awards  
Computing Research Association  
1100 17<sup>th</sup> Street, NW, Suite 507  
Washington, DC 20036-4632  
Tel. 202-234-2111  
Fax: 202-667-1066  
E-mail: [awards@cra.org](mailto:awards@cra.org) ■

### Cognitive Systems Vision from Page 1

improvements in system capability should help us make a serious dent in the maintenance and complexity problems we are facing.

In a nutshell, we want to transform computational systems from those that are simply reactive to those that are truly cognitive. Our ultimate goal is to create systems that know what they're doing.

### Where We're Going

New research in cognitive systems has the potential to revolutionize the way we design, deploy, and depend on computing systems. A long-term research agenda might be structured in stages. For example, we might strive first to consider software systems that were in some measure self-aware. This kind of system could help in its own debugging, and might be extensible through a high-level, goal-oriented dialogue with its programmer. Next, we could imagine building cognitive networks that are able to understand their overall goals and capable of making adaptive, effective use of limited resources. Beyond that, we are interested in building autonomous, perceiving agents, which could explain their reasoning and engage in natural dialogues with human partners that would allow them to increase their functionality and performance over time. Finally, we want to build truly intelligent, multi-component systems whose overall operation would be more efficient and more easily extensible.

The initial focus of our office will be on "assistant" or "associate"

systems. The idea is to create an artificial system that could be a persistent, long-term partner for a person; this associate system would share experiences with its user and learn from those experiences. By being cognizant of the experiences of the user, the assistant system could be more effective in its communication. One can imagine an artificial executive assistant that becomes more and more personalized to its user over time, or a commander's associate that would become a dedicated partner for a battlefield commander, helping to anticipate his or her needs and removing the burden of administrative overhead.

Our effort will of necessity be multi-disciplinary, and will need to draw on many aspects of Computer Science. Despite its high-level focus on cognition, it will need serious participation from the systems, networking, security, and software communities, among others. The notion of *architecture* will be important throughout this work—truly cognitive systems are likely to be complex combinations of reactive processes, more thoughtful, deliberative processes, and reflective processes that capture self-awareness and help make the system robust in the face of unforeseen circumstances. Core technology will include learning, knowledge representation, reasoning, communication, perception, and multi-agent systems.

### Why Now?

Many of the goals of our Cognitive Systems initiative are familiar. What makes us think that we are in a substantially better position to accomplish them now than we were

before? We see several key factors: 1) improvements in computer hardware will soon give us computational substrates with the size and power to match the computational capability of animal and perhaps human brains; 2) the "Decade of the Brain" has brought us unprecedented insights from neuroscience, giving us new models of how the human brain works; and 3) there have been numerous successful deployments of a wide variety of artificial intelligence technologies, ranging from autonomous control of deep space missions to pragmatic machine learning improvements in speech understanding and data mining applications. While none of these or other factors is individually definitive, we believe that the convergence of computing power, knowledge of the brain, and practical experience in deploying reasoning and learning technology is remarkable.

As in many research endeavors, there is significant risk in this kind of initiative, but there is also extraordinary opportunity at a time when dramatically different approaches are urgently needed.

### A Challenge for Computing Researchers

Just as the original IPTO owed its success to the energetic and creative talent in the then-emerging field of Computer Science, our office must rely on the brainpower and imagination of research teams across the country. While we have issued a Broad Agency Announcement (DARPA BAA 02-21) that lays out our overall vision for Cognitive Systems, that vision cannot be realized without the individual and

collaborative breakthroughs that have been the hallmark of American ingenuity.

Put simply: we need your good ideas. We encourage you to use our BAA as a catalyst for breakthrough thinking that might dramatically advance the state of the art.

We also need new Program Managers to help us define the programs that will bring our vision to life (and to secure the necessary funding). We're looking for a few passionate visionaries who want to have an impact on a national scale on our country's security and defense.

### Off and Running

The revitalized IPTO is off and running. While our plans are ambitious, we believe we have no choice but to try something dramatically different in computing, lest we become victims of the complexity we have helped create. If we succeed, computer systems will be able to do substantially more powerful things. They will become easier to build and use, and will last longer. They will become the cooperative and supportive kind of partners that our predecessors imagined, and their novel capabilities will open new possibilities for both humans and machines. We hope you will join us in making cognitive systems a reality.

Ron Brachman is Director and Zachary Lemnios is Deputy Director of IPTO at DARPA.

To learn more, contact Dr. Brachman at [rbrachman@darpa.mil](mailto:rbrachman@darpa.mil) or Dr. Lemnios at [zlemnios@darpa.mil](mailto:zlemnios@darpa.mil). ■

## 2003 Federated Computing Research Conference

June 7-14, 2003  
San Diego, California

<http://www.acm.org/signs/conferences/fcra/>

## Transitions and Awards

**Alfred Aho**, recently of Lucent Technologies, Bell Labs, has returned to Columbia University as a professor in the Computer Science Department.

**Peter Bloniarz**, associate professor of Computer Science, University at Albany, has been named a Collins Fellow for 2002. The award is given for extraordinary and sustained commitment to the University and its community.

**Leah Jamieson**, Ransburg Professor of ECE, is currently serving as Interim Chair of ECE at Purdue. Jamieson recently received a Women and Hi Tech Leading Light award for achievements likely to inspire girls and women to pursue technology-related careers.

**Maria Klawe** has been named dean of the School of Engineering and Applied Science at Princeton University, effective January 1, 2003. She also will be appointed a professor in the Department of Computer Science. Klawe has been at the University of British Columbia since 1988, serving as the head of the Department of Computer Science, as vice president for student and academic services and, since 1998, as dean of science.

**Mark J.T. Smith** has been appointed head of the Department of Electrical and Computer Engineering at Purdue University, effective January 1, 2003. Smith, the former executive assistant to the president at the Georgia Institute of Technology, received his doctoral and master of science degrees in electrical engineering from Georgia Tech in 1984 and 1979, respectively, and a BS in in electrical engineering and computer science from MIT in 1978.

**Valerie Taylor** has been named head of the Department of Computer Science at Texas A&M, effective January 2003. Taylor currently is a professor in the Electrical and Computer Engineering Department at Northwestern University.

**Andries van Dam**, Thomas J. Watson Jr. University Professor of Technology and Education and professor of computer science at Brown University, has been named the university's first vice president for research, effective October 1, 2002.

**Jeffrey S. Vitter** has been named the Frederick L. Hovde Dean of Purdue University's School of Science, effective September 1, 2002. Vitter, a CRA board member, was formerly the Gilbert, Louis and Edward Lehrman Professor of Computer Science at Duke University, where he served as department chair from 1993 to 2001. ■

## NSF Doubling Put on Hold

A bill that would authorize the doubling of research funding at the National Science Foundation over the next five years stalled in the Senate after an anonymous senator placed a "hold" on consideration of the legislation.

H.R. 4664, the "Investing in America's Future" Act, would provide authorization for increases of 15 percent per year to NSF's core research accounts—including information technology research—for fiscal years 2003-07. While not a guarantee for increased funding, it would provide congressional appropriators with the authority to provide the increases should funds be available. The measure passed the House 397 to 25 in early June.

The Senate appeared poised for quick consideration of the bill after two Senate committees granted their approval. However, after Senate leaders placed the bill on the Senate calendar for consideration as a "unanimous consent" request—a special status reserved for bills expected to be non-controversial—staffers learned a hold had been placed on it by an anonymous senator (later learned to be Sen. Jon Kyl (R-AZ), according to Democratic Senate staff). Kyl was apparently acting at the behest of the White House's Office of Management and Budget, which expressed concerns about the word "doubling" in the bill's description and the bill's five-year time span, but apparently no objection to the funding levels in the bill.

It is unclear what effect the hold will have on the measure's chances for final passage. Both the House and Senate have adjourned until after the November 5<sup>th</sup> elections. It is not known whether House and Senate committee members will work to allay OMB's concerns about the measures when they return. For the latest developments, check the CRA Government Affairs website at <http://www.cra.org/govaffairs>.

## CRA Distributed Mentor Project Deadline for Applications

February 14, 2003

<http://www.cra.org/Activities/craw/>



### Intel Research Network from Page 1

bridge the gap between the world of university ideas and Intel's R&D. To succeed, we would need to create an environment in which we could focus on some of the most promising technologies, then work on them together with universities. In addition, we would need to create a research environment within Intel that could move some of these collaborative projects downstream, towards products.

### Launching a Network of University Labs

After a year of exploring possibilities, we launched a new model of industry-university collaboration in the form of the Intel Research Network of university labs. These project-focused labs, wholly owned and funded by Intel, are located near major universities. The universities were selected for their expertise in specific areas of computer science and information technology research that support our proactive computing research agenda, and for their willingness to experiment with an open collaborative model of joint research.

Currently the network consists of four labs located adjacent to UC Berkeley, the University of Washington, Carnegie Mellon University, and Cambridge University. Each lab explores a different aspect of proactive computing, from new technologies for ubiquitous computing environments to software for widely distributed storage systems.

The labs' directors are top academic faculty with tenured appointments in their respective departments. During their tenure as Intel lab directors, they are Intel employees, on partial leave from their faculty positions. Each lab will have approximately 20 Intel researchers and an equal number of university researchers when fully built out. They will collaborate closely in an environment that promotes sharing of knowledge, a commitment to timely publication of results, and broad diffusion of research results. The research agenda of each lab will evolve to take advantage of new research opportunities. Since most of the lab directors are on two- to three-year leaves, the periodic rotation of directors will keep the agenda fresh.

To facilitate technology transfer from these laboratories, we have set up a bi-directional tech transfer structure that can either take lab technology downstream or infuse Intel technology into these labs and the universities.

### Overcoming the IP Obstacle

The sticking point in all university-industry research relationships is intellectual property rights. The history of university-industry collaboration is rife with cases of procrastination on contracts interfering with useful research and/or resulting in surprising and problematic disputes. In some cases, no collaboration happens at all.

For the purpose of the network of laboratories, the four principles we have established are that: 1) collaboration—not just throwing money over the wall—should be the norm; 2) the IP of the research we collaborate on should be non-exclusive; 3) there are many areas of research where, for the sake of collaboration, we favor not filing for IP protection at all; and 4) proprietary advantage should be generated when the principles take ideas downstream—for example, through internal R&D programs.

Not all universities, licensing offices, and/or professors will be able to agree to these principles. Some professors like to keep their IP exclusive so they can use it to start their own companies. Some licensing offices strongly believe they can extract value from CS and EE patents. However, we have found a great number of researchers who share our principles and are very keen on collaboration.

At the CRA Snowbird Conference in July, the popular argument that computer science IP generates substantial revenue for universities was deconstructed by J Strother Moore of the University of Texas at Austin. Moore analyzed the licensing income of universities and concluded that, while IP is indeed a powerful revenue generator for universities, only a fraction of the fees come from licensing computer science or electrical and computer engineering innovations. A similar analysis done by Dave Hodges, former Dean at UC Berkeley, led to significant changes in the flexibility of UC campuses in negotiating sponsors' rights to university intellectual property developed in CSEE-based sponsored research. (<http://patron.ucop.edu/ottmemos/docs/ott00-02.html>)

The vast majority of licensing income is generated by other fields—most prominently, biotechnology, agriculture, and medical technology—in which each product embodies a single, clearly defined, patentable invention. By contrast, CS/ECE products may rely on hundreds or thousands of ideas in various configurations. This makes it difficult to extract royalties, since each patent is a minor contributor and it is often possible to substitute alternative technologies. Furthermore, attempting to do so alienates companies that would sponsor university research if it weren't for all the restrictions. In fact, some companies have decreased or eliminated their research sponsorships for this reason.

With so little for universities to gain from restrictive agreements in CS/ECE and so much to lose in terms of industry sponsorship, why not collaborate openly? Leadership in the CSEE Departments at UC Berkeley and the University of Washington reached this same conclusion a few years ago. UC Berkeley incorporated it in their CITRIS plans and the University of Washington started the process with the Portolano Technology Access Program. That, in addition to their

expertise, made them a natural partner to help launch our new network of university labs. Together we formulated an Open Collaborative Research (OCR) Agreement. That document serves as a template that has been tailored for each of the labs in the network. Intel has recently signed an open collaborative research agreement with UC Berkeley, University of Washington, and Carnegie Mellon University.

### The OCR Agreement

The OCR agreement provides a framework for Intel and the university to conduct joint research in the open. Under the agreement, Intel and principal investigators within the university can propose and initiate computer science and information technology research projects they wish to jointly undertake. Each project is defined in a project document that specifies the boundaries of the project—specifically, what research is to be conducted in the open—with the expectation that the results will be published and made widely available. The OCR provides the master agreement that addresses how these projects are initiated, documented, and approved, including the identification of specific facilities and researchers involved. Our intention is to make it fast and easy for researchers on both sides to collaborate and move freely between Intel and campus to conduct joint research projects.

The emphasis of the agreement is on acceleration of research, bringing together the combined strengths of both Intel and the university, and on the timely publication of research results. Though patents are expected to be rare, as the focus of the collaborations is on openness, the document does spell out the process for handling patents when they arise. As noted earlier, the focus is on non-exclusive access to IP, both for participants and for parties outside the agreement.

The OCR agreement further encourages collaboration by allowing for third parties to participate (we're currently talking with one company that wants to participate in a project within one of our labs). It also can accommodate larger collaborations that form around major projects. For example, UC Berkeley's CITRIS program may consider using our agreement as a guide for managing the IP issues surrounding that project. In short, the OCR agreement is designed to make collaborating easy.

### Everyone Wins

As the foregoing suggests, our open collaborative model provides benefits for all participants. It allows university researchers to amplify their thinking and their work—and potentially see it translated into commercial products—without having to leave academia. It enables Intel to accelerate research in areas we find interesting and worthy of exploration by conducting research concurrently in the labs and within our company. By facilitating synergy and open

exchange of ideas, the model will enable Intel and the participating universities to jointly lead the industry, to generate breakthroughs that will continue to advance the state of the art. Under this new model of industry-university research, we believe everyone wins. (It is important to note, though, that we apply the model to our long-term engagements in exploratory CS/IT research. It is an open question whether or not our principles and this collaboration model can be applied to other engagements.)

Other companies and industry groups have expressed interest in our open approach, and in developing standard agreements governing industry-university collaboration. We believe this would be beneficial, both for our industry and for universities. We encourage others to build on the foundation we have laid, and to use our agreement as a starting point for building a set of standard documents covering a variety of research relationships.

*Hans Mulder, Ph.D., is a Sector Director within Intel Research, responsible for driving research into ubiquitous computing and distributed systems. He also is co-director of Intel Research Berkeley, one of four labs currently in the Intel Research Network. For more information about the labs and their people and projects, visit [www.intel-research.net](http://www.intel-research.net). ■*

### CRA Workshop on Post-9/11 Research Practices

On September 21, CRA hosted a workshop aimed at developing recommendations to strengthen research infrastructure in areas that are of critical importance to national security. About 25 people from academe, industry, and government participated.

Held at the National Conference Center in Arlington, Virginia, the workshop was jointly sponsored by CRA and the National Science Foundation. It was organized by CRA board members Kathleen McKeown (Columbia University), John Stankovic (University of Virginia), and Lori Clarke (University of Massachusetts, Amherst).

The workshop focused on three general topics, including initiation of efforts for setting up best practices in the areas of security and information fusion, recommendations on how to facilitate interaction between research and practice, and recommendations on strategies for funding in this area. The program was structured as a series of working sessions, including short introductions followed by group discussion aimed at identifying key problems and recommendations.

The conclusions of the workshop will be detailed in a forthcoming report.

**Trading Agent Competition  
from Page 3**

additional utility by supplementing a travel package with tickets to entertainment events. Each item is sold separately at auction: in total there are 28 goods and 28 simultaneous auctions. Airline ticket prices follow a biased random-walk—prices are more likely to increase than decrease. Hotel room reservations are sold in ascending ‘English’ auctions (auctions like those for antiques and art). These auctions clear one per minute, in an unspecified random order. Entertainment tickets are traded in continuous ‘double’ auctions (auctions like those on the New York Stock Exchange).

**Decision-Making**

During a TAC game, agents are continuously faced with three basic decisions: what goods to bid on, how many to bid for, and what price to bid at. These bidding decisions are complicated by the tradeoffs that result from complementary and substitutable goods. For example, a flight to Boston complements a flight back to TACtown, but a one-way ticket is of no utility. Similarly, an entertainment ticket for a given night would complement a travel package that included that night, such as a flight arriving that day, a hotel room for that night, and a flight departing the next day—but the entertainment ticket is of value only if the complete travel package is obtained. Moreover, multiple entertainment tickets on a given night are substitutable (a single client can go to, at most, one of symphony, theater, and baseball); thus, an agent has to trade off among its clients’ preferences for the various types of entertainment tickets and the price differentials of the tickets. Similarly, the good and bad hotel rooms are substitutable: an agent has to trade off between its clients’ preferences for the good hotel and the price differentials between the two hotels.

In competing TAC-agent designs, one strategic dichotomy is seen in the use of greedy vs. optimal decision-making algorithms. Greedy solutions are fast and easy to implement, but are suboptimal in general. Optimal solutions, on the other hand, repeatedly solve NP-complete problems in real-time. For example, while some agents focus on obtaining complete packages, others make bidding decisions on travel packages alone (i.e., flights and hotel rooms) without regard for entertainment tickets, essentially breaking the TAC problem down into two sub-problems. But it is preferable to extend a client’s stay whenever the utility obtained by assigning that client an additional entertainment ticket exceeds the cost of the ticket and an additional hotel room (plus any travel penalties incurred). Similarly, it is sometimes preferable to sell entertainment tickets and shorten a client’s stay accordingly. A second example of this strategic dichotomy is seen in the fact that some agents aim to satisfy each of their clients in turn (greedy), whereas others make global decisions regarding all their clients’ interests simultaneously (optimal).

