

COMPUTING RESEARCH NEWS

A Publication of the Computing Research Association

May 2008

Vol. 20/No. 3

Adrion and Ladner Win CRA Service Awards

CRA is pleased to announce the winners of its 2008 service awards, which will be presented at the CRA Conference at Snowbird on the evening of July 14.

CRA Distinguished Service Award



The CRA Board of Directors has selected **W. Richards (Rick) Adrion**, University of Massachusetts at Amherst, to receive the 2008 Distinguished Service Award.

Adrion was recognized for his sustained record of effective and significant service contributions spanning more than two decades. He has played a key role in building, nurturing and shaping today's computer science community. Among these contributions are leadership in the development of the Internet; leadership in setting strategic directions at the National Science Foundation; leadership in developing

a stronger political voice for computer science in national politics; leadership in strengthening the software engineering community; leadership in strengthening, modernizing and invigorating computing and information technology programs in Massachusetts public higher education; and overall service to the computer science community. Rick Adrion was general chair of the first ACM/CRB Conference on Strategic Directions in Computing. He also played a leadership role in the formation of CRA and was an active board member for many years, serving on the Executive Committee and Government Affairs Committee.

Rick Adrion is Professor of Computer Science at UMass Amherst, Co-Director of RIPPLES, Co-Director of the Commonwealth Information Technology Initiative (CITI), and Director of CRICCS. He served as Division Director for Experimental and Integrated Activities in the NSF Directorate for Computer and Information Science and Engineering (CISE) from January 2000 through August 2002, and as a part-time Senior Advisor in CISE until September 2003.

CRA A. Nico Habermann Award



The CRA Board selected Richard E. Ladner, Boeing Professor in Computer Science and Engineering at the University of Washington, to receive the 2008 Habermann Award. Professor Ladner is recognized for his lifelong, strong and persistent advocacy on behalf of people with disabilities in the computing community.

Ladner's contributions have been in three areas—mentoring of students, research with and for persons with disabilities, and national advocacy. He is known for his dedicated, one-on-one mentoring of students (both with and without disabilities). Over the past 15 summers, he has worked with 38 severely disabled high school students on week-long summer projects in computing. Ladner has also mentored undergraduates and graduate students with disabilities, often working with them on assistive technology research.

His assistive technology efforts have resulted in networking (remote login, email) for Seattle's deaf-blind community, large-print user interfaces for Unix machines, video compression algorithms that are tailored to American Sign Language and simple enough to implement in real-time on a cell phone, and new image processing and enhancement algorithms to convert graphical images—diagrams in math and science textbooks—into tactile images.

Richard Ladner currently co-leads the NSF-sponsored AccessComputing Alliance, a national effort to increase the number of students with disabilities majoring in computing. As part of their effort, the Alliance hosts workshops and summer camps around the country, and Ladner has run many of these, including a three-day Vertical Mentoring Workshop for the Blind in Science, Technology, Engineering and Mathematics, and a nine-week summer camp for deaf students. Ladner has also been tireless in his advocacy at the national level: he has spoken to many groups, including department chairs at the CRA Conference at Snowbird, and worked with organizations and departments (through AccessComputing's communities of practice) to make it easier for students with disabilities to fully participate. ■

Inside CRN

Expanding the Pipeline.....	2	Taulbee Survey Results.....	6
New CRA Board Members.....	3	BLS Projections 2006-2016.....	18
Musings from the Chair.....	3	Professional Opportunities.....	20
CCC Data-Intensive Computing.....	4	Snowbird 2008 Program.....	24
Science Funding FY 08.....	5		

Ricoh Innovations, Inc. California Research Center

By John Barrus, Director

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>.



The California Research Center (CRC) of Ricoh Innovations, Inc. is quickly approaching its 20th anniversary. Founded in 1989, CRC's charter was to perform fundamental research to ensure the technological future of Ricoh. Ricoh is a manufacturer of office equipment, including copiers, printers and electro-optics, and is a global remote management service provider. A \$20 billion enterprise, Ricoh Company, Ltd. (RCL) and its subsidiaries have more than 80,000 employees in 150 companies. Ricoh is well known and highly respected in

Japan and around the world and has a reputation for high-quality manufacturing and service. One of Ricoh's core values is sustainable environmental management, and our environmental activities led to a Gold Medal from the World Environment Center in 2003.

