**Title IX and Women in Academics**

By Senator Ron Wyden

This fall the athletic fields of America's elementary and secondary schools, colleges and universities will resound with the voices of girls and young women who choose to include sports as part and parcel of their educational experience. Those girls and young women will not only be taking physical exercise; they’ll be exercising their rights to equal opportunity under a law known as Title IX.

Title IX states a simple principle. The entire statute reads: "No person in the United States shall be subjected to discrimination on the basis of sex in any education program or activity receiving Federal financial assistance."

Many Americans know the enforcement of that common-sense rule has brought women much closer to parity in high school and college educational programs and activities. But in my view, what Title IX has achieved on the playing field remains undone in the classroom, where the promise of this law was originally directed. Particularly, I believe that Title IX has yet to be applied stringently enough in traditionally male-dominated fields such as the hard sciences, math and engineering—disciplines where our nation needs competent workers now more than ever before.

We can all agree that fairness implies us to create and enforce equal opportunity for women in math, science and technology. That is a compelling argument in itself, but it is not the only argument. A report from the Hart-Rudman Commission on National Security to 2025 warned that America's failure to invest in science and to inform math and science education was the second biggest threat to our national security, greater than that from any conceivable conventional war.

America will not remain the power it is in the world today, nor will our people be as healthy, as educated, or as prosperous as they should be, if we do not lead the world in scientific research and engineering development. To make our country better, to improve our national security and quality of life, we need to encourage people to go into these disciplines. Women represent a largely untapped resource in achieving this vital goal. Encouragement through Title IX is more than the right thing to do; it is the smart thing to do.

The numbers reveal a striking ineqiunity when it comes to gender representation in the math, science and technology fields. A National Science Foundation study found that women accounted for only 23 percent of physical scientists and 10 percent of engineers. The percentagses of women on faculties in those areas are even lower, with 14 percent of science faculty members being women and a mere 6 percent in engineering departments. Moreover, the numbers are getting worse in some areas. The percentage of recipients of computer and information sciences bachelor's degrees who were women, which peaked at 37 percent in 1998, had decreased to just 28 percent in 1999. That is a movement in the opposite direction from athletics, where Title IX has been adequately enforced. Before Title IX, one in 17 girls in school played sports. Now it is one in 2.5. This country needs that kind of progress in math, science, and technology. That will not happen as long as subtle and not-so-subtle discriminations persist in our educational institutions.

Studies show that women often have trouble advancing in math, science and technology due to a lack of equal access to financial aid and a lack of access to child care in graduate school. Additionally, evidence indicates discrimination toward not only aspiring students, but toward members of university faculties as well. Women in science and math often find themselves pushed into traditional female roles, such as teaching, while their male counterparts receive almost all the research fellowships that pay more completely for graduate school. Without a research background, women are less likely to obtain tenure-track faculty positions, which carry higher pay and prestige.

Just as America's schools were sent a clear message that they would lose Federal funding unless women were given parity in sports, it's time for our institutions to understand that there will be consequences if Title IX does not become a guiding light for our nation needs competent workers now more than ever before.
Visionaries Needed for CRA Conference
Grand Research Challenges in Information Security & Assurance

Airlie House, Warrenton, Virginia
November 16-19, 2003

In 2002, CRA sponsored its first “Grand Research Challenges in Computer Science and Engineering.” This was the first in a series of highly non-traditional conferences where the goal is to define important questions rather than expose current research. Grand Challenges meetings seek “out-of-the-box” thinking to expose some of the exciting, deep challenges yet to be met in computing research. Because of its clear importance and pressing needs, CRAs second “Grand Research Challenges Conference” will be devoted to defining technical and social challenges in information security and assurance. We are seeking visionaries, educators, business people, futurists, and others who have some vision and understanding of the big challenges (and accompanying advances) that should shape the research agenda in this field over the next few decades. These meetings are not structured as traditional conferences with scheduled presentations, but rather as highly participatory sessions exposing important themes and ideas. As such, this is not a conference for security specialists alone: We seek to convene a diverse group from a variety of fields and at all career stages—we seek insight and vision wherever it may reside.

The organizing committee is chaired by Eugene Spafford, Purdue University, and co-chaired by Richard DeMillo, Georgia Institute of Technology. Attendance is limited to 50 people and is by invitation only. Individuals invited must commit to attending for the entire three-day conference (beginning Sunday at 6 pm, ending after lunch on Wednesday). If you are interested in attending, please submit a two-page (or less) statement of two or three examples of a “grand research challenge” problem in the IS/IA area. The deadline for submission is September 17, 2003.

For additional details, including instructions for submitting statements and a list of the organizing committee members, see [http://www.cra.org](http://www.cra.org)

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CRA Outstanding Undergraduate Awards
Deadline October 20

The Computing Research Association is pleased to announce the 10th annual CRA Outstanding Undergraduate Awards Program, recognizing undergraduate students who show outstanding research potential in an area of computing research.

Nominees must attend a university or college located in the United States or Canada, and must be nominated by the department chair or a faculty member. A cash prize of $1,000 will be awarded to each of two undergraduates who are recognized, one male, who are majoring in computer science, computer engineering, or an equivalent program.

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

The Computing Research Association gratefully acknowledges the support of Microsoft Research and Mitsubishi Electric Research Labs who sponsor the Outstanding Undergraduate Awards Program. In alternate years, Mitsubishi Electric Research Labs is this year’s sponsor.


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Change in Taulbee Survey Reporting

The CRA Board of Directors has recently approved a change in CRA’s procedures for disseminating the results of the annual Taulbee Survey. One reason for the change is to reward departments that submit the survey on time by disseminating the preliminary salary data to them in December rather than in the January CRN. Another is to provide final survey results to CRA members, as a benefit of their membership, before they are made publicly available.

Previously, the Taulbee preliminary faculty salary results have been published in the January issue of Computing Research News, followed by the complete survey results in the March edition of CRN.

Beginning with the 2002-03 survey, which will be circulated to chairs of Ph.D-granting departments in mid-September 2003, only those departments that have submitted their surveys by the November deadline will receive the preliminary salary results. These results will be provided to those departments by mid-December; they will no longer be published in the January CRN or made public at that time.

In mid-February, final Taulbee Survey results will be provided to departments that participated in the survey and to all CRA members. Once again, this is earlier than in the past. Final results will no longer appear in the March CRN, nor will they be publicly available at that time. Instead, they will be published in the May issue, and will be posted on the CRA website at that time.

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Richard Tapia Celebration of Diversity in Computing Conference 2003

Co-Sponsored by ACM and CRA
October 15-18, 2003 in Atlanta, Georgia


Note to Department Chairs
Taulbee Survey 2002-03 Coming Soon
Best Practices Memo

University-Industry Sponsored Research Agreements

Universities and businesses have considerable incentive to cooperate in the development of intellectual property (IP). Businesses recognize universities for their rich talent pool and enthusiastic graduate students, while universities recognize businesses as a source of real-world problems, technical know-how, and funding. There are numerous examples of successful research collaborations in computer science, computer engineering, and electrical engineering. Mindful that some IP such as gene splicing and human growth hormone have produced “IP goldmines,” many university administrators (and some students and faculty) are eager to establish strong safeguards to protect their rights to intellectual property.

While such safeguards are perhaps essential in biomedical, pharmaceutical, and agricultural research, they are not appropriate in Information Technology (IT). They can be difficult and time-consuming to negotiate, and because considerations such as time-to-market are so important in IT, the delay can frustrate beneficial cooperation. Moreover, patent safeguards are unnecessary because of the role of IP in IT products and the complications involved in deploying IT IP. Formulating university-industry cooperative agreements must be sensitive to these issues. This document describes the best practices for university-industry agreements in IT, particularly the IP aspects of such agreements.

Context and Setting

Research and development in IT-related university departments is funded largely by two mechanisms: federal grants and university-industry sponsored research agreements (SRAs). Commercializing intellectual property derived from federal grants is (when appropriate) required by the Bayh-Dole Act. The law specifies the conditions of ownership and defines “standard practice” for grant-receiving institutions. Practices surrounding university-industry SRAs, however, vary widely, being governed mostly by the needs of the agreeing parties. These agreements can take a variety of forms, as explained in the next section.