**RoxyBot**

“Roxybot” is short for “ApproximateBot,” a name that represents the goal of constructing a trading agent whose strategic behavior approximates optimal behavior. Using AI heuristic search techniques, Roxybot incorporates an optimal solver for the problem of *completion*—determining the optimal quantity of each item to buy and sell given current holdings and estimates of auction clearing prices.

At the heart of Roxybot is an algorithm that generates TAC bidding policies consisting of: 1) a set of goods *A* on which to bid, or ask; and 2) a set of prices, one price corresponding to each good in the set *A*. During each bidding cycle, Roxybot-00 (see Table 1) pings the server for updated information; estimates auction clearing prices; solves the completion problem (to generate part 1 of a TAC bidding policy), and computes marginal utilities (to generate part 2 of a TAC bidding policy). (The marginal utility of good *x* is defined as the utility of all goods, including good *x*, less the utility of all goods, excluding good *x*.)

**Table 1. RoxyBot-00's High-Level Strategy**

Repeat

1. Ping server for updates on current holdings and current prices in each open auction.
2. Based on current and historical price trajectories, generate clearing price **point estimates** for each open auction.
3. Generate a bidding policy
  - Run the **completer** to determine the optimal quantity of flights, hotels, and entertainment tickets to buy and sell, given the set of price point estimates.
  - Compute bid and ask prices as **marginal utilities**, given the set of price point estimates.
4. Place online bids and asks according to the bidding policy.

Until game over

Roxybot-01 (see Table 2) generalizes Roxybot-00 by computing policies not simply from price point estimates, but rather from estimated price *distributions*. Roxybot-01 determines a set of goods that is likely to be of value under many

**Table 2. RoxyBot-01's High-Level Strategy**

Repeat

1. Ping server for updates on current holdings and current prices in each open auction.
2. Based on current and historical price trajectories, estimate clearing price **distributions** for each open auction.
3. Generate a bidding policy
  - Run the **generalized completer** to determine the quantity of flights, hotels, and entertainment tickets to buy and sell, given the set of estimated clearing price distributions.
  - Compute bid and ask prices as **average marginal utilities**, across samples from the set of estimated clearing price distributions.
4. Place online bids and asks according to the bidding policy.

Until game over

samples of its estimated price distributions. (This algorithm proceeds by determining an initial set of goods that is desired under many samples, adding that set to the set of current goods, and repeating. A larger and larger set of goods is built up by conditioning on those goods that were desired in earlier iterations.) Bid and ask prices are computed by averaging marginal utilities across many samples of the estimated price distributions.

Roxybot-02 (see Table 3), an agent based on Monte Carlo simulations, generalizes both earlier versions of Roxybot. Specifically, this agent: 1) generates candidate bidding policies *a la* Roxybot-01, using estimated price distributions, or Roxybot-00, obtaining a set of price point estimates by sampling from estimated price distributions; and 2) evaluates each candidate by averaging its score across many samples of estimated price distributions. This search through the space of bidding policies continues until time expires, at which point Roxybot-02 bids according to the best bidding policy. Roxybot-02 generalizes and outperforms both Roxybot-01 and Roxybot-00.

**Table 3. RoxyBot-02's High-Level Strategy**

1. Ping server for updates on current holdings and current prices in each open auction.
  2. Based on current and historical price trajectories, estimate clearing price **distributions** for each open auction.
  3. Repeat
    - Generate a **bidding policy** *a la* RoxyBot-01 or RoxyBot-00, obtaining a set of price point estimates by sampling from the price distributions.
    - Compute the value of this policy by averaging its score across many samples of the estimated price distributions.
- Until bidding cycle time out.

4. Place online bids and asks according to the **best** bidding policy seen in step 3.

Until game over

The trading agent competition is an exciting domain in which to study artificial intelligence (AI) techniques. Some TAC agent designs are based on straightforward applications of AI: for example, at the heart of \roxybot-00 is a beam search optimization routine. Other TAC agent designs extend state-of-the-art techniques in AI: \roxybot-01 and \roxybot-02 both offer solutions to a generalized search problem that is relevant to decision making under uncertainty.

**The Future of TAC**

The travel domain has been the focus of the trading agent competition for three years running. At TAC-2003, this game will take a back seat, and a new game based on supply chain management will be introduced. In next year’s competition, each TAC agent will act as a PC assembler, buying computer parts piecemeal from suppliers, and compiling its inventory into custom-specific products for its clients. This game is being designed by Norman Sadeh and Raghu Arunachalam at Carnegie Mellon’s eCommerce Institute, in conjunction with the SICS development team. Game details will be announced in mid-October.

Amy Greenwald is an Assistant Professor in the Department of Computer Science at Brown University. **Email:** amygreen@cs.brown.edu; **URL:** http://www.cs.brown.edu/~amygreen/

The CRA Digital Government Fellowship is supported by the National Science Foundation’s Digital Government Program, and is intended to build ties between academic and industrial computing research communities, as well as among information technology workers in federal, state, and local governments. ■

### Federal Budget Cycle from Page 4

office for several interagency research initiatives, including the National Information Technology Research and Development program (NITRD), which comprises all of the federal government's IT research programs. OSTP also provides guidance to agencies on the President's priorities for R&D funding for future budgets, although this guidance is heavily influenced by OMB.

In May 2002, agency directors received a memo entitled "FY 2004 Interagency Research and Development Priorities," co-signed by OSTP Director Marburger and OMB Director Mitch Daniels. The memo set forth the Administration's position on R&D priorities (which include continued support for NITRD activities) and spelled out the tests the Administration will apply to all R&D programs to see whether they warrant the Administration's continued support. The tests are culled from the President's Management Agenda, a document released by OMB in August 2001, which spells out the President's desire to develop R&D performance measures, or "investment criteria," that will "help improve R&D program management, better inform R&D program funding decisions, and ultimately increase public understanding of the possible benefits and effectiveness of the federal investment in R&D." The three tests—relevance, quality, and performance—are to be applied to all R&D programs agency directors hope to include in the President's budget.

Agency directors must also keep presidential priorities in mind when putting together their budgets. For FY 2004, OSTP and OMB have indicated six interagency initiatives to be given high priority in formulating agency budgets: Homeland Security and Antiterrorism; NITRD; Nanotechnology; Molecular Level Understanding of Life Processes; Climate Change Science and

Technology; and Education Research. Funding increases in areas beyond those covered by these initiatives will have to be well justified, according to the memo.

In setting research priorities, the Administration looks to a number of different groups for recommendations. Among the most prominent are presidential advisory groups such as the President's Council of Advisors for Science and Technology (PCAST) and the President's Information Technology Advisory Committee (PITAC). PCAST is the most active of the presidential advisory committees for research issues. Made up of members from industry and academia—currently chaired by Marburger and Floyd Kvamme, a partner at a high-tech venture capital firm—PCAST is currently charged with providing advice to the President in four primary areas: research and development priorities; combating terrorism; broadband deployment; and energy efficiency issues. Their recommendations regarding R&D in the FY 2004 budget—they support increasing funding for the physical sciences, for example, and vigorous funding of IT R&D—should influence the President's final plan.

PITAC, on the other hand, has been a committee without members since January 1, 2002. Last year, the President extended the committee's charter (to evaluate the current state of the federal information technology research effort) through 2003, but did not extend any of the committee members' terms. Those terms expired at midnight on December 31, 2001, and no new members have been appointed. Although sources at OSTP say that the vacancies will be filled "soon" (as they have been saying since March), some outside of OSTP have suggested that the President's lethargy in appointing members to PITAC, which had a more academic membership than PCAST, is indicative of his distrust of academia generally. The President, according to this argument, is more

comfortable with the industry presence on the PCAST panel and with technology advice from his close friend and Director of the Commerce Department, Don Evans, and the head of Commerce's Technology Administration, Phil Bond, than he is from a panel of academic researchers. Whatever the reason, PITAC will have no influence on budget deliberations this cycle.

After heeding the guidance of OMB and OSTP and soliciting feedback from the communities they support, agency directors must complete their budgets and submit them to the President by early fall. OMB then spends several months sifting through the budgets, deciding what programs to accept and reject. The process is held completely within the executive branch, and agency officials are not permitted to discuss with Congress or any other interested party what they have submitted to the President or any feedback they may have received.

OMB then sends the budgets back to the agencies (called a "passback") for changes, and to give the agencies one more opportunity to justify items in the proposed budget that OMB may have changed or eliminated completely. Although this is a confidential process, it is not unusual for details about disappointing passbacks to find their way to the affected communities, and for those communities to lobby against those changes even though they have not been made public.

Agencies typically have until December to return the budgets to OMB with required alterations, and many will spend the time until the deadline arguing against the changes, sometimes appealing to the President himself. After the final budgets are accepted and included in the President's budget, all arguments with the administration typically end, and agency directors present a unified front in defending the budget in Congress in the later stages.

This need—indeed, requirement—to unite behind the

President's budget can put agency directors in the position of arguing against changes beneficial to their agencies—increases proposed by Congress, for example—that they themselves may have proposed in the budget approval process. This year, for example, the President's budget contained only a modest 1.4 percent increase for the National Science Foundation (NSF) for FY 2003 over FY 2002. Congress, which has just completed a five-year effort to double the budget for the life sciences, now finds itself favorably disposed to do the same for the physical sciences (including computing research) at NSF. The House passed a measure authorizing the doubling of NSF over five years in late July.

As this article goes to press, two Senate committees have approved a similar plan and the measure is ready to head to the Senate floor. However, because the bill includes an authorization for FY 2003 that is significantly higher than the level requested by the President, NSF Director Rita Colwell has written to the Senate Commerce, Science and Transportation Committee asking that they oppose the nearly 15 percent increase already approved for her agency by the committee in favor of the significantly smaller increase proposed by the President.

After the formal introduction of the President's FY 2004 budget on the first Monday in February 2003, the agency heads will once again unite behind the President's plan, even as they begin their work on the next year's budget (FY 2005). Their work on FY 2004 is hardly over—they will be called to testify on behalf of their agencies before Congress in defense of their budgets. But their influence on the process is now secondary compared to the actions of key congressional committees and members.

(See January 2003 CRN for Part 2—*The President's Budget in Congress*). ■

## CRA-W to Hold Career/Mentoring Workshop at SIGCSE 2003

CRA's Committee on the Status of Women in Computing Research will hold its second daylong career/mentoring workshop for faculty women at undergraduate computer science and engineering institutions at the SIGCSE 2003 Symposium in Reno, Nevada next February.

Like last year's successful workshop at SIGCSE 2002, this workshop is directed towards graduate students and faculty members who are interested in undergraduate education and research. The workshop will provide critical information and tools to build successful academic careers that focus on undergraduate teaching and research. Workshop sessions will offer mentoring activities specifically for women, who face particular challenges in pursuing and maintaining academic careers at primarily undergraduate academic institutions.

Last year's participants rated the workshop highly in areas such as "how to build a research career," "getting federal funding," and "professional networking." Sixty-six percent (66%) of participants reported making "valuable professional contacts" from among the community of female computer scientists and academics who attended the CRA-W workshop at SIGCSE 2002.

Information on the agenda, applications for support to attend the workshop, and workshop registration are forthcoming. Information on SIGCSE 2003 is available at: <http://www.csis.gvsu.edu/sigcse2003/> ■

## CISE Newsletter Rekindled

After an absence of several years, CISE/NSF is again providing a newsletter to inform the community of new CISE programs, NSF-wide programs of interest, personnel changes, and other news in the directorate.

You can view the newsletter at:

[http://www.cise.nsf.gov/cise\\_nwsltr/index.html](http://www.cise.nsf.gov/cise_nwsltr/index.html)

Any comments or suggestions should be sent to: [cisenews@nsf.gov](mailto:cisenews@nsf.gov)

In addition, you may wish to subscribe to the CISE email list, which has short, occasional messages for the CSE research community.

To subscribe, send a message to: [join-cise-announce@lists.nsf.gov](mailto:join-cise-announce@lists.nsf.gov) ■

## CRA Welcomes New Academic Members

Cornell University (ECE)

Miami University (CS)

Massachusetts Institute of Technology  
(Aeronautics & Astronautics)

The MOVES Institute, Naval Postgraduate School

## Professional Opportunities

## CRN Advertising Policy

See <http://www.cra.org/main/cra.jobshow.html>**Armstrong Atlantic State University**School of Computing  
Faculty Positions

The School of Computing invites applications for several tenure-track positions in Computer Science. Candidates should have a PhD in Computer Science or a related field. We also have tenure-track openings in Information Technology. Candidates should have a PhD or MS in Information Technology, or a related field. Two-year visiting positions are also possible. The appointments begin in January 2003. Salary is competitive with good startup equipment packages.

The Department of Computer Science is accredited by the CAC of ABET. It is part of the strategic Yamacraw Project of the State of Georgia ([www.yamacraw.org](http://www.yamacraw.org)) to become one of the national leaders in high bandwidth communications. We are particularly interested in candidates in the areas of optical networks, networking, and software engineering; however, candidates in other systems areas will be considered. Current faculty research interests are in algorithms, biometrics, complexity theory, computer vision, distributed systems, graph theory, networking, parallel computation, programming languages, and software engineering. Faculty research is currently supported by NSF, ONR, and NIH.

There are 125 Computer Science majors and 125 Pre-Computer Science majors in the undergraduate program. In January 2002 we began a Masters program and currently have twenty graduate students. The Department of Computer Science wishes to attract faculty interested in conducting research and involving undergraduate students in their work.

The Department of Information Technology began in January of 2002 and is growing rapidly. We currently have over 100 Information Technology majors. We also offer two certificates. Faculty applicants with an interest in e-commerce, security, or an expertise in Java are particularly welcome.

The emphasis at Armstrong Atlantic is on quality undergraduate education. Average class size is about twenty students. Many members of CS and IT have duplicate course preparations. The School of Computing moved into a new science building in the fall of 2001. A \$23,000,000 computing building will be constructed for the School of Computing in 2007. Armstrong Atlantic is part of the University System of Georgia. We have an enrollment of about 6,000 students. The University is located in the suburbs of the coastal city of Savannah. The cost of living in Savannah is very reasonable with nice 3-bedroom homes available for as little as \$100,000.

Applicants should send a letter of interest, CV, and have three letters of reference sent to:

Professor Raymond Greenlaw (Dean)  
Attn: Faculty Search  
School of Computing  
Armstrong Atlantic State University  
Savannah, GA 31419-1997.

Phone inquiries are welcome at (912) 961-3076. Review of applications is ongoing and will continue until the positions are filled. Georgia is an Open Records Law State.  
AA/EOE

**Bucknell University**Department of Computer Science  
Asst./Assoc. and Asst. Prof.

Applications are invited for two tenure track positions beginning mid-August 2003. A Ph.D. in computer science or computer engineering is required.

Position 1: Asst./Assoc. level with specialization in programming languages preferred.

Position 2: Entry-level Asst. Prof. Specialization open.

Please visit <http://www.eg.bucknell.edu/csci> for more details about the department of computer science and the position.

Send a resume, a transcript, and the names of three references to:

Gary Haggard, Chair  
Dept. of Comp. Sci.  
Bucknell University  
Lewisburg, PA 17837

**Butler University**Department of Computer Science  
Assistant/Associate Professor

The Department of Computer Science and Software Engineering at Butler University ([www.butler.edu/csse](http://www.butler.edu/csse)) invites applications for an assistant professor or, if qualifications

warrant, an associate professor from individuals interested in creating an innovative Software Engineering curriculum founded on mathematics, problem solving, strong ties with industry and service learning.

Applicants should have a Ph.D. in Computer Science or a related discipline and background in an applied field (i.e. software engineering, operating systems, networks, computer architecture, etc.). A strong commitment to teaching and distinction in scholarship are expected and encouraged. Applicants should send a detailed resume to:

Professor Peter B. Henderson, Head  
Department of Computer Science and Software Engineering  
Butler University  
4600 Sunset Ave.  
Indianapolis, IN 46208-3485

Please arrange to have at least three letters of reference sent to the same address. Screening will begin immediately, and continue until the position is filled.

Letters and requests for information may also be sent to [pheanders@butler.edu](mailto:pheanders@butler.edu). In addition, please e-mail to the same address a URL pointing to your online resume and publications.

Butler University is an equal opportunity employer and is committed to enhancing the diversity of the student body and its faculty and staff; therefore, women and minorities are strongly encouraged to apply.

**The Citadel, Military College of South Carolina**

Department of Mathematics and Computer Science

Faculty Position: Department Head at the Rank of Associate or Full Professor Level

Applications and nominations are invited for the head of the department at the rank of associate or full professor level, beginning in the fall 2003 academic year. Qualifications for the position include an earned Ph. D. in an area of mathematics or computer science, administrative experience, a demonstrated commitment to excellence in teaching and service, and an established record of research. Salary and benefits will be competitive.

The Citadel is a fully accredited, state-assisted, comprehensive, coeducational college, founded in 1842, with a faculty of 160 and with a student body of 2000 undergraduate and 1500 evening and graduate students. The department has 14 full time faculty members covering the areas of mathematics, statistics, and computer science and offers B.A. and B.S. degrees in mathematics, a B.S. in computer science, an M.S. in computer science, and supports an MEd. degree in mathematics education.

Applicants should submit a letter of application, curriculum vita, a statement of administrative philosophy with details about personal administrative experience, and the names of at least three references. Applications will be reviewed as they are received, beginning January 15, 2003, and the position will remain open until filled.