Ricoh has several large research facilities in Japan, supplemented by the California Research Center and a software research center in Beijing. CRC has a strong connection to Ricoh Japan, in particular its research divisions, with frequent visits from corporate officials and research colleagues alike. Our offices are located in the heart of Silicon Valley, right on Sand Hill Road in Menlo Park.

The twenty research scientists at CRC conduct research in a variety of areas, including document workflow, multimedia document capture and analysis, media organization and communication and, more recently, digital optics and document-centric devices.

CRC has always developed software prototypes and hardware designs, but now has the facilities and expertise to create complete electronic devices—from circuit boards and enclosures to system software and user-interfaces. Overall, our efforts have resulted in more than 300 issued U.S. patents, and numerous peer-reviewed conference and journal publications. Also, CRC researchers have garnered several external awards, such as best paper awards and fellowships from major international technical societies. CRC scientists often deliver plenary lectures and invited papers.

CRC has had a direct impact on Ricoh in a number of ways. CRC creates new technology that leads to new products and services. For example, CRC created the world's fastest JPEG software and its smallest ASIC

Ricoh Innovations, Inc. CRC
Continued on Page 5

NONPROFIT ORG.
U.S. POSTAGE
PAID
WASHINGTON, DC
PERMIT NO. 983

CRA
1100 Seventeenth Street, NW
Suite 507
Washington, DC 20036-4632

Computing Research Association

Board Officers

Daniel A. Reed
Chair
Microsoft Research

Lori Clarke
Vice Chair
University of Massachusetts

Carla Ellis
Secretary
Duke University

Philip Bernstein
Treasurer
Microsoft Research

Board Members

Annie I. Antón
North Carolina State University

William Aspray
Indiana University

Andrew A. Chien
Intel Corporation

Anne Condon
University of British Columbia

George V. Cybenko
Dartmouth College

Richard A. DeMillo
Georgia Institute of Technology

Marie desJardins
University of Maryland,
Baltimore County

Eric Grimson
Massachusetts Institute of
Technology

Mary Jean Harrold
Georgia Institute of Technology

Laura M. Haas
IBM Almaden Research Center

Peter Honeyman
University of Michigan

Norman Jouppi
Hewlett Packard

Peter Lee
Carnegie Mellon University

J Strother Moore
University of Texas at Austin

David Notkin
University of Washington

Martha E. Pollack
University of Michigan

Jennifer Rexford
Princeton University

Robert Schnabel
Indiana University

Fred B. Schneider
Cornell University

Marc Snir
University of Illinois
at Urbana-Champaign

Robert F. Sproull
Sun Microsystems Laboratories

David Tennenhouse
New Venture Partners

Frank Tompa
University of Waterloo

Moshe Vardi
Rice University

Jeffrey Vitter
Purdue University

Benjamin Wah
University of Illinois
at Urbana-Champaign

Richard Waters
Mitsubishi Electric
Research Labs

Bryant York
Portland State University

Executive Director

Andrew Bernat

CRN Editor

Jean Smith

Affiliate Societies



CACS/AIC

siam.



USENIX

Expanding the Pipeline

African-American Researchers in Computing Sciences: A Model for Broadening Participation in Computing

By Juan Gilbert, Jerlando Jackson, and Cheryl Seals

African-Americans in Computing Sciences

According to the most recent Computing Research Association (CRA) Taulbee Survey, African-Americans represent 1.3 percent of all computing sciences faculty. Nationally, across all disciplines, African-Americans represent 5.2 percent of all academic faculty.

The African-American Researchers in Computing Sciences (AARCS) program was funded by the National Science Foundation's Broadening Participation in Computing (BPC) program in 2006. It aims to narrow the gap between computing science faculty and the national average by eliminating concerns and misunderstandings about graduate school, research, and computing sciences faculty among African-American undergraduate computing sciences majors.

AARCS Program

The African-American Researchers in Computing Sciences program consists of three components: 1) targeted presentations, 2) future faculty mentoring, and 3) an annual AARCS mini-conference.