Research universities typically have two offices, variously named, that are concerned with funding and intellectual property. The Office of Sponsored Projects (OSP) is generally responsible for negotiating funding agreements with granting agencies, foundations, and companies. The Office of Technology Transfer (OTT) is generally responsible for protecting and licensing technology created at the university. In rough terms, the OSP is largely involved before the intellectual property is created, and the OTT is involved afterwards. (As another generalization, the OSP is typically less familiar with industry’s needs than is the OTT.) For all research covered by the Bayh-Dole Act, the university is stipulated as the (initial) owner of the intellectual property. For SRAs, ownership and rights to the intellectual property resulting from research are the subjects of negotiations prior to funding.

The motivation for establishing best practices guidelines is the potential for the conflicting interests of universities and industry to impede their negotiations. An important “best practice” is for the OSP and the OTT to cooperate in establishing the practices described below.

Expectations

The possibility of producing a much-needed revenue stream by licensing their intellectual property has motivated some administrators, regents, and chancellors to require OSPs to exact strong protection for the university’s rights. Patent protection, which is generally required for biomedical, pharmaceutical, and agricultural IP, is very slow to obtain and can be expensive to secure and to defend. Almost all patenting expenditures do not recover their investment. As a general rule, universities that successfully generate revenue from IP do so with a tiny number (< 10) of significant patents. (In 2001, the University of California system generated 77 percent of all revenue from 25 licenses, and none was IT.) There are no known “goldmine” IT licenses.

Managing IT IP using the traditional patent/licensing mechanism is inappropriate for the following reasons. First, patent protection is rarely the best form of IT IP protection. Copyright is usually better, since it can be used to control an embodiment of the ideas, such as a software implementation. Second, time-to-market is often a significant consideration in making a product a success, so both the university and industry are best served by rapid action. Third, products like software often contain many “key” ideas (e.g., algorithms), and it is difficult to assess how any specific idea contributes to the overall worth of the product, so as the purpose of assessing royalties. Fourth, unlike patents, which are published in enough detail that someone can reproduce the art, effective transfer of IT IP such as software often requires participation by the creators. Finally, many IT ideas can be implemented by “those schooled in the art” once they have seen the technology in operation. Thus, companies have a risk of using IP inadvertently, increasing the value of mechanisms that lower that risk.

The implications of these considerations are: a) universities can introduce significant barriers to cooperation by forcing IT into a standard patent-centric form, and b) agreement principles customized to IT will focus on rapid action.

Consulting and Internships

The most valuable part of intellectual property is the intellect that produced it. Accordingly, IT businesses understand that working with faculty and graduate students is at least as valuable as licensing the IP that they produce. Because IT requires only modest facilities, and to avoid complex negotiations with universities about who owns the resulting IP, many firms have opened labs near universities as a venue for faculty consulting and student internships. Performed on their premises with their equipment and staff, the companies own all of the IP. It is an efficient scheme for the businesses, and it can provide professionally valuable experience for both faculty and students. But it cuts out the university.

A Model for Sponsored Research

Confronted with the aforementioned facts, several universities have adopted approaches that reflect the best practice. In these cases, an industrial partner funds research with the understanding that it will receive a non-exclusive, non-transferable, worldwide, royalty-free license to any IP created by the organization. In one model the partner funds (annually) a specific team with a specific research direction, and the arrangement is seen as ongoing. In another model (e.g., Stanford’s EPIC program) industry partners join a consortium for a modest annual fee, and then have “pay-per-view” privileges for any specific IP at a specified rate for a non-exclusive, royalty-free license. The university retains ownership of the IP, and the option to negotiate an exclusive license is available. Standardized terms and conditions regularize the process for rapid and predictable execution.

Although it is assumed that industry wants and needs exclusive licenses, in general this seems not to be the case. Since companies in IT do their own development, licenses protect them from being sued for infringing on others’ IP. For that purpose a non-exclusive license suffices.

In this model, industry supports the effort with its funds “up front,” with the assurance that there will be a license if anything useful comes out of the research. Not charging royalties has the advantage that the uses of the IP do not have to be accounted for. There is risk on both sides: It is possible the university might do better by negotiating more favorable terms for a specific promising technology, and industry is gambling that the investigators’ discoveries get to them early enough for rapid deployment. However, this model has the value of promoting and accelerating cooperation. There is generally an understanding among the participants that if the IP turns out to be a “home run,” then the company will return later to the question of what it owes the university for the IP, typically in the form of generous donations or longer-term research contracts.

End Notes

The assertions in this memo are documented in “Model Language for Patent and Licensing Agreements for Industrially Sponsored University Research In Information Technology,” by J Strouther Moore, University of Texas, Austin. See: http://www.cra.org/reports/ip/. Additional information and sample wording for agreements are also provided.

Prepared by: J Strouther Moore (University of Texas, Austin)
Lawrence Snyder (University of Washington)
Philip A. Bernstein (Microsoft Research)
The Northern Report: Computer Science News from Canada

By Gord McCalla

Now that the Canadian Association of Computer Science/Association informatique canadienne (CACS/AIC) is officially an affiliated society of the Computing Research Association, it seems reasonable to provide an annual report on important issues within the Canadian computer science community. It may also be of interest to CEA members and its other affiliated societies. This year I would like to briefly focus on several issues: research initiatives, current enrollment trends, accreditation of programs, and the software engineering dispute in Canada.

Research Initiatives

The research climate for Canadian computer science (and other science and engineering disciplines) continues to improve. For several years the Canadian federal government has been increasing its investments in research and development as it tries to position Canada to succeed in the emerging knowledge economy. At the same time, many provincial governments have invested heavily in computer science and computer engineering, stimulating considerable growth in many computer science departments in the country.

The result of these investments is a huge growth in demand from computer scientists for research funding. In fact, for each of the past 4 years, the number of new computer science applicants for “discovery grants” from Canada’s Natural Sciences and Engineering Research Council (the grants that fund professors’ curiosity-driven research programs) has led all NSERC disciplines. In 2003 alone some 114 of 900 new applicants were computer scientists (with many more computer engineers applying to engineering committees).

Fortunately, NSERC has continued to get increased funding to handle this influx of “requests,” with some $12.5 million (Canadian) in new funds having recently been allocated for first-time applicants over the next 3 years. The next challenge will be to make sure that even more money enters the system to fund these new applicants as they progress through the system, seeking increased renewal grants down the road. And a modest start has been made in a recent NSERC re-allocations exercise the base budget for funding computer science was increased in recognition of the importance of the field and its incredible growth.

NSERC has also added considerably more money to its Canada Graduate Scholarships program, creating some 650 new scholarships paying $17.5K (Can) for one year to M.Sc. students and $35K (Can) for 3 years to Ph.D. students, while the existing program of postgraduate scholarships continues. In addition, NSERC has created several new programs, including a networks program to encourage “distributed centers of critical mass” of scientists at different institutions interacting with one another on cutting-edge research, and a special opportunities program for high-risk (but potentially high-payoff) research.

Beyond NSERC, over the past few years, and education and workforce announcement funded some 2,200 Canada Research Chairs positions (across all academic disciplines) at universities and industry. It also continues its Canadian Foundation for Innovation (CFI) program that has begun to rebuild universities.

Changes in CISE

The CISE Directorate is approaching the end of its second decade as a major organizational unit within NSF. CISE is unique among NSF directors in its dual responsibility for the health of the CISE research communities and for the support of a national computation and communication infrastructure for all of NSF’s research and educational programs. The past few years have seen unprecedented growth in the CISE budget, a continuing diversification of CISE research, education and infrastructure programs, and an attendant, dramatic increase in proposal pressure and staff workload. Today, CISE is a primary source for the funding of fundamental academic research in computing, communication, and information, and of research at the interface of information technology and other disciplines. Since the last CISE reorganization in 1997, the directorate’s budget has grown by 113 percent (60% for NSF) and the number of proposals received has grown by more than 125 percent (16% for NSF).

While the opportunities for our community have increased with the introduction of NSF-wide priority areas, such as the CISE-led Information Technology Research program and a growing number of program announcements and solicitations for traditions and areas of special emphasis, success rates have diminished dramatically. We believe investigators have responded to these opportunities and the falling success rates by submitting more proposals. This is counter-productive, as it raises the workload in CISE and in the research community. We want the community involved in research and teaching, not proposal-writing, and we want a CISE staff with the time and resources to effectively manage grant selection and oversight.