For more information about the college and the department, please see <http://www.mathcs.citadel.edu>. Further questions about the position should be directed to the chair of the search committee. Applications and supporting materials should be addressed to:

Dr. Peter Greim, Chair, Search Committee  
Department of Mathematics and Computer Science  
171 Moultrie Street  
The Citadel, Charleston, SC 29409  
phone: 843-953-5035; fax: 843-953-7391  
e-mail: [peter.greim@citadel.edu](mailto:peter.greim@citadel.edu).

You may also submit application and materials online at <http://www.citadel.edu/hr>. Please reference job #F02-17CRA. Applications from women and minorities are especially encouraged.

The Citadel is an affirmative action/equal opportunity employer, dedicated to multi-cultural diversity in campus leadership positions.

**Clemson University**Department of Computer Science  
Computer Science Faculty Positions

The Department of Computer Science at Clemson University has multiple openings for tenure-track faculty positions at all levels as well as lecturers. Outstanding candidates at all areas of Computer Science are encouraged to apply. Current faculty interests include algorithms and theory, graphics & visualization, networking and systems, programming languages, and software engineering.

Applicants for the tenure-track positions should have a Ph.D. in computer science or a related field. Applicants for the lecturer positions should hold an M.S. in computer science and should be committed to high quality undergraduate instruction. The Department has 21 faculty members, about 600 undergraduate majors, and over 100 graduate students. In addition to B.A., B.S., M.S. and Ph.D. degrees in Computer Science, the department also offers inter-disciplinary degrees in E-Commerce and Fine Arts in Computing.

Clemson University is the land-grant university of South Carolina and has an enrollment of approximately 17,000. The University is located in Clemson, South Carolina, a small college town on beautiful Lake Hartwell at the foothills of the Blue Ridge Mountains. The area offers numerous outdoor activities.

For additional details, please see [www.cs.clemson.edu](http://www.cs.clemson.edu). Electronic applications (preferably in PDF), including names of three references, may be sent to: [search@cs.clemson.edu](mailto:search@cs.clemson.edu). If unavoidable, hard copies may be mailed to:

Faculty Search Committee  
Department of Computer Science  
Clemson University  
Clemson, SC 29634-0974.

Applications will be accepted and screened periodically beginning October 1, 2002. The search will continue until the positions are filled.

Clemson University is an Affirmative Action/Equal Opportunity Employer.

**Colorado State University**  
Computer Science Department

Department Chair

Colorado State University seeks applications and nominations for the position of Professor and Chair of the Department of Computer Science. Candidates from academic, industrial, and government sectors are encouraged to apply. We are a dynamic and energetic department located in Fort Collins at the base of the scenic Rocky Mountains. Fort Collins is consistently ranked as a top ten community for its quality of life, particularly for families.

The Department is involved in leading research programs, and is strongly committed to excellence in graduate and undergraduate teaching. Our research strengths include artificial intelligence, software engineering, parallel and distributed computing, networking, databases, security, architecture, computer graphics, and theory of computation. More information is available at <http://www.cs.colostate.edu>

The Chair will have opportunities to capitalize on a university-wide Information Technology initiative and to guide the department's expansion into a new building. The Chair will take an active role in faculty development and work with the department to identify and pursue innovations in teaching, research and outreach activities. (S)he must have a vision to lead the department to a prominent role in research and teaching, develop a plan to achieve it, and pursue its attainment. The Chair will be actively engaged in research, and perform teaching and student advising as appropriate.

Candidates must have a doctorate or equivalent and a distinguished record of research and scholarship in computer science or related field. Good interpersonal skills, demonstrated or potential administrative ability, scientific and organizational leadership, and teaching ability are expected. The Chair will have creative ideas for organizational development, and an ability to work effectively with university, community, industry and government officials.

The appointment will be at the full professor rank at Colorado State University.

Letters of application should discuss your qualifications for the position as listed above. Include a full curriculum vitae and the names, addresses, telephone numbers, and e-mail addresses of five references. Nominations or applications may be submitted in Adobe Acrobat format to [chair-search@cs.colostate.edu](mailto:chair-search@cs.colostate.edu) or to:

Professor David Krueger  
Department of Computer Science  
Chair Search Committee  
Colorado State University  
1873 Campus Delivery  
Fort Collins, Colorado 80523-1873

Applications and nominations will be considered until position is filled; however, applications should be received by December 3, 2002, for full consideration. The anticipated starting date is July 1, 2003. Colorado State University is an EEO/AA employer. Equal Opportunity Office: 101 Student Services. When semifinalists are identified, their files will be open to all faculty in the Department of Computer Science.

**Cornell University**  
Operations Research & Industrial Engr/Computing & Info. Science  
Assistant/Associate Prof.

Cornell University's School of Operations Research and Industrial Engineering and Faculty of Computing and Information Science (CIS) are jointly seeking candidates for a tenure-track faculty position in Information Technology, broadly construed. Rank will depend on experience and qualifications. (See <http://www.orie.cornell.edu/> and <http://www.cis.cornell.edu/infoscience/> for more information on ORIE and CIS.)

Candidates should have a Ph.D. and research interests in a discipline that is relevant to information technology, including but not limited to Operations Research, Computer Science, Economics, or Information Science. Research areas include data mining, network analysis and management, economics of information technology or information goods, applications of information technology to supply chains and manufacturing logistics, e-commerce, game theory and electronic auctions, among others. Demonstrable excellence in teaching and research is required.

Applicants should provide a c.v., a 1-page statement of research directions and teaching interests, a doctoral transcript for junior applicants, and other supporting materials. They should also arrange for four letters of recommendation to be mailed.

All relevant materials should be sent to the:

Information Technology Faculty Search Committee  
School of ORIE, Rhodes Hall  
Cornell University  
Ithaca, NY 14853

Applicants should apply as early as possible. Applications received before January 15, 2003 will receive full consideration; all applications will be considered until the position is filled.

Women and minority candidates are especially encouraged to apply.

Cornell University is an affirmative action/equal opportunity employer.

**BROOKLYN COLLEGE**  
of the CITY UNIVERSITY OF NEW YORK

BROOKLYN



COLLEGE

Brooklyn College of the City University of New York is a liberal arts college offering a strong undergraduate curriculum to a diverse student body. As part of CUNY, the Department also provides doctoral training and access to other units of the University.

The Department of Computer and Information Science (CIS) is seeking to fill two tenure-track vacancies at either the Assistant or Associate Professor level. We are an urban liberal arts college, and our department has 29 full-time faculty, over 700 undergraduate majors, over 200 Master's students and over 20 affiliated doctoral students of the CUNY Graduate Center. Several major research projects are currently underway. Extensive faculty and student SUN/UNIX and PC networks are used in teaching and research.

We are seeking two individuals specializing in any area of computer science.

A successful candidate will teach undergraduate and/or graduate courses in CIS and is expected to develop a research program in the field. He or she should have a broad knowledge of computer science and should have good teaching skills. For appointment as an Assistant Professor, a candidate should have a Ph.D. in computer science or a related area. For appointment as an Associate Professor, a preferred candidate should also have a record of participation in research grants and high-quality research in the field.

Please send a CV and three letters of reference to:

Aaron Tenenbaum, Dept. of CIS  
Brooklyn College, 2900 Bedford Avenue, Brooklyn, NY 11210  
([tbaum@sci.brooklyn.cuny.edu](mailto:tbaum@sci.brooklyn.cuny.edu))

Please indicate whether you are applying for the Assistant or Associate Professor position. Please include your email address and a phone number. Review of applications will begin October 30 and will continue until positions are filled.

An EO/AA/IRCA/ADA Employer

## Professional Opportunities

### Drexel University

#### Department of Computer Science

Drexel University invites applications for multiple tenure-track positions at all levels. Interests include: Computer Graphics and Human-Computer Interaction, Software Engineering, Networks, Systems and Security. Strong applicants in other areas are also encouraged to apply.

Drexel's Computer Science Department has rapidly expanding graduate programs in Software Engineering, Graphics, HCI, AI, Networks, Security, and Scientific Computing. Our Department emphasizes both interdisciplinary and applied research and is supported by major federal research grants from NSF, DoD and NIST, as well as by private sources.

One-third of our faculty are recipients of the NSF CAREER Award. The University plans for significant growth in tenure-track Computer Science faculty in the coming years.

Send cover letter, CV along with names and contact information for four references to:

Faculty Search Chair  
Computer Science Department  
Drexel University  
Philadelphia, PA 19104  
E-mail: [cs-search-03@drexel.edu](mailto:cs-search-03@drexel.edu)  
WWW: <http://www.cs.drexel.edu/cs02-03/>  
Electronic submissions in PS/PDF format are preferred. Drexel University is an Affirmative Action/Equal Opportunity Employer.

### Duke University

#### Department of Computer Science Experimental Systems Faculty Position

We invite applications and nominations for a tenure-track or tenured faculty position at any rank in the Department of Computer Science at Duke University, to start September 2003. Preference will be given to applicants in the various areas of experimental systems and architecture.

We continue to build upon an already strong, highly collaborative group in experimental systems. We are broadly interested in all areas of experimental systems including computer networks and protocols, Internet environments and services, mobile and wireless computing, databases and large-scale storage, computer architecture, distributed systems, computer security, compilers and programming languages, and operating systems.

This faculty hire will be in a position to help guide and influence the continued expansion of our vibrant and growing Department. For more information about the faculty, facilities and other resources, please refer to [www.cs.duke.edu](http://www.cs.duke.edu)

Applications should be submitted *via email with PDF attachments*. Applications should include a curriculum vitae, a list of publications, and copies of the most important publications. A Ph.D. in computer science or related area is required. Applicants should arrange for at least four letters of reference to be sent directly to the Faculty Search Chair. To guarantee full consideration, applications and letters of reference should be received no later than January 15, 2003.

[facsearch@cs.duke.edu](mailto:facsearch@cs.duke.edu)  
Faculty Search Chair  
Department of Computer Science  
Duke University  
Durham, NC 27708-0129  
Duke University is an affirmative action, equal opportunity employer.

### Emory University

#### Mathematics and Computer Science Department

#### Tenured or Tenure-Track Position in Computer Science

The Department of Mathematics and Computer Science, Emory University, invites applications for an anticipated tenure track Assistant Professorship or a tenured appointment at the rank of Associate Professor or Professor, effective 2003-2004. Applicants must have a PhD in computer science or a closely related field, with demonstrated promise in research and a strong commitment to teaching in a liberal arts environment. Senior candidates must have an established research program.

While strong candidates in all areas of systems and theory will be considered, preference will be given to candidates in database, high performance computing and architecture, networking, or distributed systems. There are diverse opportunities for collaboration with CS faculty, applied and numerical mathematicians, and university faculty in biomedical and scientific computing. Emory University has embarked on an ambitious development program for the sciences and we expect substantial growth in departmental and interdepartmental education and research programs. The department has just moved into the new

Mathematics and Science Center, has excellent infrastructure and technical support, and is committed to adding significant strength in computer science.

Applicants must provide CV's, with at least three recommenders' names, and have recommendation letters sent to:

Professor Dwight Duffus, Screening Committee  
Department of Mathematics and Computer Science  
Emory University  
Atlanta GA 30322

Screening of applications will begin on 15 December 2002, with initial interviews planned for mid-January and continuing until positions are filled.

Informal inquiries are welcome; please see our web page for further details at:

<http://www.mathcs.emory.edu/News/Ops/>  
Emory University is an Affirmative Action/Equal Opportunity Employer.

### Federal Railroad Administration Department of Transportation Office of the Associate Administrator for Safety

FRA is recruiting for the following positions: *Senior Scientific/Technical Advisor for Railroad Electronic Systems*

Position requires a nationally and internationally recognized expert in the field of electronic safety-critical systems and security of these systems. Incumbent will provide authoritative guidance to top management on program development and implementation on all matters related to this field. Salary range is \$110,472 to \$138,200. Announcement FRA-02-74T.

*Electronics/Computer Engineer or Computer Scientist*

Position requires an authority on the internal functioning of safety- and security-critical electronic systems used in railroad operations, with emphasis on software design and integrity and verification of systems. Salary range is \$92,060 to \$119,682. Announcement FRA-02-73T.

*Electronics/Electrical/Computer Engineer*  
Position requires an authority on the application of safety-critical electronic systems used in railroad operations, with emphasis on system requirements (including security requirements), system architectures/interfaces and validation of systems. Salary range is \$92,060 to \$119,682. Announcement FRA-02-72T.

All applicants must be United States citizens. Announcements with qualification requirements and application procedures are located at [www.fra.dot.gov](http://www.fra.dot.gov). They can also be obtained by calling: (202) 493-6112 or TDD (202) 493-6487 or 6488. When applying, be sure to submit all required documents.

The Department of Transportation is an Equal Opportunity Employer.

### Florida International University School of Computer Science Faculty Positions

Applications are invited for multiple tenure track faculty positions at the level of Assistant or Associate Professor. A Ph.D. in computer science or related area is required. Candidates are sought in all areas of computer science, but priority will be given to database, software engineering, software systems, security, and distributed computing.

FIU is a member of the State University System of Florida with over 34,000 students and offering 190 baccalaureate, master's and doctoral degree programs in 19 colleges and schools, and is one of the 30 largest universities in the United States. FIU is one of the four public universities in Florida ranked as Doctoral Research/Extensive by the Carnegie Foundation, the highest ranking in its classification system. US News & World Report has ranked FIU among the top 100 public universities.

The School of Computer Science is a designated program of excellence at the University and enjoys strong support of the university administration. Through its two Research Centers for High Performance Database Research, and for Advanced Distributed Systems Engineering the School has attracted substantial support from NSF, NASA, ARO, AFOSE, BMDO, FEMA, ONR, AFRL, together with considerable funding other Federal, State, and private agencies totaling over 2 million dollars annually. The School has excellent computing infrastructure and technology support. The School has 25 faculty members and offers B.S., M.S., and Ph.D. degrees in Computer Science. The current enrollment is approximately 900 undergraduate majors and 100 graduate students.

Successful candidates are expected to develop a high-quality funded research program and must be committed to excellence in teaching at both the graduate and the

undergraduate levels. Our salary and benefits package is highly competitive.

Applications, including a letter of interest, curriculum vita, e-mail address, and the names of three references, should be sent to:

Chairperson, Recruitment Committee  
School of Computer Science  
Florida International University  
University Park, Miami, FL 33199

Evaluation will begin January 9, 2003, and will continue until the positions are filled. Further information can be obtained from the School website <http://www.cs.fiu.edu>, from the sites of our Research Centers: <http://hpdr.cs.fiu.edu> and <http://cadse.cs.fiu.edu> or by e-mail to [recruit@cs.fiu.edu](mailto:recruit@cs.fiu.edu)

Florida International University is a member of the State University System of Florida and is an equal opportunity/affirmative action/equal access employer.

### The Florida State University Department of Computer Science Tenure-Track and Non-Tenure Track Positions

The Department of Computer Science invites applications for several tenure-track positions at the rank of Assistant Professor and one non-tenure track position, beginning August 2003. Exceptional candidates may be considered for the rank of Associate Professor.

Applicants for tenure-track positions should hold a PhD in Computer Science or a closely related field, and have excellent research and teaching accomplishments / potential. Areas of priority are: architecture, embedded systems, databases, multimedia systems, networking, distributed systems, compilers, operating systems, virtual reality, and biomedical computing. We are preferentially seeking candidates with a systems focus. Applicants for the non-tenure track position will be expected to contribute to the undergraduate teaching mission of the department.

The department offers degrees at the BS, MS, and PhD levels. It is in a period of significant growth and further information can be found at <http://www.cs.fsu.edu>. FSU is classified as a Carnegie Research I university. Its primary role is to serve as a center for advanced graduate and professional studies while emphasizing research and providing excellence in undergraduate education. FSU is located in the beautiful and picturesque Florida

## CHAired FACULTY POSITIONS WIRELESS COMMUNICATIONS AND NETWORKING

The Digital Technology Center (DTC) at the University of Minnesota in conjunction with the Department of Computer Science & Engineering (CS&E) and the Department of Electrical & Computer Engineering (ECE) invite applications for three faculty positions with endowed chairs (two ADC Telecommunications chairs and one Qwest chair). The appointments will be at the rank of Associate or Full Professor with tenure in one of these departments, or, potentially in related disciplines represented within the DTC. Areas of interest span all aspects of wireless and mobile communications, networking, multimedia distribution, distributed computing, and storage. Applicants must possess a distinguished research record, demonstrated ability in establishing and leading a highly visible research program, and a commitment to teaching at the graduate and undergraduate levels. A Ph.D. in a relevant discipline is required. Please see complete details for these positions at [www.dtc.umn.edu/jobs/chair.html](http://www.dtc.umn.edu/jobs/chair.html).

Applicants should submit a curriculum vitae and the names of at least three references to:

Prof. David Du, DTC Search Committee Chair

c/o Ann Johns, Assistant Director for Human Resources

University of Minnesota, Digital Technology Center

599 Walter Library, 117 Pleasant St. SE, Minneapolis, MN 55455

You may also apply electronically to [johns@dtc.umn.edu](mailto:johns@dtc.umn.edu).

Review of completed applications will begin immediately with the search remaining open until the positions are filled.

## UNIVERSITY OF MINNESOTA

The University of Minnesota is an Equal Opportunity/Affirmative Action Educator and Employer.

capital – a city of approximately 250,000, about an hour's drive from the Gulf Coast.

Screening of candidates will begin December 1, 2002, and continue until the positions are filled. Please use the on-line application form at: <http://www.cs.fsu.edu/positions/apply.html>.