Targeted Presentations

The targeted presentations component consists of a presentation that addresses seven barriers, identified by social science research, for minority participation in STEM Ph.D. programs. In this component, at least one faculty member and one graduate student will travel to an HBCU and give a presentation discussing graduate school, computing sciences research, and academic faculty employment. The faculty member executes the targeted presentation and the graduate student assists in answering questions after the presentation. The targeted presentations address all the misunderstandings that undergraduates may have about computing sciences graduate school programs, academic faculty, and research. The content of the targeted presentation may be summarized in terms of seven barriers:

1. Stereotypes

The inaccurate stereotypes that students typically have of scientists (e.g., as white males) are immediately broken down when the faculty and the graduate students walk into the room. These stereotypes do not fit the presenting faculty or the graduate students. In the presentation, the stereotypes are explicitly pointed out and immediately discarded.

2. Role Models

The presentation explains the importance of role models. At the same time, the presentation reveals the low numbers of African-Americans in the computing sciences.

This approach is taken to help the students realize the slim chances of finding African-American role models within the computing sciences through random encounters alone. However, through AARCS, the students will enter a network of African-Americans in computing sciences, making them more likely to find useful mentors.

3. "Helping" Professions

Within the presentation, several links are made to illustrate how computing sciences can be used to "give back" and help others. Specifically, the presentation suggests research areas—like artificial intelligence, advanced learning technologies, human-centered computing, and others—as vehicles that can be used to give back and demonstrate how computing can be used to help others.

4. Financial Concerns

The presentation covers graduate school funding opportunities. An explanation of graduate teaching assistantships, research assistantships and fellowships is provided. Specifically, fellowship opportunities for African-Americans are discussed.

5. Inadequate Advisement

Research has shown that African-Americans and other minorities often suffer from inadequate advisement about graduate school, research and the professoriate. The targeted presentation addresses this issue head-on by suggesting resources that provide advisement and options. The targeted presentation and the AARCS program are vehicles of proper advisement; therefore, the presentation itself addresses this issue.

6. Lack of Knowledge Regarding the Advantages of Having a Ph.D.

Research has shown that African-Americans and other minorities may not see the advantages of having a Ph.D.; therefore, these groups do not tend to pursue the degree. The targeted presentation offers several advantages of obtaining a Ph.D. in computing sciences—tenure, the ability to work on problems you want to address, and salary, for example.

7. Employment Opportunities

Similar to the lack of knowledge regarding the advantages of having a Ph.D., research shows that often minority groups do not understand the employment opportunities available to Ph.D. recipients. Employment opportunities are addressed by providing facts about computing sciences. The presentation addresses outsourcing concerns, corporate employment options, government research opportunities (NSF, DARPA, etc.), faculty employment

options and research scientist options.

The targeted presentations provide motivation and information for undergraduates to pursue graduate school opportunities. The future faculty mentoring component works with graduate students.

Future Faculty Mentoring

Given the disparity between the number of African-Americans receiving the Ph.D. in computing sciences and the number who pursue faculty positions, it became clear that African-Americans do not receive adequate advice upon the completion of their Ph.D. Several students have expressed this concern in private discussions. As a result, the Future Faculty Mentoring (FFM) component was created as part of the AARCS model. Initially, a group of African-Americans from across the country in computing sciences Ph.D. programs in research-intensive institutions were pulled together as participants in the FFM component. The goal of the FFM component is to advise these students on the academic search process. Each of them had expressed an interest in obtaining a faculty position, but no one had explained to them, for example, how to search for positions, how the interview process works, or how to negotiate salary. In fact, some of the students were told that they would make "good teachers." In other words, these students were told that they were not worthy of faculty positions at research-intensive schools.

The FFM group regularly exchanges email and participates in scheduled conference calls. Some of the FFM activities include reviewing academic job announcements and reviewing job offers collected from other African-Americans in computing sciences. The students share information about their interviews and offers. In fact, the FFM component has a database of job offers that can be used for future FFM groups. Every member of the FFM group who accepts a tenure-track appointment will be a success.

African-American Researchers in Computing Sciences (AARCS) Mini-Conference

The AARCS mini-conference is a two-day symposium that brings together students from the targeted presentation sites and African-American researchers from computing sciences all over the nation. Undergraduate students apply for travel scholarships to attend the AARCS mini-conference. The mini-conference includes the following activities:

1. Prominent African-American researchers from computing sciences participate as speakers.

African-American Researchers
Continued on Page 23

CRA Elects New Board Members

In its recent election, CRA elected three new members to its board of directors. They will begin three-year terms on July 1, 2008.