In fact, for each of the past 4 years, we have four divisions, working as highly integrated units, coordinating to manage the broad research portfolio for which CISE is responsible. The four divisions are: Computing & Communications Foundations (CCF); Computing, Networking, Information Systems (CNS); Information and Intelligent Systems (IIS); and Deployed Infrastructure (DDI). The slides from the announcement of the reorganization provide a good introduction and can be found at: http://www.cise.nsf.gov/news/cise_all_hands_meeting_files/frame.htm

The new divisional structure will be more closely aligned with the demands of the science. CCF, CNS, and IIS are principally “research” divisions, which represent a natural progression from core foundations through systems to basic and focused research in the context of complex information and intelligent systems. We believe this organization reflects a common grouping of the research communities served by CISE, and that individual investigators will easily find a “home” for their research interests. We also recognize the high degree of interactivity across these delineations and will work to ensure a strong, collaborative environment.

DDI represents the next logical step in the progression with management responsibility for national cyberinfrastructure activities. This division merges the national infrastructure programs currently managed by Advanced Computational Infrastructure and Research (ACIR) and Advanced Networking and Cyberinfrastructure and Research (ANIR), and expands the scope of CISE cyberinfrastructure to include computation, communication, information, distributed sensing, instrumentation, and middleware. DDI will also be responsible for the education, outreach, and training (EOT) activities related to the national cyberinfrastructure.

By centralizing the research in one program solicitation called “Cyber Trust,” the title reflects our understanding that the public not only wants their information systems to be secure, they want to trust them in all kinds of situations. As a simple example, they need to be able to trust that data will be kept private. By centralizing the research in cyber trust under a key theme, CISE will ensure that the area of cybersecurity receives increased, concerted attention that builds on the significant work that has already been devoted to it. In addition to restructuring the program, we expect to allocate more funds to research and education in this area, which is

CISE FY2004 Update

By Sean Jackson, National Science Foundation

This column will serve as an update on some of the changes in CISE as we start a new fiscal and academic year.

Cyber Trust

Cybersecurity is a clear example of a national priority to which the CISE themes are designed to respond. Congress expects NSF leadership on cybersecurity research and education. Fiscal year 2003 research activities in cybersecurity were handled through four different program announcements. In 2004, these four programs will be handled by the four program managers working as a team under one program solicitation called “Cyber Trust.” The title reflects our understanding that the public not only wants their information systems to be secure, they want to trust them in all kinds of situations. As a simple example, they need to be able to trust that data will be kept private. By centralizing the research in cyber trust under a key theme, CISE will ensure that the area of cybersecurity receives increased, concerted attention that builds on the significant work that has already been devoted to it. In addition to restructuring the program, we expect to allocate more funds to research and education in this area, which is
Past is Prologue: View from the Chair

By Jim Foley

What can we, our members, expect from CRA? Well, because past is indeed prologue, I encourage you to read our 2003 Annual Report, enclosed with this issue of CRN.

CRA’s biennial Conference at Snowbird 2004 for department chairs and directors of labs and centers is already being planned by co-chairs Moshe Vardi and Dick Waters and an able committee. The dates are July 11-13, 2004. Plenary sessions will cover such topics as CSE education apres le crash; the vast and pernicious impact of IT on the U.S. economy; and issues affecting women and minorities in CSE.

The ever-popular Academic Careers Workshop for new faculty and nearly finished Ph.D. students, organized by Lori Clark, is scheduled for February 23-24, 2004 in Washington, DC. Space fills up very quickly for this workshop, so advise potential attendees (graduate students and junior faculty choosing or beginning their careers) of the dates now. Information will be posted at http://www.cra.org. Encourage new faculty to use start-up funds to attend; scholarships will be available for grad students.

The second CRA Grand Research Challenges Conference, on Information Security and Assurance, will be held November 16-19, 2003. The organizing committee, chaired by Gene Spafford and co-chaired by Rich DeMillo, will issue invitations based on papers submitted by September 17, 2003 (see http://www.cra.org for details). This is your opportunity to help shape the field. We are also seeking ideas for a topic for Grand Research Challenges III, currently planned for 2005.

Growth in our academic membership slowed to just two net new members last year. Facing uncertain membership growth for this year and without the surplus generated by a Snowbird conference, the CRA board adopted a very conservative 2003-04 budget at our February meeting. After learning of our situation, two industry members recently stepped up to the plate and increased their membership levels—Microsoft became a Sustaining Member and Sun a Supporting Member. Other industrial members are planning increases as well. These acts of corporate good citizenship, along with tight cost controls at CRA, have allowed us to continue all of our programmatic efforts.

Funding for the National Science Foundation this year will probably increase by about 6 percent—nowhere near what is needed for the budget-doubling approved last year by Congress. Improving on this for the following fiscal year will be a challenge. This is particularly critical to continuing progress, given the decreasing base of industrial research. We will need all of our members to help carry this message to Washington.

How can you help CRA achieve our four goals of community building, human resources development, information dissemination, and influencing policy? Very simply: suggest additional ways that CRA can achieve our goals—and volunteer to make it happen! Become one of the 55 non-board members of CRA committees (see list) who help make CRA work. You can be one of them! Contact me at foley@cc.gatech.edu to volunteer.

The computing research community thanks the following non-board members who served on CRA committees from July 2002 through June 2003.

| AI AlO, Columbia University | Mary Jane Harrold, Georgia Institute of Technology |
| Alfredo, University of Houston | Juris Hartmanis, Cornell University |
| Nancy Amato, Texas A&M | Tom Henderson, University of Utah |
| Sandra Johnson Baylor, IBM | Raquell Holmes, Boston University |
| Ron Brachman, AT&T (now at DARPA) | Andrew Hume, AT&T Labs - Research |
| Eric Brittain, MIT | John Harley, Clark Atlanta University |
| Carla Bledsoy, Purdue University | Charles Isbell, Georgia Institute of Technology |
| Sheila Castaneda, Clarke College | Jolene Jesse, AAAS |
| Theresa Chutman, Rice University | Std Karin, UC San Diego |
| Carla Ellis, Purdue University | Randy Katz, UC Berkeley |
| Sheila Castaneda, Clarke College | John King, University of Michigan |
| Anne Condon, University of Victoria | (board member eff. July 1, 2003) |
| Carla Ellis, Duke University | John King, University of Michigan |
| (board member eff. July 1, 2003) | (board member eff. July 1, 2003) |
| Gerald Engel, University of Connecticut | Willis King, University of Houston |
| Faith Fich, University of Columbia | Charlotte Kuh, National Research Council |
| Joan Francconi, Winona State University | Cynthia Lanius, Rice University |
| Oscar Garcia, Wright State University | Andrea Lawrence, Spelman College |
| C.W. Grat, NEC Research Institute | Phoebe Lenear, NCSEA |
| Clayton Lewis, University of Colorado, Boulder | Dr. Royce C. Porter, Montana State University |
| Barbara Gurek, University of Michigan | Ran Libeskind-Hadas, Harvey Mudd College |
| Mary Jane Harrold, Georgia Institute of Technology | Monica Martinez-Canales, Sandra National Lab |
| Juris Hartmanis, Cornell University | J Strother Moore, University of Texas, Austin |
| Tom Henderson, University of Utah | James Morris, Carnegie Mellon University |
| Raquell Holmes, Boston University | David Novick, University of Texas, El Paso |
| Andrew Hume, AT&T Labs - Research | Christos Papadimitriou, UC Berkeley |
| John Harley, Clark Atlanta University | Lori Pollock, University of Delaware |
| Charles Isbell, Georgia Institute of Technology | Ann Redelso, NPAIS/ESISS |
| Jolene Jesse, AAAS | Eric Robers, Stanford University |
| Std Karin, UC San Diego | Gabby Silberman, IBM |
| Randy Katz, UC Berkeley | Barbara Simons, ACM |
| John King, University of Michigan | Robert Sproull, Sun |
| John King, University of Michigan | Valerie Taylor, Texas A&M |
| (board member eff. July 1, 2003) | Patricia Tellier, University of Texas, El Paso |
| Willis King, University of Houston | Henry Walker, Grinnell College |
| Charlotte Kuh, National Research Council | Roger Webb, Georgia Institute of Technology |
| Cynthia Lanius, Rice University | Pamela Williams, Sandra National Lab |
| Andrea Lawrence, Spelman College | Ellen Yoffa, IBM |
| Phoebe Lenear, NCSEA | Wei Zhao, Texas A&M University |

SNOWBIRD 2004 ALERT - Department Chairs and Directors of Labs/Centers

Mark your calendars now for CRA’s Conference at Snowbird 2004!