Questions can be e-mailed to [recruitment@cs.fsu.edu](mailto:recruitment@cs.fsu.edu). Also, please arrange for at least 3 letters of reference to be sent to:

Faculty Search Committee  
Computer Science Department  
Florida State University  
Tallahassee FL 32306-4530

The Florida State University is an Equal Opportunity/Affirmative Action employer, committed to diversity in hiring, and a Public Records Agency

### Georgia College & State University

Department of Mathematics And Computer Science  
Assistant/Associate Faculty Position in Computer Science

The Department of Mathematics And Computer Science invites applications for a tenure track position in the faculty of computer science. Salary and rank will be commensurate with qualifications. Excellence in teaching, scholarly activity, and university/community service are requirements for promotion and tenure. A Ph.D. is required in computer science or a computer related field. Candidates from all specializations of computer science and technology are welcome to apply.

The department has approximately 130 computer science majors, an active ACM student organization, a chapter of the UPE honor society and excellent computer facilities dedicated to computer science instruction. The program is progressing toward CSAB accreditation for computer science, is actively reviewing and revising curriculum and engaged in planning for future growth and development. GC&SU is the state's Public Liberal Arts University and a member of the Council of Public Liberal Arts Colleges (COPLAC).

Review of applications will begin December 15, 2002 and continue until the position is filled. Send letters of application with current vitae and three letters of reference to:

(cont'd)

## Professional Opportunities

Chair, Computer Science Search Committee  
 Department of Mathematics and Computer Science  
 CBX 017  
 Georgia College & State University  
 Milledgeville, GA 31061.  
 GC&SU is an Equal Opportunity/Affirmative Action Employer.

### Georgia Southern University, Statesboro GA Founding Dean, College of Information Technology

Reporting directly to the Provost and Vice President for Academic Affairs, the Dean serves as the chief academic and administrative officer of the new College consisting of faculty in computer science, information systems, and information technology. The Dean is regarded as an intellectual leader within the College and across the University and information technology communities.

The Dean sets the vision for the College within the University's strategic plan, establishes new opportunities for the College, and directs its growth and development through shared academic governance. The Dean participates in campus-wide planning and is responsible for the College's teaching quality, budget, development and allocation of resources, and the administration of academic and research programs and alumni relations.

The Dean communicates official business of the College with University authorities, faculty, students, staff, and external constituencies and provides leadership in fund-raising to augment state appropriations.

Screening begins October 18, 2002.

For more information, including job qualifications and application information, see [http://www2.gasou.edu/acadaff/searches/IT\\_college-ad.html](http://www2.gasou.edu/acadaff/searches/IT_college-ad.html) and <http://chronicle.com/jobs/profiles/911.htm>.

EEO/AA Institution.

Georgia is an Open Records State.

Individuals who need reasonable accommodations under the ADA in order to participate in the search process should contact the search chair.

### Gustavus Adolphus College Department of Mathematics and Computer Science

#### Tenure-Track Faculty Position

Gustavus Adolphus College invites applications for a tenure-track computer science position at the Assistant or Associate Professor level starting Sept. 1, 2003. We seek a person who will join our current staff of 13 mathematicians and computer scientists and who will share our goal of offering a leading national liberal arts computer science program.

Primary responsibilities include teaching computer science or supporting courses, maintenance of an active program of scholarly activity, and service to the College.

We seek candidates who have earned their Ph.D. in computer science or a related area (with strong qualifications in computer science), and are interested in working in a vibrant department with motivated undergraduates in a theoretically oriented program.

#### How to Apply:

To apply, please send a letter of application, vita, a statement of teaching philosophy and research interests, and three names of professional references to:

Dr. Jeff Rosoff, Chair  
 Department of Mathematics and Computer Science  
 Gustavus Adolphus College  
 St. Peter, MN 56082

Initial letters of interest may also be sent via email to [tojr@gustavus.edu](mailto:tojr@gustavus.edu).

Review of applications will begin on Dec. 2, 2002 and continue until the position is filled. Additional information may be found at <http://www.gustavus.edu/oncampus/academics/mcs/>

Gustavus Adolphus College is a coeducational, private Lutheran (ELCA), residential national liberal arts college of 2500 students. EOE

### Indiana University Computer Science Department Faculty Positions

The Indiana University Computer Science Department anticipates filling several tenure-track faculty positions beginning 2003-2004. Areas of interest are databases, embedded systems, networking and programming languages. In addition our new, privately endowed, pervasive technology labs will be hiring several senior positions in the areas of

graphics, human computer interaction, embedded systems, data mining and security.

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

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

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

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

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

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

### Ithaca College Department of Mathematics and Computer Science Assistant Professor

Ithaca College invites applications for a tenure-eligible computer science/information systems position starting in the 2003-04 academic year. The successful candidate is expected to teach computer science and information system courses at a variety of undergraduate levels.

Required qualifications: Appointees at the assistant professor level must have a PhD or ABD in Computer Science, Information Systems or a closely related field. Salary is competitive and is commensurate with qualifications and experience.

Interested individuals should apply on line at: <http://www.icjobs.org> and attach a resume and a cover letter addressed to:

Dr. Patricia Woodworth, Chair  
 Department of Mathematics and Computer Science

Applications will be reviewed beginning early December 2002, and will continue to be accepted until the position is filled.

### Michigan State University Department of Computer Science and Engineering

#### Tenure-Stream Faculty Positions

The Department of Computer Science and Engineering (CSE) at Michigan State University invites applications for several tenure-stream faculty positions. Appointments start in August 2003. Candidates from all areas of specialization in computer science will be considered. The candidate should hold a Ph.D. degree in computer science or a related field. The appointment will be made at the rank appropriate to the credentials of the candidate.

As a unit within the College of Engineering, the CSE Department presently has 25 faculty members and administers BS, MS, and PhD programs. The Department conducts leading-edge research in many areas, with particular strength in software engineering and formal methods; computer systems and networking; and image processing and machine intelligence. Michigan State University enjoys a large, park-like campus with many outlying research facilities and natural areas. The greater Lansing area has approximately 300,000 residents, and the University is proactive in exploring opportunities for the employment of spouses, both inside and outside the University.

Candidates should submit a cover letter, curriculum vitae, the names of three references, and a statement of research and teaching interests to the address below (email preferred). Applications will be reviewed on a continuing basis until all positions are filled. For full consideration, applications should be received before January 15, 2003.

# Indiana University School of Informatics

## Tenure-Track Positions Available School of Informatics Indiana University, Bloomington IUPUI, Indianapolis

Indiana University's School of Informatics on the Bloomington and Indianapolis campuses invites applications for tenure-track positions, primarily at the assistant professor rank. Senior rank will be considered for applicants with recognized national and international stature. Rank will be determined on the basis of qualifications and experience.

This is the first new school at Indiana University in 28 years, and one of the very first schools in the country dedicated to informatics. At both Indiana University Bloomington (IUB) and Indiana University Purdue University Indianapolis (IUPUI), the school offers a B.S. in Informatics and M.S. degrees in both design informatics (human-computer interaction) and bio- and chemical informatics. On the IUPUI campus, the school offers both a B.S. and an M.S. in new media and an M.S. in health informatics. In addition, the school is initiating a new graduate program in laboratory informatics. More information about the school may be found at [www.informatics.indiana.edu](http://www.informatics.indiana.edu) and at [www.informatics.iupui.edu](http://www.informatics.iupui.edu).

This is an excellent opportunity for faculty interested in building new academic programs in a dynamic environment. Applicants for either campus should be able to teach a range of undergraduate and graduate courses in informatics, which could include logical and mathematical foundations of information, organizational informatics, social informatics, distributed information and knowledge systems, bioinformatics, chemical informatics, and design informatics (human-computer interaction)-and on the IUPUI campus, also health informatics and new media. In particular, IUB is seeking faculty to begin a new specialty in information technology applied to music, while IUPUI is seeking faculty in laboratory informatics (including laboratory robotics, DAQ, CDS, LIMS, and scientific data management). Joint appointments in the applicants' discipline with appropriate other schools on campus are possible.

Applicants at the assistant professor level should have a promising agenda of scholarly research or creative activity and demonstrated commitment to teaching. Senior applicants should have evidence of outstanding research and excellent teaching. Preference will be given to those with a completed Ph.D. or the equivalent, or appropriate terminal degree.

Applicants should send a letter of application outlining their qualifications, a curriculum vitae, and a list of three references (for senior applicants, a list of six references). A sample of written work and evidence of quality teaching are welcome additions.

Mail all applications materials for Bloomington (IUB) positions to:

Dr. William Aspray  
 School of Informatics  
 901 E. Tenth St.  
 Indiana University  
 Bloomington, IN 47408

Mail all application materials for Indianapolis (IUPUI) positions to:

Dr. Douglas Perry  
 School of Informatics  
 Walker Plaza, Rm 370  
 719 Indiana Ave.  
 Indiana University Purdue University  
 Indianapolis  
 Indianapolis, IN 46202

The search committee will start reviewing applications on **October 15, 2002**, and will continue until the positions are filled. The School of Informatics is eager to consider applications from women and people of color. Indiana University is an Affirmative Action/Equal Opportunity Employer.

## Professional Opportunities

Faculty Search Committee  
Department of Computer Science and  
Engineering  
3115 Engineering Building  
Michigan State University  
East Lansing, Michigan 48824-1226  
search@cse.msu.edu  
Michigan State University is an Equal  
Opportunity/Affirmative Action Institution  
and handicappers have the right to request and  
receive reasonable accommodations.  
<http://www.cse.msu.edu>

### New Mexico State University Department of Computer Science Opening for a tenure-track assistant professor

The department has an opening for an  
assistant professor in any area of specialty.  
Strong commitment to both research and  
teaching is required. Applications from women  
and members of minority groups are encour-  
aged. A Ph.D. in Computer Science or a  
closely related discipline and evidence of  
strength in teaching and research are required.  
The department has twelve tenure-track and  
two non tenure-track faculty positions and  
offers B.S., M.S. and Ph.D. degrees. Facilities  
in the department include a network of about  
100 workstations, a 14 processor Sun  
Enterprise, a 64-cpu Beowulf machine, and  
several other multi-processor machines, as well  
as VBNS/Internet-2.

The Department recently received a \$1.5M  
grant from the National Science Foundation to  
augment its research and teaching infrastruc-  
ture. Computer Science has growing enroll-  
ment, with over 300 undergraduates and 80  
graduate students. Salaries are competitive.

NMSU is unique in having both Carnegie  
Research Extensive, and Minority Institution  
status, as well as EPSCoR status at the state  
level. NMSU is also a recipient of a 5-year  
\$3.7M grant from NSF-ADVANCE program  
to promote recruitment, retention, and  
advancement of women scientists and  
engineers. The Department has collaborations  
with the Computing Research Laboratory, the  
Physical Science Laboratory, Southwest  
BioTechnology and Informatics Center, and  
many other departments, including Biology,  
Mathematics, Psychology, Electrical and  
Computer Engineering, and Business  
Computer Systems. There are close ties to both  
Sandia and Los Alamos National Laboratories,  
and the White Sands Missile Range, which are  
all within New Mexico.

Las Cruces is in southern New Mexico, the  
"Land of Enchantment," just 50 miles from El  
Paso airport. For more information visit  
<http://www.cs.nmsu.edu>. Applicants should  
arrange for a vita, a short research description  
and at least three reference letters to be sent by  
postal mail directly to:

Desh Ranjan, Faculty Search Committee  
Chair  
Department Of Computer Science  
Box 30001 MSC CS  
New Mexico State University  
Las Cruces, NM 88003-8001

Screening will begin November 16th,  
2002. Enquiries by e-mail to Desh Ranjan  
(dranjan@cs.nmsu.edu) are welcome.  
Applications will be accepted until the  
position is filled.

NMSU is an EEO/AA employer.

### Ohio State University Dept. of Computer & Information Science Assistant and Full Professors

The Department of Computer and  
Information Science invites applications for  
several tenure-track/tenured positions. The  
department's focus areas are in artificial intelli-  
gence, graphics, networking, software engi-  
neering, and systems. Outstanding applicants  
in any of these areas will be considered, with  
priority given to the artificial intelligence  
(speech, vision, and machine learning in par-  
ticular) and networking (security in particular)  
areas.

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

The department maintains and encourages  
active collaborations With Ohio  
Supercomputer Center, Advanced Computing  
Center for the Arts and Design, Center for  
Cognitive Science, Department of Biomedical  
Informatics, and many other units in the uni-  
versity.

To apply, send a curriculum vita (including  
names and addresses of at least three refer-  
ences) and a statement of research and  
teaching interests, by e-mail to:

fsearch@cis.ohio-state.edu  
or by mail to:  
Chair, Faculty Search Committee  
Department of Computer and Information  
Science  
The Ohio State University  
2015 Neil Avenue, DL395  
Columbus, OH 43210-1277  
Review of applications will begin immedi-  
ately and will continue until the positions are  
filled. For additional information please see  
<http://www.cis.ohio-state.edu>.

The Ohio State University is an  
Equal Opportunity/Affirmative Action  
Employer. Qualified women, minorities,  
or individuals with disabilities are encouraged  
to apply.

### Princeton University Department of Computer Science Assistant Professor, tenure-track positions

The Department of Computer Science at  
Princeton University invites application for  
Assistant Professor, tenure track positions. We  
are entertaining applications in all areas of  
Computer Science. Candidates for more senior  
ranks with exceptional records of research will  
also be considered. Applicants must demon-  
strate superior research 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. Applicants should  
include a resume and the names of at least  
three people who can comment on the appli-  
cant's professional qualifications. Applications  
should be sent to:

Chair, Search Committee  
Dept. of Computer Science  
Princeton University  
35 Olden Street  
Princeton, NJ 08544-2087  
E-mail search@cs.princeton.edu

The committee will begin to consider  
application in January 2003.

Princeton University is Equal  
Opportunity/Affirmative Action employer.

### Purdue University Department of Computer Sciences Tenure-Track Positions

The Department of Computer Sciences at  
Purdue University invites applications for  
tenure-track positions beginning August 2003.  
Positions are available at the assistant professor  
level; senior positions will be considered for  
highly qualified applicants. Applications from  
outstanding candidates in all areas of computer  
science will be considered. Areas of particular  
interest include security, mobile and wireless  
systems, scientific computing and computa-  
tional biology, and software engineering.

The Department of Computer Sciences  
offers a stimulating and nurturing academic  
environment. Thirty-six faculty members have  
research programs in analysis of algorithms,  
bioinformatics, compilers, databases, distrib-  
uted and parallel computing, geometric mod-  
eling and scientific visualization, graphics,  
information security, networking and operating  
systems, programming languages, scientific  
computing, and software engineering. The  
department implements a strategic plan for  
future growth, which is strongly supported by  
the higher administration. This plan includes a  
new building expected to be operational in  
2005 to accommodate the significant growth  
in faculty size. Further information about  
the department is available at:  
<http://www.cs.purdue.edu>.

Applicants should hold a Ph.D. in  
Computer Science, or a closely related disci-  
pline, and should be committed to excellence  
in teaching and have demonstrated strong  
potential for excellence in research. Salary and  
benefits are highly competitive. Special depart-  
mental and university initiatives are available  
for junior faculty. Applicants can apply elec-  
tronically by sending a curriculum vitae, a  
statement of career objectives, and names and  
contact information of at least three references  
as a postscript or .pdf file to fac-search@cs.  
purdue.edu. Alternatively, applicants can send  
hard copies of their application to:

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

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

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

### Queen's University School of Computing Tenure-Track Faculty Positions

The School of Computing invites applica-  
tions for up to four faculty positions, including  
a Canada Research Chair position. Two of the  
positions require Professional Engineering reg-  
istration or eligibility and commitment to reg-  
ister as a Professional Engineer.

Queen's University is one of the top uni-  
versities in Canada and is well known for the  
high quality of its students and faculty. Queen's  
University is situated in Kingston, a beautiful  
and historic city located on Lake Ontario and  
within easy traveling distance of Toronto,  
Montreal, Ottawa and Syracuse. Kingston  
offers the amenities of a large city along with  
the comfort of a small city.

The School of Computing, which has 21  
faculty, 12 staff and approximately 80 graduate  
students, is committed to excellence in both  
research and teaching. The School has strong  
research programs in areas such as software  
engineering and design, theoretical computer  
science, computer graphics, biomedical com-  
puting, intelligent systems, human-computer  
interaction and computer systems. The School  
has one of the best teaching environments in  
Canada, and offers major and medial under-  
graduate programs in computing, as well as spe-  
cialized programs in cognitive science,  
biomedical computing and software design. It  
offers graduate degrees at the masters and  
doctoral levels.

Further information can be found at  
the Department's web site:  
<http://www.cs.queensu.ca>.

Applicants should hold a Ph.D. degree in  
computer science, software engineering, or a  
related field. The School will consider appli-  
cants in all areas of computing; applicants are  
particularly sought in the areas of biomedical  
computing, software engineering and human-  
computer interaction. The successful candidate  
will be expected to have demonstrated excel-  
lence in research and the promise of excel-  
lence in teaching. Salary will be competitive  
and commensurate with qualifications  
and experience.

Applicants should send a full curriculum  
vitae, including a list of publications, teaching  
and research summaries, the names of three  
references, and copies of up to three recent  
papers to:

Dr. James R. Cordy, Director  
School of Computing  
Queen's University  
Kingston, Ontario  
Canada K7L 3N6.

E-mail applications to search@cs.  
queensu.ca are encouraged. E-mail attachments  
in any common document format are  
acceptable.

Openings are for July 2002 and beyond.  
Screening of applicants will begin immediately  
and continue until all positions are filled.  
Queen's University is committed to employ-  
ment equity and welcomes applications from  
all qualified men and women, including visible  
minorities, aboriginal people, persons with dis-  
abilities, gay men and lesbians.