Susanne Hambrusch is a Professor in the Department of Computer Science at Purdue University, and recently completed five

years as department head. Since 2003, she has served as Co-Director of the Center for Wireless Systems and Applications at Purdue.

As a CRA-W board member, Hambrusch has served as a co-director of CREU and MRO-W, and was an Invited Distinguished Professor in its Cohort of Associate Professors Project in 2005. At Snowbird 2006, she was a panelist in the New Department Chairs Workshop, and will co-chair that workshop in 2008. She has also organized a workshop for Snowbird 2008.

Hambrusch has served as a member of External Advisory Boards at Virginia Tech and Georgia Tech, and has been a member of the Editorial Boards of *Parallel Computing* and *Information Processing Letters*. Her research interests include parallel and distributed computation, data management and query processing in mobile environments,

uncertainty management in databases, and analysis of algorithms. Professor Hambrusch was awarded a Ph.D. in computer science from Pennsylvania State University.



James Kurose is Distinguished University Professor, Department of Computer Science at the University of

Massachusetts, Amherst, where he served as chair from 1998-2001.

He is a Fellow of both the IEEE and the ACM; other honors include the IEEE Computer Society's Taylor Booth Education Medal, and IEEE Communication Society Publications Exemplary Service Award. Kurose was Founding Editor-in-Chief, *IEEE/ACM Transactions on Networking*, and twice served on the IEEE Communications Society Board of Governors. He has been program co-chair of a number of conferences and workshops, including IEEE Infocom, ACM Sigcomm, ACM Sigcomm Education Workshop, ACM Sigmetrics, and ACM IMC. Kurose also has chaired a number of NSF workshops such as Network Research Testbeds and Integrated Computing and Education and Research, and co-chaired a CPATH New England Town Hall Meeting. He

currently serves on the ACM Education Council.

Professor Kurose's research interests include network protocols and architecture; network measurement; sensor networks; multimedia communication; and modeling and performance evaluation. He was awarded a Ph.D. in Computer Science from Columbia University.



Valerie Taylor is Professor and Head of the Department of Computer Science at Texas A&M University.

She has served as co-chair, chair, and member of the Executive Committee of the *Coalition to Diversify Computing*. Active in Snowbird Conferences, Taylor has been a member of the program committee; a panel member on the workshop for New Department Heads workshop; and a panel co-chair for the Industrial Affiliates Programs session.

In 2006, Taylor was part of the NSF Delegation of CS Department Heads visit to China. Currently she is co-organizer of Academic Workshops for Under-Represented Faculty and Senior Graduate Students. She has served on several editorial boards and won a number of prestigious awards.

Taylor's research interests include: systematically analyzing and improving application performance in the context of parallel and distributed applications; dynamic and static load balancing for distributed applications; and analysis of nano-memories. Professor Taylor received her Ph.D. in Computer Science from the University of California, Berkeley.

Five current board members—**Rich DeMillo** (Georgia Tech), **Peter Lee** (Carnegie Mellon), **J Strother Moore** (University of Texas at Austin), **David Notkin** (University of Washington), and **Dick Waters** (Mitsubishi Electric Research Labs)—were re-elected to three-year terms effective July 1, 2008.

Anne Condon (University of British Columbia), who will complete her first term on the board on June 30, 2008, did not run again due to new responsibilities at UBC. Mike Jones (Microsoft Research), who has represented USENIX on the board since 2002, has recently been replaced by Peter Honeyman (University of Michigan). Our thanks to Anne and Mike for their contributions to CRA. ■

Musings from the Chair

Snowbird and the Big Data Avalanche

By Dan Reed, CRA Board Chair



Snowbird: Navigating the Research Slopes

As I write this column, a late spring snow has settled over Seattle, covering

my freshly mown lawn. This prompted me to think about the upcoming CRA Conference at Snowbird, Utah. Every two years, the chairs of the Ph.D.-granting departments of computer science and engineering, as well as the leaders of government and industrial laboratories, gather at Snowbird to discuss all aspects of the state of computing—research, education, recruiting, diversity and inclusion, government and industrial policies, and collaboration. The Snowbird meeting provides a great opportunity for networking—the social kind—meeting new and old friends, exchanging ideas and experiences and sharing best practices.

This year's Snowbird Conference is being organized by J Strother

Moore (University of Texas at Austin) and Marek Rusinkiewicz (Telcordia Technologies), together with a very capable organizing committee. It will be held July 13-15; watch www.cra.org/Activities/snowbird/2008/index.html for details. I look forward to seeing many of you there, even without the snow!