This biennial event is a “must” for department chairs and directors of labs and centers. The planning committee is putting together a stimulating program, including the always-popular workshop for new chairs. The dates are July 11, 12, and 13, 2004 in Snowbird, Utah. Refer to future issues of CRN and the CRA website (http://www.cra.org) for updates, including program details and registration/accommodation instructions as they become available.

If you would like to suggest a topic for the program, please contact either of the program co-chairs:

**Academic Co-Chair:**

**Labs/Centers Co-Chair:**

Moshe Y. Vardi, Rice University (vardi@cs.rice.edu)

Dick Waters, Mitsubishi Electric Research Labs (dick@merl.com)

**Committee Members:**

- James Aylor (University of Virginia)
- Lori Clarke (UMass, Amherst)
- Scot Drysdale (Dartmouth College)
- John King (University of Michigan)
- Dan Reed (University of Illinois, UC)
- Moshe Vardi and Dick Waters
- nearly finished Ph.D. students

**CRA Grand Research Challenges Conference**

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This year will probably increase by about 6 percent—nowhere near what is needed for the budget-doubling approved last year by Congress. Improving on this for the following fiscal year will be a challenge. This is particularly critical to continuing progress, given the decreasing base of industrial research. We will need all of our members to help carry this message to Washington.

How can you help CRA achieve our four goals of community building, human resources development, information dissemination, and influencing policy? Very simply: suggest additional ways that CRA can achieve our goals—and volunteer to make it happen! Become one of the 55 non-board members of CRA committees (see list) who help make CRA work. You can be one of them! Contact me at foley@cc.gatech.edu to volunteer.
jumped from 0.37 percent to 0.87 percent. One reason was separated from other capital expenditures. When IT-capital deepened during that period, productivity gains were separated into IT-related and other-related productivity, the conclusions become obvious. IT-related productivity rose from 0.21 percent to 0.45 percent, while other-related productivity over the same periods grew from only 0.05 percent to 0.17 percent. In short, as opposed to a decline in labor quality during that period. When productivity gains are separated into IT-related productivity and other-related productivity, the results of new research on productivity over the coming years, productivity gains are separated into IT-related and other-related productivity, the conclusions become obvious. IT-related productivity rose from 0.21 percent to 0.45 percent, while other-related productivity over the same periods grew from only 0.05 percent to 0.17 percent. In short, there was a doubling of U.S. productivity in the period 1995–2000, which effectively means that the quality of the work force was building twice as quickly. Nearly all of that improvement was due to IT. The dot-com crash and the slowdown also provided a needed respite to step back from the “irrational exuberance” of that era to reflect on the changes underway. This is particularly important when articles with titles like “IT Doesn’t Matter” appear in Harvard Business Review, and academic leaders cast nervous glances at noticeable declines in applications and enrollments in undergraduate computer science and graduate information systems programs. Paul David’s hopeful story suggests that IT will continue to bring major improvements in productivity over the coming years, especially given the continued pace of improvement in the underlying technology itself. The challenge now lies in better understanding the ways in which IT affects organizational performance for the better. The effort to demonstrate IT’s role in productivity has been matched by research into the “hidden assets” that complement IT investments in the quest for productivity improvement. Erik Brynjolfsson of MIT and Lorin Hitt of the University of Pennsylvania define hidden assets as those that are not counted by standard economic measurement systems. Many of these hidden assets have grown up around IT implementation, including specialized software and utilities, revised work practices, new control systems, and improved analytical capacity to aid in management decision making. The ratio of hidden assets is highest in the most productive firms, reaching as much as 10:1. The value created by IT assets and hidden assets working together goes beyond standard economic measurements, affecting things such as customer convenience and service quality. Previous research not only missed the productivity impacts of IT, but failed to recognize the complexity of the mechanisms involved in improving productivity. The story of IT and productivity has been odd. The productivity payoffs of IT have been elusive for years, yet organizations kept spending on IT in spite of this news, and dramatically accelerated IT investments in the 1990s. When economists finally teared out the payoffs of IT, the dot-com boom collapsed and the economy turned down. It seems ironic that it was impossible to see the evidence of productivity when the economy was roaring, but it is easy now that things have slowed down. In fact, this is to be expected because understanding almost always lags the things to be understood. It takes time to understand change of this magnitude. The revolution launched by IT is far too large and complex to play out in just a few decades. The revolution involves economic, political, social and cultural systems that often change slowly and in subtle and sometimes ambiguous ways. The advances in IT that gave the revolution its power were accomplished by expertise in narrow areas of specialization in computer engineering, computer science, and information systems. An important role for such specialization remains, but it is increasingly important to look across and not just within these specializations, and to join with economists, psychologists, operations management specialists, library and information specialists, and others to grasp the full magnitude of the changes underway. Without this broad effort, many of those who helped to launch the revolution will see it default to those with far less sense of how it all happened, and only a distant notion of what is at stake.

Dr. John L. King (jking@umich.edu) is Dean and Professor in the School of Information at the University of Michigan. He was recently elected to a three-year term on the CRA Board of Directors.

CRA Welcome New Members

Academic Departments
Loyola University Chicago (CS)
University of Montana (CS)
University of South Florida (CSE)

CRA awarded its 2003 Outstanding Undergraduate Awards at the ACM awards banquet in San Diego in June. Front row (l-r) Omar Khan (Cornell University), outstanding Master’s thesis, Thomson (Kansas State University), Female Runner-Up; Bistra Dilkina (Simon Fraser University), outstanding Female Award; Noah Shaveley (University of Arizona), Male Runner-Up; Chand John (University of Texas at Austin), Finalist. Back row (l-r) Jim Foley, CRA’s board chair; Anton Morozov (Hunter College), Honorary Mention; Vijay Reddi (Santa Clara University), Honorary Mention; Phillip Loher (North Carolina State University), Honorary Mention; Mahdi Mekic (Lamar University), Honorary Mention; Yuli Ye (University of Waterloo), Finalist; and Andy Bernat, CRA’s executive director.
CRA Workshop on Research Related to National Security: Report and Recommendations

By Kathleen McKeeown, Lori Clarke, and John Stankovic (Organizers)

Introduction

The Computing Research Association (CRA) hosted a workshop in September 2002 to develop recommendations that will strengthen the research infrastructure in areas of critical importance to national security. It was funded by the National Science Foundation.

The workshop focused on three general topics:

1. how to facilitate technology transfer from research to practice;
2. how to foster research and infrastructure support for best practices in security and information fusion; and
3. strategies for funding research in this area.

Participants were invited from the areas of computer security, real-time systems, and information fusion, and included representatives from academia, industry, and government.

The aims of this workshop on research related to national security are directly relevant to CRA mission. CRA seeks to strengthen research and advanced education in computing and allied fields. It does this by working to influence policy that impacts computing research, encouraging the development of human resources, contributing to the cohesiveness of the professional community, and collecting and disseminating information about the importance and the state of computing research. Each plays an important role in achieving the organizational objectives for the benefit of the country.

In the following sections, we discuss the recommendations that the workshop produced for each of the topic areas.

Research Areas

The workshop focused on three research areas—security, information fusion, and critical infrastructure—based on recommendations made by a National Research Council Committee on Science and Technology for Countering Terrorism. That committee called for research in information and network security, new information technology for emergency response, and new information technology for the detection, remediation, and attribution of attacks (information fusion). Security includes authentication, availability, confidentiality, detection and identification, privacy, recovery, and new security models. Information technology for emergency response includes a variety of problems—most notably problems for critical infrastructure. Information fusion includes research in data and text mining, data integration, language technologies, image and video processing, and evidence combination. Rather than consider again the question of which research areas are important for national security, the CRA Workshop took the results of the NRC committee’s report as a starting point.