All qualified candidates are encouraged to  
apply; however Canadians and permanent resi-  
dents will be given priority.

### Rice University Department of Computer Science and Computer Engineering Faculty and Research Staff Positions

The Department of Computer Science, the  
Department of Electrical and Computer  
Engineering, the Computer System Laboratory,  
the Center for High Performance Software,  
and the Center for Multimedia Com-  
munication at Rice University have several  
openings for faculty and research staff posi-  
tions, starting in the 2003-2004 academic year.  
We are soliciting applications for tenure-track  
faculty, research faculty fellows, senior research  
faculty fellows, research scientists, and post-  
doctoral researchers. Exceptional candidates  
for higher ranks will be considered. Chairs  
are available for exceptional candidates at  
all ranks.

We seek outstanding candidates across the  
entire spectrum of computer science and com-  
puter engineering - to reinforce existing areas  
of strength at Rice or to expand our program  
with new directions. Applicants should hold a  
Ph.D. degree or the equivalent in computer  
science, computer engineering, or a related dis-  
cipline, or expect to complete such require-  
ments prior to assuming an appointment. A  
commitment to excellence in both research  
and teaching is required for a tenure-track  
appointment. Preference will be given to  
early applications.

The Departments of Computer Science  
and of Electrical and Computer Engineering  
have assembled a collection of superb research  
facilities. These include parallel and multi-  
processor systems laboratories, large networks

of workstations, and a high-speed network test  
bed. The Departments have access to external  
facilities and communities through NSF,  
NASA, and DOE networks.

The Computer System Laboratory spans  
both departments; it includes faculty with a  
broad range of interests in systems research.  
The Center for High Performance Software  
supports several major research projects; it pro-  
vides access to massively parallel computers  
located at collaborating institutions.

The Center for Multimedia  
Communication develops embedded systems,  
distributed systems, and network architectures  
for tetherless and multimedia communications  
applications. These organizations are co-  
located in one building, Duncan Hall.

Rice is a highly endowed private university  
with a strong reputation for academic excel-  
lence, particularly in undergraduate education.  
It attracts outstanding students nationally and  
internationally. It provides a stimulating envi-  
ronment for research, teaching, and joint proj-  
ects with industry. Teaching loads are low to  
accommodate faculty.

To apply, send a resume, a statement of  
research and teaching interests, and the names  
and addresses of at least three references to:

Computer Science and Engineering Search  
Committee  
Rice University, MS 132  
P.O. Box 1892  
Houston, Texas 77251-1892

The deadline for applications is January 15,  
2003. Please specify the position for which you  
are applying. For more information, see  
<http://www.cs.rice.edu> or call Iva Jean  
Jorgensen (713)-348-3818, [ivaje@rice.edu](mailto:ivaje@rice.edu)

Rice University is an Equal  
Opportunity/Affirmative Action Employer.

### The University of Alabama at Birmingham (UAB) Natural Sciences and Mathematics Dean, Natural Sciences and Mathematics (NS&M)

The University of Alabama at  
Birmingham (UAB) seeks applications and  
nominations for the Dean of the School of  
Natural Sciences and Mathematics. The  
school consists of doctoral degree granting  
departments of biology, chemistry, computer  
and information sciences, mathematics, and  
physics. The school is a dynamic academic  
organization and provides an environment that  
encourages professional development among its  
faculty, student attainment of academic and  
professional success, and strong partnerships  
with private and public sector organizations.  
It employs 85 faculty and currently enrolls  
approximately 1,400 undergraduate student  
majors and 200 students in graduate study.

The school has undergone explosive  
growth in research capabilities in the past  
decade. During this time, a number of  
interdisciplinary research centers have been  
established and extramural research funding  
has tripled. Exceptional opportunities  
exist for building university-wide collabora-  
tions in research and education. Additional  
information on the School of Natural  
Sciences & Mathematics can be found at the  
UAB Web page ([www.uab.edu](http://www.uab.edu)) under  
"Schools."

The University: UAB is a comprehensive,  
urban university and Medical Center enrolling  
16,500 students in 12 schools on its 80-block  
campus. UAB has grown rapidly in its 30-year  
history. It is a Carnegie Doctoral Research  
Extensive institution with active grants and  
contracts exceeding \$700 million. The univer-  
sity is the largest employer in the state with  
more than 15,000 employees and a \$1.2 billion  
budget. Through the UAB Research Founda-  
tion, a technology business incubator, and  
the UAB Research Park, the university has  
developed comprehensive and successful  
programs to support technology transfer and  
economic development.

Responsibilities: The Dean is the chief  
academic, administrative, and financial officer  
for the school, and reports directly to the  
Provost. The Dean provides leadership for all  
of the instructional, research, development,  
and service programs of the school; interacts  
with students and prospective students; pro-  
vides direction to and recommendations  
from appropriate school committees charged  
with curriculum and personnel responsibilities;  
and develops and administers the school  
budget.

Qualifications: Qualifications include  
proven administrative and leadership skills in  
higher education; the ability to articulate a  
vision for the future of a School of Natural  
Sciences and Mathematics in a top-ranked  
research institution; and a demonstrated  
capacity to work effectively with faculty, staff,  
students and community leaders. The ability to  
develop and maintain effective fund-raising  
strategies for the school and a proven track

(cont'd)

## Professional Opportunities

record of extramural funding development are essential. Qualifications must also include a terminal degree and distinguished academic credentials meriting appointment to the rank of Professor in the school.

**Application Procedure:** For full consideration, nominations and applications should be received before December 1, 2002; however, nominations and applications will be accepted until the position is filled. Applications should include a letter of interest, current curriculum vitae and a list of references. The University of Alabama at Birmingham is an Equal Opportunity/Affirmative Action Employer. Women and minority candidates are encouraged to apply. Address correspondence to:

Dr. Linda C. Lucas  
Chair, Search Committee for Dean of  
Natural Sciences and Mathematics  
University of Alabama at Birmingham  
HOEN 100  
1530 3rd Avenue South  
Birmingham, AL 35294 – 4440  
llucas@eng.uab.edu

### University of Arkansas - Fayetteville

Computer Science & Computer Engineering

#### Department Head Search

The University of Arkansas seeks candidates for the position of Department Head in Computer Science & Computer Engineering, with selection targeted for summer 2003. Nominations and applications will be accepted until the position is filled, with review to begin Fall 2002. Candidates must possess a distinguished record of academic scholarship, a significant record of excellence in instruction and graduate research, strong administrative and interpersonal abilities, and an established record of university and professional service appropriate for appointment as a Full Professor.

The successful candidate will have sufficient experience and leadership qualities to direct a multi-faceted academic department, a participatory management style, and the ability to articulate and promote the department's vision. The salary will be highly competitive. The department offers degrees in both computer science and computer engineering at the bachelor's, master's, and doctoral levels, and has diverse research programs. Additional information regarding the department and the College of Engineering may be found at: [www.csce.uark.edu](http://www.csce.uark.edu).

Please send applications and nominations to:

Dr. John English, Search Committee Chair  
4207 Bell Engineering  
University of Arkansas  
Fayetteville AR 72701  
or electronically to [search@csce.uark.edu](mailto:search@csce.uark.edu).

An application package should contain a resume, names of 3 to 5 references with complete contact information, and a vision statement.

The University of Arkansas is an equal opportunity/affirmative action institution, committed to achieving diversity in its faculty, staff, and student body. Qualified minority and women candidates are especially invited to apply.

### University of California, Davis

Department of Computer Science

#### Faculty Positions

The Department of Computer Science, at the University of California, Davis, invites applications for several tenure-track faculty positions. The department is seeking candidates at all levels. At the senior level, we invite applications from candidates with truly distinguished records in research, teaching, and leadership; at the junior level, we invite applications from candidates with demonstrated research excellence and a commitment to excellence in teaching.

The department welcomes applications from candidates in areas that emphasize innovative applications in computer science. It has a particular interest in the areas of Networks, Information Systems and Computer Systems. We further encourage applicants whose research can both have impact in these core areas and leverage our extensive programs in other areas of computer science.

The Computer Science Department currently has 27 faculty members, covering all major areas of computer science. It is experiencing a period of strong growth in the size of its faculty and expects to continue this trend. The Davis campus is the third largest in the University of California system. UC Davis ranks among the nation's top 20 universities in research funding.

Davis is a pleasant, family-oriented community in a college town setting with excellent public schools and a mild climate. Davis is ideally located for many professional, cultural and recreational activities. It is just 15 miles

from California's capital city of Sacramento and is within easy driving distance of the Silicon Valley, Berkeley, San Francisco, the Sierra Nevada Mountains, and the Pacific Coast areas.

These positions require a Ph.D. or equivalent. The positions are open until filled, but for full consideration, applicants should apply by January 13, 2003.

UC Davis is responsive to the concerns of dual career couples and offers a Partner Opportunity Program. UC Davis is an affirmative action/equal opportunity employer.

Please consult our web page for additional information on the particular areas of interest and application instructions.  
(<http://www.cs.ucdavis.edu/department/employ>)

### University of California, Los Angeles

Department of Computer Science

#### Tenure-Track Positions

The Department of Computer Science in the Henry Samueli School of Engineering and Applied Science at the University of California, Los Angeles, invites applications for tenure-track positions in all areas of Computer Science and Computer Engineering. Applications are also strongly encouraged from distinguished candidates at senior levels. The UCLA Campus administration is committed to significant growth in the faculty of Computer Science Department, with a projection of 3-4 new faculty members per year for the next five years.

Quality is our key criterion for applicant selection. Applicants should have a strong commitment to both research and teaching and an outstanding record of research for their level. We seek applicants in any mainstream area of Computer Science and Computer Engineering, but we particularly welcome those with strength in systems, networking, compilers, theory, and in interdisciplinary areas such as bioinformatics and electronic commerce.

To apply, please visit <http://www.cs.ucla.edu/recruit>. Faculty applications received by January 15 will be given full consideration.

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

### University of California, Riverside

Marlan And Rosemary Bourns College Of Engineering

#### Faculty Positions in Computer Science & Engineering

The University of California, Riverside invites applications for tenure-track or tenured faculty positions in the Department of Computer Science and Engineering for the 2003-2004 academic year. Applicants must have a Ph.D. in Computer Science or in a closely related field. Systems specialties such as networking, security, databases, operating systems, computer graphics, software engineering, architecture, compilers, embedded systems, VLSI, as well as the area of computational biology are of particular interest, but applications are welcome in all areas of Computer Science. Senior candidates must have an exceptional research and teaching record. Junior candidates must show outstanding research and teaching potential. Salary will be competitive, and commensurate with appointment rank and qualifications.

UC Riverside is the fastest-growing member of the nine-campus University of California System, widely regarded as the most distinguished system of public higher education in the United States. The CSE department has now grown rapidly to 23 full-time faculties, and expects to grow to about 40 over the next six years. The Campus- and College-wide expansion programs include a new state-of-the-art building soon to house the CSE and EE departments. Annual research expenditures in the College are close to \$346K/year per faculty. The CSE department offers the B.S., M.S., and Ph.D. degrees. More information is available at <http://www.cs.ucr.edu>.

The city of Riverside, located about 60 miles away from Los Angeles, offers easy access to mountains, Pacific Ocean beaches, cultural activities, shopping, and other attractions. Applications and inquiries should be sent to:

Chair, Faculty Search Committee  
Department of Computer Science and Engineering  
University of California  
Riverside, CA 92521-0304  
(909) 787-5639  
e-mail to: [hire@cs.ucr.edu](mailto:hire@cs.ucr.edu).

Applications must include curriculum vitae, list of publications, a statement of research and teaching objectives, and names and addresses of four references (junior candidates may have reference letters mailed directly to the department).

Formal review of applications begins January 18, 2003. Early applications are

encouraged, however, late applications will be considered until the positions are filled.

The University of California, Riverside is an Equal Opportunity, Affirmative-Action Employer.

### University of California, Santa Barbara

Biomaterials, Biomolecular Materials, Bioengineering

The University of California, Santa Barbara seeks to hire highly creative, innovative and productive individuals for multiple new faculty openings at the junior and senior levels in fields related to Biomaterials, Biomolecular Materials and Bioengineering. UCSB is broadening the interfaces among biology, physical science and engineering and is developing a vigorous interdisciplinary and intercollegiate Program in BioMolecular Science and Engineering (BMSE).

This Program builds on and is an integral part of UCSB's unique environment for multidisciplinary collaboration, and its recognized strengths in Materials, Chemistry and Biochemistry, Chemical, Mechanical, Electrical and Computer Engineering, Computer Science, Physics, Molecular and Cellular Biology and Device and Nanosystems Science and Technology. UCSB's core strengths are supported and enhanced by a collection of interdisciplinary research and education centers, including the California NanoSystems Institute, the NSF-sponsored Materials Research Laboratory and Institute for Theoretical Physics, the Neuroscience Research Institute, the Marine Science Institute and the Marine Biotechnology Center. The facilities available to carry out research in these fields at UCSB are superb. The positions advertised here are in addition to positions in related areas being advertised by the UCSB Department of Chemistry and Biochemistry, though there is coordination between the searches. Suitably qualified candidates are welcome to apply to both calls.

Research and new instructional initiatives in biomaterials, biomolecular materials and bioengineering are being formulated to build on and enhance current associated strengths. The new faculty appointments may be in BMSE, or in the departments mentioned above, or in some combination of these administrative units, in order to optimize the effectiveness of each hire.

Applications from individuals from all disciplinary backgrounds with interests in all areas of Biomaterials, Biomolecular Materials and Bioengineering are encouraged. Specific areas of interest include, but are not limited to: biomolecular materials, motors, machines, biomolecular electronics and opto-electronics, bio-sensors and other bio-devices, biosynthesis and genetic engineering of materials, bio-nanotechnology, metabolic engineering and bioinformatics. Individuals appointed will come in with the opportunity for and expectation of active participation in shaping future hiring and other developments, commensurate with the individual's background and experience.

Application for the positions is open until they are filled. Consideration of candidates will begin immediately; those received by December 15, 2002 will be considered thoroughly for the first round of interviews.

Please address all applications, which should contain a letter briefly outlining career plans, a statement of research and teaching interests, curriculum vitae and names and contact information on 3 – 5 references, or have letters of reference sent directly, to:

Bioengineering Search Committee  
Matthew Tirrell and Daniel Morse  
Co-Chairs Attention: Vivien LaFrance  
Dean's Office  
College of Engineering  
University of California  
Santa Barbara, CA 93106-5130

Applications may be sent via electronic mail in PDF format to:  
[bioengr@engineering.ucsb.edu](mailto:bioengr@engineering.ucsb.edu).

An EO/AA employer.

### University of California, Santa Cruz

Computer Engineering

#### Assistant Professor

The Computer Engineering Department of the Baskin School of Engineering at the University of California, Santa Cruz (UCSC) invites applications for a tenure-track Assistant Professor position starting Fall 2003. We seek outstanding applicants in all areas of Computer Engineering, and particularly welcome those with research interests in embedded systems, computer networks, computer system design, autonomous systems, and robotics.

The Department has 18 faculty with research programs in wireless networks, inter-networking, high-speed networking, computer vision and multimedia, VLSI and VLSI CAD,

embedded systems, software engineering, storage systems, parallel and distributed systems, and bioinformatics. UCSC is the UC campus nearest to Silicon Valley and has close research ties with the computer industry.

Applicants should submit a curriculum vitae, statements of research plans and teaching interests, and copies or URLs of selected reprints to:

Computer Engineering Search  
Baskin School of Engineering  
University of California  
Santa Cruz, CA 95064

Applicants should ensure that three confidential letters of recommendation are sent under separate cover. Contact information for the references should be included with the applicant's submitted material. Letter writers must read UCSC's confidentiality statement at <http://www2.ucsc.edu/ahr/policies/confstm.htm>.

Screening will begin on January 3, 2003, and continue until the position is filled. Refer to <http://www.soe.ucsc.edu/events/jobs/> for information on electronic submission of applications.

For further details about the School of Engineering at UCSC, see <http://www.soe.ucsc.edu/>.

UCSC is an EEO/AA/IRCA Employer.

### University of California, Santa Cruz (UCSC)

Computer Science Department

Assistant, Associate or

Full Professor

The Computer Science Department of the University of California, Santa Cruz (UCSC) invites applications for tenured and tenure track faculty positions for the 2003-2004 academic year. We are recruiting for positions at the Assistant, Associate and Full Professor levels. We seek outstanding applicants in mainstream Computer Science, and we particularly welcome those with research interests in Database systems, Software Engineering, and Computer Systems or Security. The campus is especially interested in candidates who can contribute to the diversity and excellence of the academic community through their research, teaching, and service.

Minimum Qualifications: For the Assistant Professor positions: A Ph.D. or equivalent in computer science or a related field (Ph.D. by July 1, 2003 preferred, must be conferred within one year of appointment); demonstrated potential for excellence in research; and a strong commitment to graduate and undergraduate teaching. For the Associate and (full) Professor positions: a Ph.D. or equivalent in computer science or a related field; and an outstanding record as researcher and educator, appropriate to the level of appointment. All applicants are expected to develop externally funded research programs.

Positions Available: Fall 2003, subject to final budgetary approval.

To Apply: Applicants should submit a curriculum vitae; a statement of research interests and plans; a statement of teaching interests; and ensure that at least three letters of recommendation are sent directly, by the deadline, to the address below. Names, affiliations, and contact information for the references should be included with the applicant's submitted material. Copies or URLs of selected reprints are also helpful. Send all materials to:

Chair, Computer Science Search  
Committee  
Baskin School of Engineering  
1156 High Street  
University of California  
Santa Cruz, CA 95064

To submit application materials electronically, please see the following web site:

<http://www.soe.ucsc.edu/jobs/>

Applicants must clearly state whether they are applying for an (untenured) Assistant Professor, a (tenured) Associate Professor, or a (full) Professor position. All letters will be treated as confidential; please direct your references to UCSC's confidentiality statement at <http://www2.ucsc.edu/ahr/policies/confstm.htm>.

For additional information on the positions email [recruit@soe.ucsc.edu](mailto:recruit@soe.ucsc.edu). For further details about the Baskin School of Engineering at UCSC, see <http://www.soe.ucsc.edu/>.

Screening will begin with applications received by January 3, 2003, and continue until the positions are filled during academic year 2002-03.

UCSC is an affirmative action/equal employment opportunity employer. Women and minorities are encouraged to apply.



## Professional Opportunities

### The University of Cincinnati Department of Electrical & Computer Engineering and Computer Science Assistant/Associate Professor Positions

The Department of Electrical & Computer Engineering and Computer Science invites applications and nominations for Assistant/Associate Professor positions in Computer Engineering and Computer Science, although appointment at higher rank will be considered for candidates with exceptional qualifications. Areas of interest include, but are not limited to, 1) VLSI and design automation, 2) programming languages and algorithms, and 3) networks and distributed systems. Candidates must have earned Ph.D. degrees in Computer Science, Computer Engineering, or a closely related field, and have the commitment to develop significant funded research programs and to provide effective instruction at the undergraduate and graduate levels.

The ECECS Department offers undergraduate programs and M.S. programs in Computer Science, Computer Engineering, and Electrical Engineering, and offers the Ph.D. in Computer Science & Engineering and in Electrical Engineering. The Department has 45 full-time faculty, 350 full-time graduate students and 550 undergraduate students, and awards approximately 35 M.S. and 15 Ph.D. degrees per year. Research and education programs are funded, with annual research funding over \$6M. The Department has well-equipped research and teaching laboratories, and occupies 45,000 square feet of space including research laboratory space in a new Engineering Research Center. For additional information please see the departmental web site at <http://www.ececs.uc.edu>.

The University is completing a major building campaign designed to make it one of the finest urban settings in American higher education. The city of Cincinnati has been identified as one of the most livable cities in America, with excellent cultural and entertainment opportunities, a moderate cost of living, and a wealth of housing options. Curricula vitae and/or nominations should be sent to:

Secretary for the Computing Search  
Committee  
P.O. Box 210030  
University of Cincinnati  
Cincinnati, Ohio 45221-0030  
or electronically to: [Search@ececs.uc.edu](mailto:Search@ececs.uc.edu).

The University of Cincinnati is an Affirmative Action/Equal Opportunity employer and encourages applications from women and minorities.

### University of Delaware Computer and Information Sciences Faculty Positions

Applications are invited for multiple tenure track Assistant Professor positions to begin Fall 2003. Outstanding candidates for senior level positions are also encouraged to apply. Of primary interest are candidates whose research is in networks, systems, security, software engineering, graphics and visualization, speech processing, data mining, or databases. Applicants should hold a Ph.D. or its equivalent, and should be committed to excellence in research and teaching. The normal teaching load is three courses per year.

The Department has 17 tenure-track and 2 research faculty members, with a substantial portion of our 100 graduate students pursuing the Ph.D. We have significant external funding, including NSF Career and ITR Awards, a \$2.2M grant in Communications and Networks that is part of the Army Research Lab's Collaborative Technology Alliance, and an NSF CISE Research Infrastructure Grant for parallel and distributed computing. A major UDel biotechnology initiative (<http://www.dbi.udel.edu>) offers opportunities for collaborative research in bioinformatics. The University of Delaware is centrally located between Philadelphia and Baltimore, with major government and industrial labs nearby. Considerable information about the Department is available at <http://www.cis.udel.edu>. To apply, please mail a curriculum vitae to:

Professor Errol Lloyd, Chair of the Faculty  
Search Committee, Department of  
Computer and Information Sciences  
University of Delaware  
Newark, DE 19716

In addition, candidates should have three confidential letters of reference sent directly to either (but not both) the above address or [csfacsch@cis.udel.edu](mailto:csfacsch@cis.udel.edu). The CV and letters of reference shall be shared with departmental faculty. Applications will be accepted until the positions are filled; those received by February 1, 2003 are assured full consideration. Qualified minority group members and women are encouraged to apply.

The University of Delaware is an equal opportunity employer.

### The University of Iowa Computer Science Department Assistant Professor Positions, Fall 2003

The University of Iowa Computer Science Department invites applications for tenure-track positions at the assistant professor level. We will consider strong candidates in all research areas, but especially seek those with expertise in graphics, HCI, systems and networks, databases and information systems, verification, applied algorithms, and computational biology.

Candidates should be committed to developing a nationally recognized research program, supervising Ph.D. students, and obtaining appropriate funding. A Ph.D. in Computer Science (or a closely related field) is required.

Iowa City is a small city of approximately 75,000, with excellent public schools, affordable housing, outstanding health care facilities, and abundant cultural and recreational activities. The University is situated along the banks of the Iowa River and is adjacent to the shops and restaurant area of downtown Iowa City.

To apply, please send a curriculum vita, a statement of research and career objectives, and three letters of recommendation to:

Faculty Hiring Committee  
Computer Science Department  
University of Iowa  
14 MacLean Hall  
Iowa City, Iowa 52242-1419

Applications or queries may be sent to [cs\\_hiring@cs.uiowa.edu](mailto:cs_hiring@cs.uiowa.edu). More information can be found at [www.cs.uiowa.edu/hiring](http://www.cs.uiowa.edu/hiring).

Evaluation of applications will begin immediately and continue until the position is filled. Applications received on or before January 15, 2003, will be assured of consideration.

Women and minority candidates are especially urged to apply for this position. The University of Iowa is an Affirmative Action/Equal Opportunity Employer

### UMBC University of Maryland Baltimore County

#### An Honors University in Maryland Information Systems Department

The Information Systems Department invites applications for tenure-track faculty positions at the Assistant or Associate Professor level.

The Department is multi-disciplinary, placing a strong emphasis on the application of information systems. Consequently, we seek people who have an application-oriented approach to research and teaching. Candidates for assistant professor must have an earned PhD in a relevant area and must show strong potential for excellence in research and teaching. Traditional academic candidates for associate professor must have an established record of funded research and excellence in teaching. Non-traditional candidates with significant industrial or governmental background are encouraged to apply. Such candidates should either have experience in research and teaching or demonstrate potential to perform in these activities in an academic environment.

The Department offers a wide variety of courses at the Bachelors, Masters, and Doctoral levels, has one of the highest IS enrollments in the USA, and offers the only PhD program in Information Systems in Maryland. Further details on programs and research may be found at <http://www.ifsm.umbc.edu/>. Consistent with the UMBC vision, the Department has excellent technical support, research, and teaching facilities.

The Department is moving into a new information technology building in Spring 2003, which includes additional laboratory space, state of the art technology, and a decision support room. The Technology Center, Research Park, and Center for Entrepreneurship are major indicators for continued research and outreach at UMBC.

Interested applicants should send a cover letter, three letters of recommendation, a one-page statement of teaching interests, a one-page statement of research interests, and a curriculum vitae to:

Dr. Andrew Sears  
Chair of Faculty Search Committee  
Information Systems Department  
UMBC  
1000 Hilltop Circle  
Baltimore, MD 21250-5398.

For inquiries, please call Robin Schmidbauer at (410) 455-3206 or e-mail: [schmidba@umbc.edu](mailto:schmidba@umbc.edu). Electronic submission of cover letter and curriculum vitae as PDF documents (sent to the preceding e-mail address) are preferred.

Review of applications will begin immediately and will continue until the positions are

filled. All positions are subject to the availability of funds.

Women and minority applicants are particularly encouraged to apply.

UMBC is an Affirmative Action/Equal Opportunity Employer and welcomes applications from minorities, women and individuals with disabilities.

### University of Maryland, Baltimore County

#### Bioinformatics Research Center & Computer Science and Electrical Engineering

##### Assistant Professor

The Bioinformatics Research Center (BRC) of the University of Maryland, Baltimore County (UMBC) invites applications for a tenure-track position of Assistant Professor with primary appointment in the Department of Computer Science and Electrical Engineering (CSEE). Candidates should have a Ph.D. in Computer Science with an established research background in Bioinformatics. Preferred areas of concentration are algorithmic developments for molecular evolution and functional genomics.

The BRC is part of an emerging Bioinformatics consortium in the Baltimore area that includes departments at UMBC, the University of Maryland Medical School and the University of Maryland Biotechnology Institute. UMBC has committed a multi-year plan to establish the BRC as a center of excellence for research and teaching that involves additional faculty and staff lines and other significant resources. The BRC's prime location fosters collaborations with researchers at NIH, Celera, TIGR, and other organizations in Maryland's sizable biotechnology industry.

The CSEE Department offers BS, MS, and PhD degrees, has 44 full-time faculty, over 1350 undergraduate and 300 graduate students, and will move into the new Information Technology and Engineering Building in 2003.

UMBC is a medium-sized university with over 11,000 students ranked in top tier of nation's research universities (Doctoral/Research Universities-Extensive). UMBC's mission is to focus on science, technology, engineering and public policy and has strong research programs in biosciences and biotechnology. The suburban campus is in the Baltimore-Washington corridor, providing easy access to both metropolitan areas and numerous federal agencies, industrial research centers, and consulting firms.

To apply, send a cover letter, CV, and a statement of research interests and have at least three letters of recommendations sent to:

BRC Search Committee  
Mathematics and Statistics  
UMBC  
Baltimore, MD 21250

Review of applications will begin in December 2002 and continue until the position is filled. For more information see <http://brc.umbc.edu/>.

UMBC is an Affirmative Action/Equal Opportunity Employer.

### The University of Massachusetts, Amherst

#### Faculty and Research Scientist Positions

The University of Massachusetts, Amherst invites applications for tenure-track faculty positions at the assistant professor level.

Applicants must have a Ph.D. in Computer Science or related area and should show evidence of exceptional research promise. Candidates with an established record of strong research may also apply for positions other than at the assistant professor level. We particularly welcome candidates who would thrive in a highly collaborative environment in which projects often span several research groups.

The Department of Computer Science has 39 tenure and research track faculty and 180 Ph.D. students with broad interdisciplinary research interests. The department offers first-class research facilities and has just moved into a new state-of-the-art building. Please see <http://www.cs.umass.edu> for more information. Applications should reference search R17424.

We also invite applications for Research Faculty (R17423), Research Scientist (R17422), Postdoctoral Research Associate (R17422), and Research Fellow (R17422) positions in all areas of Computer Science. Applicants should have a Ph.D. in Computer Science or related area (or an M.S. plus equivalent experience), and should show evidence of exceptional research promise. These positions are grant-funded; appointments will be contingent upon continued funding.

To apply, send a letter with your vitae and at least three letters of recommendation to:

Search (fill in number from above)  
c/o Chair of Faculty Recruiting  
Department of Computer Science  
University of Massachusetts  
Amherst, MA 01003-9264

We will begin to review applications on November 01, 2002, and will continue until available positions are filled. Salary commensurate with education and experience; comprehensive benefits package.

Inquiries and requests for more information can be sent to: [facrec@cs.umass.edu](mailto:facrec@cs.umass.edu)

The University of Massachusetts is an Affirmative Action/Equal Opportunity employer. Women and members of minority groups are encouraged to apply.

### University Of Miami Department of Computer Science

#### Two new tenure-track faculty positions

The Department of Computer Science for the University of Miami seeks to hire two new tenure-track faculty (rank open). Candidates must hold a doctorate in computer science or a related field and demonstrate strong potential for excellence in research and teaching. Rank and salary are commensurate with qualifications.

The successful candidate will show the desire to shape the future of the department. The University of Miami is a Group I research university as well as a member of the next-generation Internet (Internet2) project. For more information on the department and the university, please visit our web site at [www.cs.miami.edu](http://www.cs.miami.edu).

Applicants should send a letter of application, curriculum vitae, research statement, teaching statement and the names of three references to:

Victor Milenkovic  
Department Chair  
Faculty Search Committee  
Department of Computer Science  
University of Miami  
P.O. Box 248154  
Coral Gables, FL 33124-4245  
or via email to [csearch@cs.miami.edu](mailto:csearch@cs.miami.edu)

In addition, please include in your letter of application a URL containing supporting material such as online publications. Electronic submissions are strongly encouraged.

Review of applications will begin immediately and continue until positions are filled. Women and minorities are encouraged to apply.

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

### University of Michigan, Ann Arbor

#### Department of Electrical Engineering and Computer Science Computer Science and Engineering Division

##### Faculty Positions

Applications and nominations are solicited for multiple junior and senior faculty positions in the Computer Science and Engineering (CSE) Division. Qualifications include an outstanding academic record, a doctorate or equivalent in computer engineering or computer science, and a strong commitment to teaching and research. Candidates from all areas of computer science and engineering are encouraged to apply, especially those in graphics and software systems.

The University of Michigan is a Non Discriminatory/Affirmative Action Employer. Please send resume, url and names of three or more references to:

Professor John E. Laird, Assoc. Chair  
CSE Division  
Department of Electrical Engineering and  
Computer Science  
University of Michigan  
1301 Beal Avenue, Room 3402  
Ann Arbor, MI 48109-2122  
URL: <http://www.eecs.umich.edu/cse>

You may submit applications and inquiries via email to [csesearch@eecs.umich.edu](mailto:csesearch@eecs.umich.edu)

### University of North Carolina at Charlotte

#### Department of Computer Science Lecturer and Senior Lecturer Positions in Computer Science

The Department of Computer Science ([www.cs.uncc.edu](http://www.cs.uncc.edu)) at the University of North Carolina at Charlotte is recruiting for three-fixed term (non-tenure track, core positions) Lecturers and two Senior Lecturers to teach introductory (freshman, sophomore, and service) courses in computer science, and serve as undergraduate academic advisors. Senior Lecturers are also expected to take a leadership role in the continued development, evaluation, and updating of our introductory courses for computer science majors and our service courses to other departments.

(cont'd)

## Professional Opportunities

Lecturer applicants must possess a master's degree in computer science or a related field and have previous experience teaching introductory computer science courses at the college level. Senior Lecturer applicants should possess a Ph.D. in computer science or a related field and have a successful history of both computer science instruction and curriculum development. Both Lecturers and Senior Lecturers will be appointed for two-year terms, renewable based on performance.

Charlotte, NC has a metro-area population of over one million people and is the second largest financial center in the U.S. UNC-Charlotte has a student enrollment of approximately 19,000 with plans to grow to 25,000 and is poised to move from Doctoral Research Intensive to Doctoral Research Extensive Carnegie Classification. The University has seven colleges (Information Technology, Engineering, Arts and Science, Health and Human Services, Architecture, Education, and Business Administration) offering a variety of Ph.D., Master, and baccalaureate programs.

The Department of Computer Science, located within the College of Information Technology, has approximately 600 undergraduate computer science majors and 150 graduate students in computer science and information technology. Construction has begun on a new building to house the entire College of Information Technology with anticipated completion date of Fall 2004.

Interested parties should send a copy of their resume, evidence of their teaching experience, and the names and contact information of at least three references via email to: [search@cs.uncc.edu](mailto:search@cs.uncc.edu) or by postal mail to:

Chair, Search Committee  
Computer Science Department  
University of North Carolina at Charlotte  
9201 University City Boulevard  
Charlotte, NC 28223-0001

Review of applications will begin immediately and continue until the positions are filled. Appointments may start with either the beginning of the Spring 2003 or the Fall 2003 semesters.

### University of North Carolina at Charlotte

#### Department of Computer Science Assistant Professor in Computer Science

The Department of Computer Science ([www.cs.uncc.edu](http://www.cs.uncc.edu)) at the University of North Carolina at Charlotte invites applicants for a tenure track position at the level of Assistant Professor. Applicants must have an earned doctorate in Computer Science, Computer Engineering, Information Technology, or a related field, and should have demonstrated potential to excel in teaching and research.

Charlotte, NC has a metro-area population of over one million people and is the second largest financial center in the U.S. UNC-Charlotte has a student enrollment of approximately 19,000 with plans to grow to 25,000 and is poised to move from Doctoral Research Intensive to Doctoral Research Extensive Carnegie Classification. The University has seven colleges (Information Technology, Engineering, Arts and Science, Health and Human Services, Architecture, Education, and Business Administration) offering a variety of Ph.D., Master, and baccalaureate programs.

The Department of Computer Science, located within the College of Information Technology, has approximately 600 undergraduate computer science majors and 150 graduate students in computer science and information technology. Construction has begun on a new building to house the entire College of Information Technology with anticipated completion date of Fall 2004.

Applicants should send a letter of application together with their curriculum vitae and the names and contact information of at least four references to [search@cs.uncc.edu](mailto:search@cs.uncc.edu) or by postal mail to:

Chair, Search Committee  
Computer Science Department  
University of North Carolina at Charlotte  
9201 University City Boulevard  
Charlotte, NC 28223-0001

Electronic submission of PDF files is preferred. Review of applications will begin immediately and continue until the position is filled.

### The University of Oklahoma

#### School of Computer Science

##### Faculty position

The School of Computer Science at the University of Oklahoma seeks to fill a faculty position. Candidates must have demonstrated expertise in formal methods related to software development, with a special interest in the use of such methods in practice and with significant, related research accomplishments. Research involving polymorphic, statically typed, declarative programming languages is especially welcome. Applicants must hold

a doctorate in computer science or a related discipline.