To provide common grounds for discussion, the workshop began with presentations by experts, who outlined the current state of the art and active research topics in each of these areas.

Recommendations on How to Facilitate Interaction between Research and Practice in Security and Information Fusion

Top priority should be given to methods for facilitating interaction between research and practice. It is especially important that researchers have the ability to base their work on real problems with connections to real data. Because of concerns about national security and privacy, this can be particularly problematic. Nonetheless it is important that researchers and technologists have access to scenarios and data that are recognized as realistic and as representative of the challenges being faced by practitioners. If this is not the case, research results face the risk of being dismissed as irrelevant or immature.

In addition to providing access to the problems and the data, programs must be developed that facilitate an understanding of their counterparts by both researchers and practitioners. Researchers need a deeper understanding of the complex processes in which practitioners, such as government analysts, participate. They need to be able to observe practitioners and their processes in action. Practitioners need an understanding of the potential of new technology. Most are not comfortable with new technology, and novel methods for introducing technology must be developed so that people can become familiar with and test new systems—while continuing to make progress on their real-world tasks.

Given these needs, the workshop recommended that the following actions be taken:

1. Create testbeds of open data. The workshop recommends establishing a center that will make it easier for both government and industry to provide data. In general, it is hard to generate synthetic data with enough scale; this is a research project worthy of its own funding. Issues include development of new techniques for automatic scrubbing, agreement between researchers and intelligence agencies on what constitutes good, normal operational and attack scenarios, and a long-term focus on establishing and maintaining the testbed. It was suggested that different research groups focus on different aspects of the testbed; one group might focus on generating operational data, while another focuses on generating attacks. Initial models for such testbeds are being explored under the NSF KDD program, a joint program with the National Security Agency. Funding for such models involving these and other agencies should be provided.

2. Establish standards that facilitate interactions. The workshop recommended a variety of structures that could address the problem of connecting research with practice. Grants focusing solely on the transfer of technology for a short-term period should be established. Funding programs that stress interactions between the intelligence community and industry and research groups are also needed. National laboratories that focus on issues of security and data mining would allow researchers and practitioners to come together for longer periods of time. Such laboratories could provide the ability to generate large-scale simulations for which experiments could be carried out. Organizations such as In-Q-Tel should encourage technology driven by needs and not by the market, with special effort placed on removing bureaucratic difficulties. Google provides a good model for moving from research to practice that could be used as the basis for new structures.

3. Adapt human factors methods for modeling and improving security processes. It was recognized that often the security processes that practitioners follow are cumbersome and error-prone. To facilitate understanding of the tasks and the human activities involved, research should consider and incorporate cognitive approaches such as scenario-driven exercises, task modeling, cognitive think-aloud protocols, and expert panels. Increasing the automation of many of these security processes, combined with rigorous analysis, would eliminate many opportunities for security breaches.

4. Launch a research agenda. Researchers and funders must look to long-term efforts that include the continual development and improvement of realistic testbeds and careful evaluation of technology based on those testbeds. The workshop recommended that multiple cycles of evaluation are needed. In the first cycle, researchers might work with end-users to see how they react to initial tool functionality and design. In later cycles, after responding to initial concerns, more rigorous evaluation could be undertaken. This is a process that may go through many cycles and takes time. Funding agencies and users must recognize that long time periods are needed for this process to work well.

5. Create measures of effectiveness. If practitioners are to understand which technologies are worth being deployed, they need measures of effectiveness that can help them distinguish and choose among options. These measures should provide qualitative assessments of functionality and usefulness, as well as the more typical quantitative metrics.


The workshop addressed the question of best practices primarily through breakout groups that focused on each research area separately. It became clear, however, that there were commonalities across all areas. Unfortunately, it was agreed that there are not very many best practices within individual areas. It was difficult enough to define ‘best practice’, let alone the appropriate problems for which best practices should be developed. Furthermore, best practices change so quickly that it would be difficult to create a static list.

Instead, the subgroups looked to mechanisms and processes that could be put in place to dynamically track best practices. We report on recommendations separately for each research area.

Information Fusion

While researchers are very often focused on tools and methods, we agreed that what needs to be disseminated and described to the general community are the best tools for given tasks. We need a focus on the problems that get solved. Thus, a summary of what different sensors, engines do is not helpful; instead, practitioners need to know how it behaves in a specific context.
This subgroup recommended the development of a playground for tool evaluation. The playground would define scenarios and data against which tools could be tested. Such a playground might be set up on the Web, allowing researchers to post tools and practitioners to specify problems against which they could evaluate multiple tools. In order for this to work, researchers must agree on an annotation scheme for markup of data and common APIs for tightly coupled or distributed architectures. In addition to tasks, games should also be explored as a motivating mechanism for exploring the best fit of a tool.

In summary, this subgroup did not think it appropriate for any organization to develop a list of best practices; rather, it thought it would be better to define an environment for determining best practice, given a particular task. Best practice depends on context. This environment should be used to capture lessons learned. It should be developed as a glass-box scenario, logging behavior and allowing observation of end-users to see how well tools work, particularly when personal preferences play a role. It is possible that an organization such as the Linguistic Data Consortium at the University of Pennsylvania would be appropriate for setting up and maintaining such an environment, if provided with adequate funding.

Real-Time and Embedded Systems

The few best practices in existence include formal methods used for core algorithms, real-time analysis, and quality of service guarantees. In addition, there are common modeling and analysis tools in use, as well as integrated development environments. However, most of these tools are limited to isolated problems and situations. They also do not adequately address security and information assurance issues. Thus, none of these tools and best practices are needed for all of these issues.

The most critical areas for which best practices are needed include methods to deal with the integration of constraints, dynamic real-time aspects of the system, dependable software development for real-time systems, computer security, and more principled development of large-scale distributed systems, which typically are still ad hoc.

This subgroup recommended the development of a set of Critical Infrastructure Protection (CIP) centers that focus on science and provide industry/research consortiums. Such centers could provide diversity on any given problem and will allow for integration of security with real-time issues. Different centers might focus on different problems: emergency response systems; wireless sensor networks for security of infrastructure systems for power, water, and transportation; cyber security on the Internet—but cooperate with others.

Security

The security subgroup had the least agreement on what constitutes best practice, opting for the term “plausible practice” instead. Even security itself encompasses many possible areas, such as cryptography, network security, computer security, and security administration. The subgroup focused on security administration.

Recommendations include the need for more quantitative research on good security and evaluation. For improvement in security practice, the subgroup pointed out the need for creating novel forms of attacks on existing methods. Best practice is often limited due to the installed operating system and software, which are often decades behind the techniques put forth by the research community. This dichotomy between research and practice in security means that different recommendations must be developed for different situations. Given that all of our systems have vulnerabilities, it is utopian to expect that any system can ever be entirely secure. Instead, we need to move toward strategies that provide security components that are self-configurable and, in the case of attacks, self-healing.

Recommendations on Strategies for Funding Research in These Areas

There are a number of programs already in place at the different funding agencies to address issues of national security.*

The workshop recommends that a mix of funded programs targeting issues of national security be established and maintained. In particular, it is important that both short- and long-term efforts be supported; either type of effort alone is not sufficient. Four critical issues were identified as key to development of new technologies for national security:

1. Improve mechanisms for fund- ing technology transfer. We need better methods for funding efforts to deploy mature research into applications. Possibilities include 12-month funding augmentation at the end of existing grants or short-term grants focused entirely on technology transfer. Improvement of the Small Business Innovation Research (SBIR) model should also be considered. The conversion rate from Phase I to Phase II SBIR grants in the current model is fairly low, but many small companies are never weaned off of SBIR grants; when these grants end, the company also ends. A more gradual move between phases is needed. In addition to short-term efforts, a study of mechanisms that facilitate technology transfer is needed.

2. Establish support for long-term research on national security. The problems will not be addressed by deployment of existing research alone. Many of the problems facing the intelligence community are hard ones and existing solutions are not available. Nonetheless, there are research efforts underway that are applicable to these problems that could be focused on this area. Funding programs that allow for the creation of centers and focused research over a long time period are needed. The need for open and realistic testbed data sources, comparable to the data used by the intelligence community, is one example of an area where new research is needed. These testbeds would in turn be used for other research. The NSF KDD and ARDA programs provide good models for this type of funding. Additional programs such as these in more are needed.