The School of Computer Science offers bachelors, masters and doctoral degrees. About 350 students are enrolled in the undergraduate computer science program, which is CSAB accredited. The School has about 100 graduate students. Faculty research interests include functional programming, database systems, software engineering, fault tolerance and testing, embedded systems, intelligent systems, telecommunication networks, parallel and distributed computing, large scale scientific computing, graph theory and combinatorial optimization, and theoretical computer science.

Norman is a community of about 90,000 people in the Oklahoma City metropolitan area, which, taken altogether, has about a million residents. Norman offers award-winning schools, an inexpensive cost of living, and the rich intellectual life of a university town.

Applications with a list of 5 references must be submitted to:

Rex Page, Chair  
Faculty Search Committee  
School of Computer Science  
The University of Oklahoma  
200 Felgar Street, Room 144  
Norman, OK 73019-6151  
Tel: (405) 325-5408  
Fax: (405) 325-4044  
E-mail: [page@ou.edu](mailto:page@ou.edu)

Screening will begin on November 1, 2002.

Applications will be accepted until the position is filled.

The University is an equal opportunity/affirmative action employer. Women and minorities are especially encouraged to apply.

### University of Oregon

#### Department of Computer and Information Science

##### Faculty Positions

The Department of Computer and Information Science invites application for one (possibly two) tenure track faculty positions open for fall 2003. The department's primary recruiting emphases are in the areas of programming languages and distributed informatics. Programming languages is broadly construed to include compiler construction, domain-specific languages, program analysis, etc. Distributed informatics may include distributed database systems, web engineering, distributed document architecture, and other aspects of future distributed information systems. Outstanding applicants in other areas may also be considered. Applicants must have a Ph.D. in computer science or a closely related field, a demonstrated record of excellence in research, and a strong commitment to teaching.

The CIS department has eighteen research faculty and two instructors and offers B.S., M.S., and Ph.D. degrees. We offer a stimulating and friendly environment for collaborative research both within the department and with other departments on campus. The CIS Department is associated with the Computational Intelligence Research Laboratory, the Cognitive and Decision Sciences Institute, the Computational Science Institute, and the Software Engineering Research Center. More information about the department, its programs and faculty can be found at <http://www.cs.uoregon.edu>, or mail your request to:

University of Oregon  
Dept. of Computer and Information Science  
Eugene, OR 97403-1202

The University of Oregon is an AAU research university located in Eugene and within one hour drive of both the Pacific Ocean and the snow-capped Cascade Mountains.

Applicants should send their curriculum vitae, names of at least four references, a statement of research and teaching interests, and selected publications to: Faculty Search Committee, Dept. of Computer and Information Science, University of Oregon, Eugene, OR 97403-1202; email: [faculty.search@cs.uoregon.edu](mailto:faculty.search@cs.uoregon.edu). Review of applications will begin in December 2002 and continue until the positions are filled.

The University of Oregon is an Equal Opportunity/Affirmative Action institution committed to cultural diversity and compliance with the Americans with Disabilities Act.

### University of Pennsylvania

#### Department of Computer and Information Science

##### Faculty Positions

The University of Pennsylvania invites applicants for tenure-track appointments in both experimental and theoretical computer science to start July 1, 2003. Senior level appointments will also be considered. Faculty

duties include undergraduate and graduate level teaching as well as research.

Successful applicants will find Penn to be a stimulating environment conducive to professional growth. The Department of Computer and Information Science is undergoing a major expansion, including new faculty positions and a new building, Levine Hall, with completion this academic year. Over the last year, we have successfully recruited faculty in artificial intelligence, computer architecture, databases, distributed systems, machine vision, programming languages, and security. We are now especially interested in candidates in computer architecture, computational biology, cryptography, embedded systems, and graphics and animation, but we will consider seriously applications by outstanding candidates in all areas at all levels, especially those who complement our current strengths in algorithms, artificial intelligence, databases, formal methods, machine vision, and networking and distributed systems.

The University of Pennsylvania is an Ivy League University located near the center of Philadelphia, the 5<sup>th</sup> largest city in the US. Within walking distance of each other are its Schools of Arts and Sciences, Engineering, Medicine, the Wharton School, the Annenberg School of Communication, Nursing, Law, and Fine Arts. The University campus and its surroundings in Philadelphia benefit from a rich diversity of scientific, educational, and cultural opportunities, major technology-driven industries such as pharmaceuticals and aerospace, as well as attractive urban and suburban residential neighborhoods. Princeton and New York City are within commuting distance.

To apply, please complete the form located on the Faculty Recruitment Web Site at: [http://www.cis.upenn.edu/positions/faculty\\_application.html](http://www.cis.upenn.edu/positions/faculty_application.html)

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

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

Applications should be received by January 15, 2003 to be assured full consideration. Applications will be accepted until positions are filled. Questions can be addressed to [faculty-search@central.cis.upenn.edu](mailto:faculty-search@central.cis.upenn.edu).

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

### University of Redlands

#### Department of Mathematics and Computer Science

##### Computer Science Position

The University of Redlands invites applications for two tenure-track positions in Computer Science, specialty and rank open, to begin in fall of 2003. Candidates should have a strong interest in teaching a wide variety of undergraduate computer science courses. Responsibilities include teaching six courses per year, primarily in computer science, directing student research projects, pursuing scholarly activity, and engaging in university service. Opportunities exist to teach courses in our Master of Science degree program in geographic information systems.

Requirements include the Ph.D. in computer science or a related field by September 1, 2003, and evidence of excellence in and a commitment to both undergraduate teaching and scholarship in computer science. We seek candidates with interest and demonstrated ability in working with a diverse student population. The University of Redlands, which enrolls 2000 undergraduates, is a selective, private, comprehensive liberal arts university located in Southern California.

To apply, submit a letter of application, a curriculum vitae, graduate transcripts (unofficial OK), a statement of teaching philosophy, and three letters of reference, at least two of which must address teaching, to:

Dr. Alexander E. Koonce, Chair  
Computer Science Search Committee  
Department of Mathematics and Computer Science  
University of Redlands  
1200 E. Colton Ave.  
Redlands, CA 92373-0999

Review of applications will begin on Friday, January 17, 2003, and will continue until the position is filled. The University of Redlands is an EEO employer. We especially encourage women and members of other underrepresented groups to apply.

### University of Richmond Mathematics & Computer Science Department

#### Assistant Professor of Computer Science

Applications are invited for a tenure track position at the Assistant Professor level. A Ph.D. in Computer Science is required by the Fall 2003 start date. Candidates should have a commitment to excellence in undergraduate teaching together with the ability to maintain an active research program, preferably involving undergraduate students. We will consider candidates in all areas, but are particularly interested in the area of computer architecture.

The application process and additional information may be found on the Web at: <http://www.mathcs.richmond.edu/csjobs/>  
Review of applications will begin on January 15, 2003.

Richmond is a private, highly selective, predominately undergraduate university with a rising national and international profile. Ranked as one of the nation's top universities by U.S. News & World Report and other college guides, the university is noted for its challenging academic programs, excellent facilities, commitment to undergraduate education, and strong resource base. Richmond has a full-time enrollment of approximately 3,400 in schools of arts and sciences, business, law, and leadership studies. Located two hours south of Washington, D.C., the Richmond metro area has a population of one million, and as state capital, is home to numerous financial, cultural and civic organizations.

The University's campus, consistently named one of the nation's most beautiful, is located six miles west of downtown and offers an extraordinary quality of life for faculty, staff and students.

Richmond is an Equal Opportunity Employer. Women and minorities are especially encouraged to apply.

### University of Sharjah

#### Department of Computer Science

The Department of Computer Science at the University of Sharjah invites applications for two or possibly three faculty positions, starting January or September 2003, at all ranks.

Candidates must have a Ph.D. in Computer Science or related field, a strong research record, and commitment to excellence in teaching. We are particularly interested in applicants whose areas of research are related to software engineering; graphics; algorithms and complexity; database management systems; and multimedia technology. However, strong candidates in all areas of computer science are encouraged to apply.

The Department of Computer science is seeking not only to be a leader in Computer Science education but also a center of excellence in research in the region. Therefore, successful applicants are expected to provide a stimulating learning environment for students, to develop and maintain a productive research program, and to contribute to the Department.

Qualified applicants should submit (or email) a covering letter along with the curriculum vitae including at least the names of three references (with their Email addresses) to the address below. Applications for Jan. 2003 and Sep. 2003 should be received by Nov. 15 and Jan. 15, 2003, respectively, to be assured full consideration. Applications will be accepted until positions are filled.

Human Resources Dept.  
University of Sharjah  
P. O. Box 27272  
Sharjah U.A.E.  
email: [personnel@sharjah.ac.ae](mailto:personnel@sharjah.ac.ae)

The University offers a two-year renewable contract with competitive tax-free salary that commensurate with qualifications and experience; free furnished accommodation; educational allowance for the teaching of children up to AED 20,000 for one child and up to AED 40,000 for all children from KG2 to undergraduate level in or outside the UAE; annual paid leave of sixty days, annual round-trip excursion air tickets to Sharjah from the place of citizenship for the employee, spouse and up to three dependent children under age of 18 residing with employee in Sharjah; group medical insurance ;Shipping allowance , one month salary as gratuity for each year of service completed at the University paid annually.

### University of South Florida

#### Assistant/Associate/Full Professor

##### Positions

##### Computer Science and Engineering

Applications are invited for several faculty positions at all levels in the Department of Computer Science and Engineering. Areas of interest are bioinformatics and image analysis, robotics, VLSI design and test, software testing, and networks. These areas are along

## Professional Opportunities

the lines of existing research interests in the department.

Applications will be accepted until the positions are filled. The positions begin in August 2003. Full and associate professor applicants must already have achieved prominence in their field with a strong track record of funding. Software testing faculty members are expected to play a lead role in the National Institute for Systems Test and Productivity (<http://nistp.csee.usf.edu/text/>).

The Department of Computer Science and Engineering offers BS degrees in Computer Science (ABET accredited), Computer Engineering (ABET accredited), and Information Systems. The graduate program offers MS (137 students) and PhD degrees (47 students).

The department has 18 faculty members and had \$5.3 million in research funding for 2001. A strong partnership exists with the USF College of Medicine and the H. Lee Moffitt Cancer Center and Research Institute. Department faculty are well funded from federal and state agencies including DARPA, NIH, NSF, ONR, and USGS. More information about the department can be found at <http://www.csee.usf.edu/>.

Applicants for the faculty positions should send curriculum vitae, three letters of recommendation, representative publications, and a brief statement outlining research and teaching goals to:

Dr. Ken Christensen  
Search Committee Chair  
Computer Science and Engineering  
4202 East Fowler Avenue  
ENB-118  
University of South Florida  
Tampa, FL 33620-5399

The University of South Florida is an Affirmative Action / Equal Opportunity employer. Women and minorities are strongly encouraged to apply.

### University of Southern California Computer Science Department

The Computer Science Department at the University of Southern California ([www.cs.usc.edu](http://www.cs.usc.edu)) invites applications for tenure track faculty at all levels and across all areas of computer science. We are particularly interested in outstanding candidates from one or more of the core sub-disciplines of computer science (such as artificial intelligence, systems, or theoretical computer science) who will contribute to the department's cross-cutting strategic thrusts in computation, immersion, interaction, and autonomy.

**Computation:** computational modeling (including simulation and optimization) as well as on new and emerging models of computation especially in neural and genomic computing.

**Immersion:** natural and effective interactions among people (both real and virtual), computation, and the world through improved embeddings of each within the others.

**Interaction:** a coordinated investigation of distributed information technology across three levels: the network, where components become connected; the grid, where connected components become pools of resources; and organization, where resource pools support collaborative activities.

**Autonomy:** intelligent agents embodied in both hardware (robots) and software. Progress on these strategic thrusts requires research on new theories, technologies, and systems spanning the traditional sub-disciplines of computer science, plus broader syntheses across these areas. USC has a strong tradition of interdisciplinary research. Furthermore, much of this research is fostered by strong links between CS and USC's Information Sciences Institute, Integrated Media Systems Center and Institute for Creative Technology.

Candidates should send (i) a cover letter stating their primary research interest and its relation to one or more of the above strategic thrusts; (ii) a CV and (iii) three letters of support to:

Faculty Search Committee  
Computer Science Department  
941 West 37<sup>th</sup> Place, Sal 300  
University of Southern California  
Los Angeles, CA 90089-0781 U.S.A.  
USC is an AA/EO Employer.

### The University of Texas at Arlington (UTA) Computer Science and Engineering Department

The University of Texas at Arlington (UTA), Computer Science and Engineering (CSE) Department - CSE@UTA invites applications for multiple tenure-track faculty positions at all levels. However, preference will be given to positions at assistant or associate professor levels. All areas of computer science will be considered, including: software engineering; computer security; bio-informatics;

pervasive computing; multimedia and video processing; intelligent systems; networks and telecommunications; database and data mining; and applied theory. UTA, part of The University of Texas System, is located in the heart of the rapidly growing Dallas/Fort Worth area, one of the nation's largest high-technology regions, with a flourishing industrial base and excellent opportunities for industry/university collaboration.

We at CSE@UTA are committed to excellence in research, teaching, and service. We are in the third year of our "Top 25 Initiative" plan to reach a national top 25 ranking within 10 years. The initiative is strongly supported by all CSE@UTA stakeholders including the UTA administration, faculty, students and alumni, and industry partners. Since 2000, we have added 7 new tenure track faculty and 4 new full-time non-tenure track faculty to our roster of 37 full-time faculty. The number of our PhD students has increased by 50% since 2000 and the research funds awarded to the department faculty surpassed \$3.5M in 2001-02 academic year.

Applicants must have an earned doctorate in computer science, computer engineering, or closely related fields and a commitment to teaching and scholarly research. Applicants are expected to have an excellent record of professional accomplishments, commensurate with their level of experience. The faculty openings are anticipated for September 2003. Screening of applications will begin immediately and will continue until all positions are filled. Interested persons should submit a letter of application, a resume, and reference letters online at: <http://www.cse.uta.edu/application/>. Please note that we do not accept hardcopy submissions. For additional information, please contact:

Dr. David Kung  
Chair of Search Committee  
Department of Computer Science and Engineering  
The University of Texas at Arlington  
Phone: 817-272-3605  
FAX: 817-272-3070  
Email: [search@cse.uta.edu](mailto:search@cse.uta.edu)  
<http://www.cse.uta.edu>

The University of Texas at Arlington is an Equal Opportunity/Affirmative Action Employer.

### The University of Texas at Austin Department of Computer Sciences Tenured and Tenure-Track Positions

The Department of Computer Sciences of the University of Texas at Austin invites applications for tenure-track positions at all levels. Excellent candidates in all areas will be seriously considered.

All tenured and tenure-track positions require a Ph.D. or equivalent degree in computer science or a related area at the time of employment. Successful candidates are expected to pursue an active research program, teach both graduate and undergraduate courses, and supervise graduate students.

The department is ranked among the top ten computer science departments in the country. It has 36 tenure-track faculty members across all areas of computer science. The department participates in the University's Computational and Applied Mathematics interdisciplinary program. Austin, the capital of Texas, is located on the Colorado River, at the edge of the Texas Hill Country, and is famous for its live music and outdoor recreation. Austin is also a center for high-technology industry, including companies such as IBM, Dell, Motorola, Sematech, AMD, National Instruments, Tivoli, Trilogy, Schlumberger, Computer Sciences Corporation, and Intel. For more information please see the department web page: <http://www.cs.utexas.edu/>.

To apply, please send a curriculum vita, home page URL, description of research interests, and selected publications, and ask three referees to send letters of reference directly to:

Faculty Search Committee  
Computer Science Department  
University of Texas at Austin  
Austin, Texas 78712 USA  
Inquiries about your application may be directed to [faculty-search@cs.utexas.edu](mailto:faculty-search@cs.utexas.edu)

Applications will be considered immediately until the positions are filled. To ensure full consideration, please apply by January 15, 2003. Women and minority candidates are especially encouraged to apply. The University of Texas is an Equal Opportunity Employer.

### The University of Texas at Dallas Department of Computer Science Tenure-Track Positions

The Computer Science Department of The University of Texas at Dallas invite applications for tenure track faculty positions in Computer Science at all levels, starting January or September 2003. Candidates must

have a Ph.D. degree in Computer Science, Software Engineering, Computer Engineering or equivalent. Candidates should have a strong record of research, teaching, and external funding. Candidates are sought in the areas of human language technology, digital forensics, network security, and computational biology. However distinguished candidates in other areas of computer science will be considered also.

The Department of Computer Science offers the Ph.D. degree in Computer Science and has Master's degrees in CS with Major in Software Engineering as well as tracks in Telecommunications, and Traditional Computer Science. At the undergraduate level, the CS department is the first in the state of Texas to offer a Bachelor of Science degree in Software Engineering. In Fall 2002, the Department of Computer Science moved into a new 152,000 sq. ft. building. We have experienced very rapid growth in recent years and the potential for future growth is excellent. Currently the CS Department has a total of 40 faculty and 20 senior lecturers.

The University is located in one of the most attractive suburbs of the Dallas metropolitan area. There are over 900 high-tech companies within 5 miles of the campus, including Texas Instruments, Nortel Networks, Alcatel, Nokia, Fujitsu, Worldcom, EDS, and Perot Systems. Almost all the country's leading telecommunication's companies have major research and development facilities in our neighborhood. Opportunities for joint university-industry research projects and consulting are excellent. In addition to individual faculty workstations, the department has twelve computer/research laboratories, equipped with around 300 high performance workstations and high-end PCs. The Academic Computer Center supports both UNIX based workstations and PCs as well as high-speed dial-in access to campus computing facilities.