3. Create new programs that facilitate interactions between practice and research. Such programs could include a faculty center where faculty are given clearances, or a scholar-in-residence program where researchers spend a sabbatical or a shorter period of time at one of the intelligence agencies or national laboratories where researchers and practitioners could be brought together. Programs that embody cognitive methods for observing end-user needs and the use of demo and employed systems are particularly important. Flexibility and experimen- tation with new models for prototyping, testing, and redesigning systems are needed.

4. The research community must get involved. There is a need for more participation by researchers on the NSI/KDD and ARDA research community in funding programs. DARPA has a need for new program managers, and without them new programs will not be initiated. NSF also has a need for rotators who are willing to serve time at NSF to oversee funding programs. Research recommendations from the community are also influential in starting new programs at both DARPA and NSF. For example, in order to establish a cross-institutional workshop on a topic of relevance, NSF needs a White Paper from a university. Similarly, DARPA is open to suggestions from the community on new programs.

*The National Science Foundation (NSF) has created at least one program jointly with the National Security Agency under the Knowledge Discovery and Dissemination (KDD) program, and plans others. The mission of the Advanced Research and Development Activity (ARDA) is to work closely with the intelligence agencies and has several programs (e.g., AQUAINT, NIMA) where researchers and intelligence analysts are trained to work together on problems and solutions. DARPA has no set-aside to address problems in information security, but initiatives can come through the program managers. That said, there are several ongoing security-related programs within DARPA that bring together research from different sides.

Workshop Participants

James Allan
University of Massachusetts, Amherst
Kaley Allwein
Defense Intelligence Agency
Chris Buckley
S a t i Research
Jagdish Chandra
George Washington University
Yvo Desmedt
Florida State University
Helen Gill
National Science Foundation
Virgil Gligor
University of Maryland
Sally Howe
National Coordination Office of Virginia, and Lori Clarke
[University of Massachusetts, Amherst] are all members of CRA’s Board of Directors.
# 2002-03 Computing Research Association Members

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## Labs and Centers Members

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## Affliate Professional Society Members

| American Association for Artificial Intelligence |
| Association for Computing Machinery |
| Canadian Association of Computer Science (CACS/AIC) |
| IEEE Computer Society |
| Society for Industrial and Applied Mathematics |

*New members 2002-23
principle in hiring, tenure, scholarships, and the provision of lab space and equipment. It is the law on the books, and schools that are not following it now should be put on notice that Title IX will be enforced as vigorously in the halls of academia as it is on athletic fields.

Applied more comprehensively, Title IX can serve as a valuable tool in not only breaking down formal barriers to entry, but in actually ensuring that more women succeed at math, science and engineering—or any other disciplines they choose.

This will require a sea change in the attitudes of many people at the nation’s educational institutions. In my view, the Federal government should move now to bring about that change in a number of ways—particularly by helping to clearly define just how pervasive and how institutionalized discrimination in these fields has become.

Despite a great deal of anecdotal evidence, there are few studies about just how often women are discouraged from studying math, science and engineering, and how regularly women who do enter these fields face discouragement from their supervisors and colleagues. That is why Senator Barbara Boxer (D-CA) and I have asked the General Accounting Office to find out what is being done, if anything, to ensure Title IX enforcement in math, science, and engineering.

I also led legislation requiring a review of whether the National Science Foundation is meeting its goals to expand opportunities in these disciplines for women, minorities, and people with disabilities, particularly in faculty hiring, promotion, tenure, and allocation of lab space. Another section of my amendment required a study to look at gender differences in the distribution of Federal research and development funds.

Shifting awareness in the government’s scientific culture may be just as critical as changes at our educational institutions. As chair of the Science, Technology, and Space Subcommittee in the previous Congress, I held several hearings on the topic of encouraging women to enter math and science fields. One was at the National Aeronautics and Space Administration, where I was told by NASA’s leadership that they were in the process of creating a new education initiative to help triple the number of women graduating with math, science, and engineering degrees by 2012. With clear evidence of inequity, there was no reason a Federal agency launching an education program should not do so with an eye to closing the gender gap.

I am committed to continuing to push government agencies and institutions receiving Federal funds to abide by and actively consider the text and spirit of Title IX. That is why I have signed on as a co-sponsor to two resolutions, one introduced by Senator Joe Biden (D-DE) and the other by Senator Patty Murray (D-WA), both of whom reaffirm our commitment to the principles set forth in the Title IX law.

After I began advocating publicly on this issue, I received an e-mail from a professor on a search committee for a chemistry professor. He was lamenting the fact that out of 80 applicants for the position, only six were women. This frustrated educator suggested that gender inequity had to be attacked much earlier in the process, and I agree—it must be attacked much earlier, and in some cases even outside the scope of Title IX.

In addition to the barriers women face in the educational arena, cultural stereotypes discourage girls from math and science at a young age. Young girls in their formative years too often receive the message that math and science are not meant for them. In fact, one popular talking doll on the market a few years ago actually quoted catch phrases like “math is hard” and “shopping is fun.” Inside the classroom, a lack of expectations and a shortage of female role models frequently perpetuate the problem.

The good news is that the stereotypes can be overcome. Nancy Stueber, the president of the Oregon Museum of Science and Industry, has told me stories of young girls who walked into the museum thinking that science and math were for boys. When the girls were asked to draw pictures of a scientist, they all drew an older white man in a lab coat. However, after participating in programs at the museum, those same girls drew pictures of women in lab coats. They had begun to imagine themselves as mathematicians, scientists and engineers.

My goal is to make sure that when those young women choose their careers, this nation’s educational institutions are fully compliant with the law that guarantees them equal access. Careers in math and the hard sciences are their right—and it is in our nation’s interest to encourage them. The enforcement of Title IX may well be America’s best hope to maintain our position at the forefront of key scientific disciplines and our leadership in the world community.

Senator Wyden (D-OR) was elected to the Senate in 1996 and is a former chair of the Senate Commerce Subcommittee on Science, Technology, and Space. [The Senator’s views do not necessarily represent the views of CRA.]

“Expanding the Pipeline” is a regular feature in CRN, prepared by the CRA Women’s Committee (CRA-W). It serves as a vehicle for describing projects and issues related to women in CSE and a source of information for issues faced by underrepresented groups in CSE.

Undergraduate Awards

Pictured above receiving the female CRA Outstanding Undergraduate Award for 2003 is Bistra Dilkina, Simon Fraser University. The award was presented by CRA’s executive director, Andy Bernat, at ACM’s awards banquet in San Diego in June. Looking on is Julie Thornton, Kansas State University, who received the female runner-up award.

Computing Research News

Vol. 15/No. 4

September 2003

Undergraduate Awards

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Computing Research News
The Northern Report from Page 4

research infrastructure, often with matching funds from provincial gov-
ernments and industry. While none of these programs is focused on com-
puter science specifically, computer science departments have certainly
taken at least their fair share of these funds. Overall, the general climate in Canada for research seems to be
highly positive, with both levels of
government actually supporting their innovation agendas with real funding.

Enrollment Trends

A recent survey of Canadian computer science departments has revealed a general leveling off in
undergraduate enrollments with some universities experiencing consider-
able decline, especially in the early
years of their programs. It is also
increasingly difficult to get intern-
ship and co-op placements for stu-
dents, and the job market generally
for computer science graduates is
soft. This seems to be at least a
North America-wide phenomenon in
the wake of the dot-com crash.
On the other hand, graduate
enrollments continue to surge, a
natural enough result of increased
numbers of faculty members and
increased research funding. Unless
the job market turns around, an
obvious crunch point lies ahead,
with many freshly-minted Ph.D.
graduates and not many new faculty
and industrial research positions for
them. This is certainly worrisome.
One trend that may help to offset
this worry is a widespread movement
among Canadian computer science
departments to forge interdisci-
plinary programs with a variety of other academic disciplines. New faculty
positions may become available to
support these interdisciplinary pro-
grams, and current faculty may
well be attracted to such programs,
especially those who have not been
attracted to traditional notions of
computer science.

The Computer Science Accred-
idation Council of Canada (CSAC)—a joint body of the Canadian academic computer science community and the
Canadian Information Processing Society (CIPS), the Canadian organi-
ation of software professionals—has
drafted revised standards for both
computer science and software engi-
neering programs. At a recent meet-
ing of computer science department
chairs, however, there was some
unanimity with the conservative nature of these standards, and a wish on
the part of many departments to expand
the notion of computer science to
include much more broadly inter-
disciplinary perspectives and to have
standards for a much wider variety of programs. The new standards and
these broader issues are now being
discussed by CSAC and CACS/AIC.

Software Engineering

Software engineering professional-
ism is still a hot issue in Canada. Start-
ing in the mid-90s, the engi-
neering profession in Canada began
to assert what it saw as its exclusive
right to practice in the area of soft-
ware engineering, an assertion that
has been hotly contested by the
Canadian computer science commu-
nity. There are three interrelated
fronts to this dispute.
The first front has (nominally)
been an argument about the use of
the term “engineering.” In 1997, the
ingengineering profession launched
legal action against Memorial
University of Newfoundland (MUN)
for offering a software engineering
program within their computer sci-
cence department in the faculty of
science. The basis for this lawsuit
was a 1995 trademark filed by the
engineering profession on the terms
“engineer” and “engineering.”
Eventually, MUN was joined in its
defense by the Association of
Universities and Colleges of Canada
(AUCC), the organization of
Canadian universities, which was
concerned about academic freedom); CIPS (which was concerned about
its members’ right to practice); and
CACS/AIC (which was concerned
about both). In 1999, the lawsuit was
suspended for a period of 5 years to
allow both sides to work out a com-
promise. Despite several early com-
promise proposals, it now seems that
no reconciliation will be achieved, even though the morato-
rium expires in another year.
The second front is the creation
and accreditation of software engi-
neering programs within and outside
of engineering. For the past several
years, engineering schools across
Canada have been creating their
own software engineering programs,
variations on standard engineering
programs and accredited by the
Canadian Engineering Accreditation
Board (CEAB). Most engineering
schools now have such programs,
although the software-specific
courses are often provided by com-
puter science departments. So far,
seven of these programs have been
accredited by CEAB. At the same
time, a number of computer science
departments have created their
own software engineering programs, varia-
tions on standard science programs,
five of which have been accredited
by CSAC.
The third front involves the right
to practice. Several years ago, engi-
neering associations across Canada
began to successfully lobby for
changes to their provincial and terri-
torial Engineering Acts (under
which the engineering profession is
granted exclusive right to practice
engineering) to make it easier to
claim “emerging areas of engineering
practice.” These changes tended to
replace the existing description of
the scope of engineering practice
(which heretofore had included a
lengthy list of engineering works)
with an essentially circular definition of engineering as that discipline
that draws on engineering principles.

Such a broad definition would cer-
tainly make it easier to “claim” soft-
ware engineering (as well as many
other areas not traditionally consid-
ered to be engineering). CIPS,
CSAC, and CACS/AIC are attempt-
ing to see if further revisions can be
made to these Engineering Acts to
ensure that the right to practice soft-
ware engineering is clearly protected
for the wide variety of people who
have the appropriate skills to do so,
whether or not they are professional
engineers. Negotiations with engineer-
ing societies and government
have not yet resulted in
such protection.

Given the size and importance of
the software industry, and the impli-
cations for everything from the train-
ing of software professionals to the
final certification of software quality,
the final reconciliation of the soft-
ware engineering dispute seems urgent not only to Canadian
computer science departments, but
to the entire Canadian economy.
Unfortunately, at the current time,
that appears to be the court to make the final decisions about the
software engineering dispute, since no
appropriate compromise positions seem to be on the horizon.
So, that’s it for this year’s report.
Hopefully I will be able to update
you next year with lots of positive
news from the far north.

Note: The word “department” is
used generically to refer to department,
school, or faculty of computer science.

CRA Releases Two New Reports

During the summer CRA released two reports, Grand Research Challenges in Information Systems, and Recruitment and Retention of Faculty in Computer Science and Engineering.
The first is the report of the Grand Research Challenges Conference CRA
held in June 2002. This conference, which focused on information systems,
was the first of a series of conferences CRA plans to hold to address the
grand research challenges in a variety of areas related to computer science and engi-
neering. The next conference, on information security and assurance, will be
held in November 2003 (see announcement elsewhere in this edition of
CRN).
The second report, Recruitment and Retention of Faculty in Computer Science and Engineering, addresses earlier concerns about the effect that departures of
faculty to industry (e.g., dot-com companies) might have on the ability of uni-
versities to carry out their research and teaching missions. Since this project
began, economic conditions have altered the landscape, especially for high-
tech firms. However, the empirical data in this report provide a useful tool for understanding the issues surrounding faculty recruiting and retention, both
now and in the future.
Both projects were supported by the National Science Foundation. The
reports are posted on the CRA website (http://www.cra.org), and copies may
be requested by e-mailing info@cra.org.

Pictured above at CRA’s Workshop on the Road Map for
the Revitalization of High End Computing in June are (left to
right): Thomas Sterling, Center for Advanced Computing
Research, California Institute of Technology/JPL; Dan Reed,
National Center for Supercomputing Applications, University
of Illinois at Urbana-Champaign (Workshop Chair), and
David Nelson, Director, National Coordination Office for
Information Technology Research and Development, the
workshop’s sponsor.
such a vital part of national security. Cyber Trust is an example of how the new CISE structure and processes will address important themes, while reducing duplication and staff workload, increasing the opportunities for collaboration and innovative research, and providing the budget flexibility to make available appropriate duration and levels of funding.

Evolution of ITR

The community has long known that fiscal year 2004 would be the final year of the five-year Information Technology Research (ITR) program as a designated “NSF Priority Area,” and has expressed a lot of interest in how it will evolve. The success of the previous four years indicates that ITR should remain an important part of CISE for many years to come. The NSF program is transitioning, and the new program will include CISE investments in areas of existing ITR activity, as well as new areas.

As mentioned above, ITR funding will include CISE investments in these thematic areas. In addition, it is likely that rather than inviting a broad range of proposals in three (small, medium, and large) size categories, proposals will be solicited by focus areas.

While details of the solicitation were not available at the time this article was written, we can offer some insight into possible focus areas. Since each of the NSF directorates will have a different area of focus in FY 2004, proposals will be solicited by focus areas.

Budget

NSF continues to enjoy broad support from both the administration and Congress. CISE received a very generous increase in appropriations from Congress in 2003. The doubling of the NSF budget by 2007 has been authorized, and we will need annual increases in our appropriations to meet that target.

The fiscal/academic year 2004 is shaping up to be a great opportunity. The CISE staff looks forward to working with its communities of researchers and educators to seize those opportunities.

Transitions and News

Alfred V. Aho, previously Vice President of the Computing Sciences Research Center at Bell Labs, has returned to Columbia University as Professor of Computer Science.

Marjory Blumenthal, Executive Director of the National Academies’ Computer Science and Telecommunications Board, has recently become the Associate Provost (Academics) at Georgetown University.

David Farber has joined the faculty of Carnegie Mellon University as Full Professor of Computer Science and Public Policy in the School of Computer Science, with secondary appointments in the Heinz College and the School of Urban and Public Policy. Dr. Farber has previously worked at AT&T and Filer Moore Professor of Telecommunication Systems at the University of Pennsylvania.

Your Freund and Robert Schapire have been awarded the 2003 Gödel Prize for their paper “A Decision-Theoretic Generalization of On-Line Learning and an Application to Boosting,” Journal of Computer and System Sciences 55 (1997), pp. 119-139. The Gödel Prize for outstanding papers in the area of theoretical computer science is sponsored jointly by the European Association for Theoretical Computer Science (EATCS) and ACM-SIGACT.

Congratulations to CRA board member Barbara Grosz, Professor of Engineering & Applied Sciences at Harvard University, who has been elected to the American Philosophical Society. Election to the APS, this country’s first learned society, honors extraordinary accomplishments in all fields.

The community mourns the death on May 15 of Rob Kling, Indiana University’s Professor of Information Systems and Information Science at the School of Library and Information Science (SLIS) and Adjunct Professor of Computer Science.