For more information, contact Dr. D.T. Huynh, Department Head, at 972-883-2169, or view the Internet Web page at <http://www.utdallas.edu/dept/cs/>. The search committee will begin evaluating applications on December 1, 2002, and will continue until the positions are filled. Applicants should mail their resume with a list of at least five academic or professional references as soon as possible to:

Academic Search #750  
The University of Texas at Dallas  
P.O. Box 830688  
M/S AD 23  
Richardson, TX 75083-0688

Indication of sex and ethnicity for affirmative action statistical purposes is requested but not required. The University of Texas at Dallas is an Equal Opportunity Affirmative Action employer and strongly encourages applications from candidates who would enhance the diversity of the University's faculty and administration.

### The University of Utah School of Computing Tenure-Track Faculty Positions

The University of Utah's School of Computing seeks applicants for tenure-track faculty positions at all levels. Utah's School of Computing, known for its pioneering role in computer graphics, has developed strong research programs in other applied areas such as geometric modeling, virtual environments, architecture and systems, VLSI, scientific computation, robotics, natural language processing, and computer vision. Our program includes large, multi-investigator efforts addressing large-scale problems of significant impact in the above areas, as well as a number of individual investigator research activities. Research areas and course offerings benefit from the quality and breadth of our faculty and emphasize a balance of theoretical foundations and practical engineering.

As the School of Computing, we have been funded to expand from 23 to 30 regular faculty members, and we have several open positions. We will consider candidates with strong research and teaching profiles in all areas of computer science, but we especially seek candidates in computer engineering, scientific computing & visualization, systems, and algorithms.

Applicants should have earned a Ph.D. in Computer Science or a closely related field. The University of Utah is located in Salt Lake City, the hub of a large metropolitan area with excellent cultural facilities and unsurpassed opportunities for outdoor recreation only a few minutes drive away. Additional information about the school can be found at <http://www.cs.utah.edu>. Please send Curriculum Vitae, a research goals statement, a teaching goals statement, and names and addresses of at least four references to:

Faculty Recruiting Committee  
c/o Chris Coleman  
[coleman@cs.utah.edu](mailto:coleman@cs.utah.edu)  
via email in PDF format.

The University of Utah is an Equal Opportunity, Affirmative Action Employer and encourages nominations and applications from women and minorities, and provides reasonable accommodation to the known disabilities of applicants and employees.

### University of Vermont

#### The College of Engineering and Mathematics

#### Dorothean Professor in Computer Science

The College of Engineering and Mathematics at the University of Vermont invites applications for the Dorothean Professorship (at the Full Professor or Associate Professor level) in Computer Science, commencing with the 2003-04 academic year. Tenure will be sought at time of appointment.

The University of Vermont, one of the top public national universities, is located in Burlington, Vermont. It offers a supportive research environment in a relatively small city that repeatedly has drawn national attention for offering a high quality of life. The greater Burlington area includes 125,000 people, and is situated on the shores of Lake Champlain between the Green Mountains of Vermont and the Adirondack Mountains of New York. Burlington and the surrounding area provide an environment rich in cultural and recreational activities. The Department of Computer Science offers programs in the College of Engineering and Mathematics and the College of Arts and Sciences, as well as a joint program with the School of Business Administration.

Our existing faculty in Computer Science are involved in the forefront of research in knowledge and data engineering (such as data mining, database systems, pattern recognition, and knowledge-based systems), software engineering and verification (including programming languages), and computational sciences (including computational biology, discrete modeling, and numerical methods). We are seeking to complement and further strengthen our existing research and teaching activities in these areas. Candidates in these areas are most sought, and candidates in any other area of computer science will also be considered seriously.

Candidates should have a distinguished research record, hold a doctorate in Computer Science or a closely related field, and have broad teaching abilities and interests. The successful applicant is expected to (1) play a major role in departmental research initiatives and the graduate program coordination, (2) strengthen and build interdisciplinary bridges between the Department of Computer Science and other departments within the University, and (3) take an active role in teaching computer science courses.

Please send a letter of interest, a curriculum vitae, a statement of teaching experience and interests, a statement of research interests and aspirations to, and arrange for at least three letters of reference to be sent to:

Chair, Dorothean Professor Search Committee  
Department of Computer Science  
University of Vermont  
Burlington, VT 05405

Complete applications received by January 20, 2003 will be fully considered. For more information about the Department and the College please see <http://www.cs.uvm.edu> or email to [cssearch@emba.uvm.edu](mailto:cssearch@emba.uvm.edu).

The University of Vermont is an Affirmative Action/Equal Opportunity employer and encourages applications from women and members of minority groups.

### University of Washington, Bothell Computing and Software Systems Program

#### Professor and Director

Applications and nominations for Professor and Director of the Computing and Software Systems (CSS) Program are invited. CSS offers a computer science and software engineering-based BS degree and plans to offer a career transition MS degree in the near future.

Qualifications include: ability to guide the program during its formative growth and development; demonstrated academic leadership and collaboration; minimum two years experience in program development and management; earned doctorate in technology-related field; scholarly record commensurate with appointment as full professor; commitment to excellence in education; ability to attract external funding.

Responsibilities include: faculty leadership and development, as usually provided by a department chair, participation in campus

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## Professional Opportunities

leadership with fellow academic program directors, collaboration with local industry; program administration; campus-wide planning; business and community relations; and limited teaching. Applicants from all technology-related disciplines will be considered. Salary is competitive.

Please send CV; references; and a letter describing leadership and administrative experience, strategies to encourage excellence in teaching and research, program development record, and experience working collaboratively with faculty. Priority deadline is November 15, 2002. Send materials to:

Chancellor's Office  
Box 358520  
CSS Program Search Committee  
UW Bothell  
18115 Campus Way NE  
Bothell, WA 98011  
<http://www.bothell.washington.edu/CSS/>

For a full position description: <http://www.washington.edu/admin/eoo/ads> *The UW is an EO/AA employer.*

### University of Waterloo School of Computer Science

The University of Waterloo invites applications for several tenure-track faculty positions in the School of Computer Science, with priority for researchers in the areas of bioinformatics, distributed systems, human-computer interaction, and scientific computation. Exceptional candidates at all levels of experience are encouraged to apply. Successful applicants who join the University of Waterloo are expected to develop and maintain a productive program of research, attract and develop highly qualified graduate students, provide a stimulating learning environment for undergraduate and graduate students, and contribute to the administration of the school. A Ph.D. in Computer Science or equivalent is required, with evidence of excellence in teaching and research. Rank and salary will be commensurate with experience, and appointments are expected to commence during the 2003 calendar year.

The University of Waterloo's School of Computer Science is one of the largest and most eclectic within Canada. It prides itself on being a leader in Computer Science education and houses a diverse research program of international stature. Because of its recognized capabilities, the School attracts exceptionally well-qualified students at both undergraduate and graduate levels. Over twenty new faculty members have joined the School recently, resulting in over 60 full-time faculty. The School enjoys an excellent reputation in pure and applied research and is supported by 14 research laboratories. The University has an enlightened intellectual property policy by which the rights are vested in the inventor; in part, this policy has been responsible for many spin-off companies such as WATCOM (now iAnywhere Solutions), Waterloo Maple and Open Text Corp. Please see <http://www.cs.uwaterloo.ca> for further information.

Applicants should write to:  
Chair, Advisory Committee on  
Appointments  
School of Computer Science  
University of Waterloo  
Ontario, Canada N2L 3G1  
[cs-chair@cs.uwaterloo.ca](mailto:cs-chair@cs.uwaterloo.ca)

and include a curriculum vitae, teaching and research statements, and the names and e-mail addresses of three references. To expedite handling of applications, please ask those named as references to direct supporting letters to the same address. Applications will be considered as soon as documentation is complete and as long as positions remain available.

The University of Waterloo encourages applications from all qualified individuals, including women, members of visible minorities, native peoples, and persons with disabilities. These appointments are subject to the availability of funds.

### University of Wisconsin- Milwaukee Computer Science Faculty Recruitment

We invite applications for several tenure-track and tenured faculty positions. Of particular interest are the areas of Data and Computer Security, and Medical Informatics. Strong candidates in other areas will also be considered. All candidates should have a demonstrated promise of excellence in research as well as in teaching. Candidates for senior positions should have excellent research credentials and leadership qualities.

The Computer Science Program in the Department of Electrical Engineering and Computer Science has embarked on an ambitious path of continued development and growth. The Program has an established area of excellence in Data Security with a tradition of excellent graduate education in this area. We

are also actively developing a new Ph.D. Program in Medical Informatics in collaboration with the Medical College of Wisconsin to complement our existing Ph.D. Program. Our Program has established a very good record in recruiting outstanding junior faculty and in providing them with a nurturing and stimulating environment for their career development. Several of our faculty have received the NSF Early CAREER Awards.

Our University is located in a pleasant residential neighborhood of Milwaukee close to the shores of Lake Michigan. Our metropolitan location facilitates easy interactions with many industries and affords numerous cultural and recreational activities.

Applicants should send a hard copy of a vita by post or Fax, along with a statement of plans for research and teaching. We also request that at least three references be asked to send letters to:

Faculty Recruitment Coordinator for  
Computer Science  
Department of Electrical Engineering &  
Computer Science  
University of Wisconsin-Milwaukee  
PO Box 784  
Milwaukee, WI 53201-0784  
E-mail: [recruit@cs.uwm.edu](mailto:recruit@cs.uwm.edu) (for inquiries only) Fax: 414-229-6958

Evaluation of all candidates will begin in Fall 2002 and will continue until the positions are filled. Women and minority candidates are strongly encouraged to apply. Additional information about our Program may be obtained by visiting our website at <http://www.cs.uwm.edu>.

*UWM is an equal opportunity institution committed to diversity.* 9/20/02

### University of Wisconsin-Madison Computer Sciences Department Faculty Positions

The Computer Sciences Department at the University of Wisconsin-Madison, consistently ranked among the top ten departments in the nation, has embarked on a multi-year effort to significantly enhance the strengths of the department. As part of this endeavor we have multiple faculty positions available beginning August 2003.

We invite applications from outstanding candidates in all areas of Computer Science. Applicants should have a Ph.D. in Computer Science or in a closely related field, and demonstrated strength in scholarly research. The positions are at the Assistant Professor level, but exceptional candidates at the senior level (Associate or Full Professor) will also be considered. Successful candidates will be expected to teach at the undergraduate and graduate level, in addition to establishing a significant and highly visible research program.

Further information about the department may be found at <http://www.cs.wisc.edu/>.

Applicants should submit a curriculum vitae, a statement of research objectives and sample publications, and arrange for at least three letters of reference to be sent directly to:

Chair, Faculty Recruiting Committee  
Computer Sciences Department  
University of Wisconsin-Madison  
1210 West Dayton St.  
Madison, WI 53706

Applicants are encouraged to submit their applications (along with supporting material) as soon as possible, but no later than January 27, 2003.

The University is an Equal Opportunity/Affirmative Action employer and encourages women and minorities to apply. Unless confidentiality is requested in writing, information regarding the applicants must be released on request. Finalists cannot be guaranteed confidentiality.

### Washington State University Computer Science

Looking for a career in a research university with a very high quality of living?

Washington State University in Pullman offers a great opportunity to live in a small town with a strong sense of community, excellent schools, and abundant outdoor recreation nearby, while working with a team of excellent researchers.

The School of Electrical Engineering and Computer Science (EECS) at Washington State University is inviting applications and nominations for two faculty positions to be filled in Computer Science. Particular areas of interest include software engineering, security, databases, and networking/distributed systems; but outstanding candidates in other areas are encouraged to apply and will be seriously considered. Candidates at all ranks will be considered. Senior applicants must have a strong record of achievement in academia and/or industry. Junior applicants must have earned a PhD in Computer Science by August 16, 2003. All candidates must have both a strong interest in conducting publishable research and a strong commitment to teaching. A record of

publication in peer-reviewed journals and conference proceedings is required. The School offers junior faculty a reduced teaching load for the first three years of their appointment. The successful candidate will be expected to teach, effectively communicate and interact with students and colleagues, conduct funded research, publish, and direct MS and PhD student research programs.

For appropriately qualified senior candidates in software engineering, the School of Electrical Engineering and Computer Science (EECS) at Washington State University is soliciting applications and nominations for the position of Boeing Endowed Professorship in Software Engineering. The Boeing Professorship has an endowment of \$600,000, and the annual proceeds are available to support the research and teaching program of the Chair holder. Candidates must 1) possess a PhD degree in computer science or a related discipline, 2) have a demonstrated record of outstanding accomplishments, and 3) be committed to building an active research program in Software Engineering.

The School of EECS is the largest of six academic departments in the College of Engineering and Architecture at Washington State University. The School presently has forty faculty, and awards B.S., B.A., M.S., and Ph.D. degrees in computer science, B.S., M.S., and Ph.D. degrees in electrical engineering, and the B.S. degree in computer engineering. Major areas of research emphasis include software engineering, embedded systems, algorithms, distributed systems, databases, and computer networks. The School has six endowed chairs and distinguished professorships in computer science, computer engineering, and electrical engineering. Two NSF IUCRC centers are in EECS. To learn more about WSU, the School, and faculty research interests, please see <http://www.eecs.wsu.edu/>.

Screening of applications will begin immediately upon receipt of curriculum vitae. Maximum consideration will be given to applications received by January 31, 2001.

Applicants should send a cover letter that includes a summary of their research and teaching interests, a curriculum vitae, and the names and addresses of three references qualified to comment on the applicant's research and teaching qualifications to:

Chair, Computer Science Search  
Committee  
School of Electrical Engineering and  
Computer Science  
Washington State University  
PO Box 642752  
Pullman, WA 99164-2752  
WSU is an EO/AA educator and employer.

### Wellesley College Computer Science

#### Tenure-Track Assistant Professorship

The Wellesley College Computer Science Dept. seeks applicants for a tenure-track Assistant Professorship. Applicants should have a Ph.D. in CS or be close to completion. We especially encourage candidates in computer systems, architecture, software engineering, and AI, but will consider strong candidates in any area.

Located 13 miles west of Boston, Wellesley is a highly selective private undergraduate liberal arts college for women. The CS dept. offers both a major and a minor and supports programs in media arts and sciences, cognitive science, and neuroscience. A 4 course/year teaching load, a pre-tenure sabbatical leave, and a large pool of intelligent, motivated students help faculty to focus on both excellence in teaching and high quality in research. Cross-registration programs with MIT, Babson, Brandeis, and Olin and proximity to other Boston-area universities and industries dramatically increase the curricular and research resources available to Wellesley's faculty, staff, and students. For more information, please visit <http://cs.wellesley.edu>.

For full consideration, candidates should, by Dec. 13, 2002, submit a CV and a teaching/research statement and arrange for three letters of recommendation to be sent to:

Franklyn Turbak, Chair  
ATTN: CS Faculty Search  
Wellesley College  
Wellesley, MA 02481  
Phone: 781-283-3049  
FAX: 781-283-3642  
Email: [fturbak@wellesley.edu](mailto:fturbak@wellesley.edu)

Wellesley College is an EO/AA educational institution and employer; successful candidates must be able to work effectively in a culturally diverse environment. Applications from women, minorities, veterans, and candidates with disabilities are encouraged.

### Worcester Polytechnic Institute Computer Science Department Tenure Track Faculty Positions - (starting August 2003)

Do you want the combination of a research university teaching load with a liberal arts college environment? Do you like engaging undergraduates together with graduates in long-term, open-ended projects? Would you enjoy doing interdisciplinary research, experiencing the interplay between technology and society, and helping students apply their technical skills in global settings? If so, you should consider joining the faculty at WPI. WPI, in Worcester, MA, is an elite, small, national university.

The CS department is recruiting for several tenure-track positions. Candidates should have a Ph.D. in Computer Science or a closely related field, and the potential for excellence in research and teaching. Our search priorities this year are for junior appointments in Databases, Software Systems, Human-Computer Interaction and Algorithms. However, outstanding candidates for any rank and area will get full consideration.

The department has 18 tenure-track faculty, and expects a large increase in faculty size over the coming years. We hope to maintain the exceptionally close-knit, collegial atmosphere we currently enjoy.

We invite you to explore our department at [www.cs.wpi.edu](http://www.cs.wpi.edu) and see the full ad at [www.cs.wpi.edu/News/job-ad0203.html](http://www.cs.wpi.edu/News/job-ad0203.html). Questions about the hiring process, as well as electronic applications should be addressed to: [recruit@cs.wpi.edu](mailto:recruit@cs.wpi.edu).

For full consideration, applications should be received by 01/15/2003. To enrich education through diversity, WPI is an affirmative action, equal opportunity employer.

### Survey Results from Page 3

trend (+1.8% for the median, -8.9% for the mean); and

4) base compensation dropped for researchers with 16+ years of experience (-5.2% for the mean, -4.3% for the median).

Comparing these data with the most recent Taulbee Survey salary data (see March 2002 issue of *Computing Research News*), it is clear that base (9-month) average faculty compensation is substantially lower than industrial compensation at all levels. However, if we assume that faculty actually receive 12 months of compensation at the 9-month rate (i.e., 4/3 of 9-month compensation) through a combination of summer salary, consulting, book royalties, and other sources, then full-professor compensation becomes roughly comparable to industrial compensation for those with 11+ years of experience. However, compensation for assistant and associate professors still lags that of comparably experienced industrial researchers by about 25 percent.

In September 2002, CRA mailed questionnaires for the 2002 survey of industry lab salaries. Companies that complete the survey should receive the results in December.

I would especially like to thank Drew Sutter of CRA for his excellent efforts in analyzing and organizing this data, and Patrick McMullen for collecting the data.

*Dr. Waltz is President of the NEC Research Institute. He is a CRA Board Member and Co-Chair of CRA's Industry Committee. ■*