Congratulations to Ian McIvor, Professor in the School of Computer Science at Waterloo University, who was recently elected a Fellow of the Royal Society of Canada, the country’s most prestigious academic honour.

Congratulations to CRA board member Larry Snyder, Professor of Computer Science at the University of Washington, on the publication of his new book, Fluency with Information Technology. Skills, Concepts and Capabilities provides students with the experience, knowledge, and capabilities needed to apply IT effectively throughout their lives. Details at http://www.aw-bc.com/info/snyder/

David Waltz, former President of NEC Research Institute and a CRA board member, has become named Director of the new Center for Computational and Learning Systems (CLASS) at Columbia University. CLASS will initially emphasize applications to biological and medical databases; natural language, speech and the Web; and computer systems security.

NSF Update from Page 4

CRA’s A. Nico Habermann award for 2003 was presented to Rita Rodriguez, Program Director in the Division of Experimental and Integrative Activities in the CISE directorate at NSF. Dr. Rodriguez is pictured above with Jim Foley, CRA board chair. The award was presented at ACM’s awards banquet in San Diego in June.

NSF continues to enjoy broad support from both the administration and Congress. CISE received a very generous increase in appropriations from Congress in 2003. The doubling of the NSF budget by 2007 has been authorized, and we will need annual increases in our appropriations to meet that target.

The fiscal/academic year 2004 is shaping up to be a great opportunity. The CISE staff looks forward to working with its communities of researchers and educators to seize those opportunities.
Applicants (or their representatives) are encouraged to review the position announcement on the College’s web page at: http://www.case.edu/case/hires/ee.cs.d12.htm for additional information about the advertised positions and contact the Chair of the Faculty Search Committee for additional information.

Assistant Professorships are available for excellent candidates with well-developed research programs in the areas of animal sciences, biochemistry, and nutrition.

Applications will be considered until the position is filled. Those interested in this position should submit a curriculum vitae, a detailed statement of research, teaching, and service experiences, and arrange for three letters of recommendation to be sent to:

Chair, Faculty Search Committee
Case Western Reserve University
Department of Environmental Health
10900 Euclid Avenue Room 388
Cleveland, Ohio 44106-7235

Applications should be submitted electronically to: http://www.case.edu/case/hires/ee.cs.d12.htm. All applications will be reviewed until the position is filled.

Faculty Search Committee
Case Western Reserve University
Department of Environmental Health
10900 Euclid Avenue Room 388
Cleveland, Ohio 44106-7235

Applications will be reviewed until the position is filled.

Faculty Search Committee
Case Western Reserve University
Department of Chemistry
10900 Euclid Avenue Room 20
Cleveland, Ohio 44106-7235

Applications will be considered until the position is filled. Those interested in this position should submit a letter of interest, a curriculum vitae, and the names, addresses, and phone numbers of five references to:

Chair, Department of Chemistry
Case Western Reserve University
10900 Euclid Avenue Room 20
Cleveland, Ohio 44106-7235

Applications should be submitted electronically to: http://www.case.edu/case/hires/ee.cs.d12.htm. All applications will be reviewed until the position is filled.

For further information, applicants should visit the employment website at: http://www.case.edu/case/hires/ee.cs.d12.htm.
The University of Alabama at Birmingham (UAB) Department of Computer and Information Sciences

The School of Electrical and Computer Engineering invites applications for faculty positions across the board for all levels of appointment at all levels. The Computer Engineering Area of the school (ECE/Research/Analysis/CompSci) has eighteen faculty members who actively engage in computer research projects in collaboration with the UAB College of Engineering, a large number of faculty members and students, and various industrial partners. We are interested in candidates with distinguished records in research, teaching, and service who have the following qualifications:

1. Ph.D. in Computer Science, Electrical Engineering, or a related field
2. A strong commitment to excellence in teaching, research, and service
3. A strong publication record, including at least three papers in top-tier conferences or journals
4. Demonstrated ability to secure external funding
5. Excellent communication skills

Applicants should submit a cover letter, a complete curriculum vitae, a statement of teaching and research interests, and three letters of recommendation by email to:

Professor John S. Stankovic
Chair, CS Search Committee
Computer Science Department
University of Kentucky
Lexington, KY 40506-0046

Closing date: January 31, 2023. Review of applications begins immediately and will continue until the position is filled.

University of Kentucky

Department of Computer Science and Vision Science Faculty Assistant Research Professor of Computer Science

The Department of Computer Science and Vision Science at the University of Kentucky is seeking an Assistant Research Professor of Computer Science to develop computational methods in computer science and vision science. The position is expected to start in Fall 2023 and will be tenure-track. Qualified candidates should have a strong research background in computer science and vision science, with a focus on areas such as machine learning, computer vision, and computational neuroscience. The ideal candidate will have a Ph.D. in Computer Science or a closely related field and will be expected to develop a strong research program, secure external funding, and contribute to the education and research efforts of the department. The position is available immediately, and the search will continue until a suitable candidate is found.

University of Massachusetts, Amherst

Computer Science Department Robotics Lab

The Laboratory for Perceptual Robotics focuses on the development of sensor-based control systems for complex, multi-objective robotic systems with applications in autonomous assembly planning and robot learning. The position is available immediately, and the search will continue until the position is filled. Interested candidates should submit a letter of application, a curriculum vitae, and three letters of recommendation to:

Professor John S. Stankovic
Chair, CS Search Committee
Computer Science Department
University of Kentucky
Lexington, KY 40506-0046

Closing date: January 31, 2023. Review of applications begins immediately and will continue until the position is filled.

University of Nebraska Lincoln

Endowed Chair Professorship in Software Engineering

Software engineering is a thrust area of the School of Computing and Information Science (CISE) Department at the University of Nebraska-Lincoln. We are seeking a creative, visionary leader who will develop and grow the software engineering discipline. The position will involve teaching, research, and service at a high level. The successful candidate will be a strong leader who will be expected to develop and strengthen the software engineering program, to lead and mentor junior faculty, and to attract external funding. The position will begin as early as Fall 2023. Applications are encouraged from candidates with a Ph.D. in software engineering or a closely related field. The initial term of appointment will be five years, renewable based on performance. The successful candidate will be expected to engage in high-impact research that leads to publications and to actively participate in the education and training of graduate students. The position is available immediately, and the search will continue until a suitable candidate is found.

University of North Texas Computer Science and Engineering

Computer science and computer engineering courses are offered at all levels in the Bachelor of Science, Master of Science, and Doctoral of Philosophy degree programs. The Department of Computer Science and Engineering at the University of North Texas invites applications for a faculty position at all levels. The Computer Engineering Area of the school (ECE/Research/Analysis/CompSci) has eighteen faculty members who actively engage in computer research projects in collaboration with the UAB College of Engineering, a large number of faculty members and students, and various industrial partners. We are interested in candidates with distinguished records in research, teaching, and service who have the following qualifications:

1. Ph.D. in Computer Science, Electrical Engineering, or a related field
2. A strong commitment to excellence in teaching, research, and service
3. A strong publication record, including at least three papers in top-tier conferences or journals
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5. Excellent communication skills

Applicants should submit a cover letter, a complete curriculum vitae, a statement of teaching and research interests, and three letters of recommendation by email to:

Professor John S. Stankovic
Chair, CS Search Committee
Computer Science Department
University of Kentucky
Lexington, KY 40506-0046

Closing date: January 31, 2023. Review of applications begins immediately and will continue until the position is filled.

University of Virginia

Department of Computer Science

Software engineering is a thrust area of the School of Computing and Information Science (CISE) Department at the University of Nebraska-Lincoln. We are seeking a creative, visionary leader who will develop and grow the software engineering discipline. The position will involve teaching, research, and service at a high level. The successful candidate will be a strong leader who will be expected to develop and strengthen the software engineering program, to lead and mentor junior faculty, and to attract external funding. The position will begin as early as Fall 2023. Applications are encouraged from candidates with a Ph.D. in software engineering or a closely related field. The initial term of appointment will be five years, renewable based on performance. The successful candidate will be expected to engage in high-impact research that leads to publications and to actively participate in the education and training of graduate students. The position is available immediately, and the search will continue until a suitable candidate is found.