The Big Data Avalanche

The old joke whose punch line says, "If you have to ask how much it costs, you can't afford it," has some relevance to big data. If you have to ask how big your data really is, you aren't paying attention to how fast it is growing. One need only reflect on the fact that today's inexpensive digital music players have more storage capacity than yesteryear's supercomputers.

Big data has long been a personal interest of mine—from multiple perspectives. I first watched my scientific collaborators struggle to process scientific data from expensive instruments. Now, high-resolution sensors, inexpensive, large-scale storage and their diverse applications (from digital cam-

eras to environmental monitors to scientific instruments) are changing how we record social interactions and cultural history and how we explore our world. In turn, the burgeoning volumes of data pose both opportunities and challenges for data provenance and curation, for analysis and processing, and for storage and retrieval.

These issues exemplify the breadth and depth of computing, its broad societal impact and the opportunities for multidisciplinary collaboration. As a personal example, I am a member of the electronic records advisory committee for the National Archives, which preserves the records of the federal government, including all Presidential records. The growth of Presidential email and other electronic records, together with rapidly changing email formats, storage technologies and all of the associated privacy, confidentiality and national security issues, make records' preservation and organization far more daunting than I could ever have imagined.

Hence, I am excited to have just returned from a "big data" meeting in Silicon Valley, which was organized

as a Computing Community Consortium (CCC) event under CRA auspices; see the article on page 4 for details. This visioning workshop brought together academia, government and industry to discuss research opportunities in an exciting area of great change. The talks spanned the gamut of topics, extracting insights from data via social network analysis to electronic laboratory notebooks and research provenance to large-scale infrastructure for Internet search and scientific data storage.

This meeting was but the first in a series that the CCC and CRA will sponsor over the coming months. Watch the CRA website for details.

Dan Reed, CRA's Board Chair, is Microsoft's Scalable and Multicore Computing Strategist. Contact him at Daniel.Reed@microsoft.com or his blog at www.hpcdan.org. ■

Milestone Week in Evolving History of Data-Intensive Computing

By Randal E. Bryant and Thomas T. Kwan

The last week of March 2008 saw the emergence of a significant new era in the world of data-intensive scalable computing. Co-sponsored by the Computing Community Consortium (CCC) and Yahoo!, the first ever Hadoop Summit took place on March 25 in Santa Clara, followed by the first Data-Intensive Computing Symposium on March 26 at the Yahoo! Sunnyvale headquarters.

The Hadoop Summit and Data-Intensive Computing Symposium were the kickoff events of the Big-Data Computing Study Group. Sponsored by the CCC, the study group was formed to foster collaborations between industry, academia, and the U.S. government to advance the state of the art in the development and application of large-scale computing systems for making intelligent use of the massive amounts of data being generated in science, commerce, and society.

Hadoop Summit

The Hadoop Summit brought together leaders from the Hadoop developer and user community for the first time. (Apache Hadoop, an open source distributed computing project of the Apache Software Foundation, is a distributed file system and parallel execution environment that enables its users to process massive amounts of data.) Originally planned for an audience of 100, the venue was changed to accommodate the enthusiastic response from the open source community. Close to 350 people attended the summit to listen to the talks.

At the summit, Doug Cutting from Yahoo! presented the history of Hadoop and how he started the project, and Eric Baldeschwieler from Yahoo! gave an overview of the Hadoop effort at Yahoo! (To date, Yahoo! has been the primary contributor to Hadoop.) Various speakers discussed the framework they built atop Hadoop—Kevin Beyer from IBM described the JAQL language, and Chris Olston from Yahoo! described the Pig parallel programming language. Michael Isard, Microsoft Research, described DryadLINQ, Microsoft's own language and programming model that bears many similarities to Hadoop. In addition, Andy Konwinski from U.C. Berkeley described using their X-trace tool for monitoring Hadoop performance, and Ben Reed from Yahoo! described the Zookeeper directory and configuration services for Hadoop.

In data management, Michael Stark from Powerset discussed Hbase, a distributed database built atop Hadoop, and Bryan Duxbury from Rangle described the application of Hbase for storing pages crawled from the Web. Developers from Facebook described the use of HIVE, a data

warehouse built atop Hadoop, and its use at Facebook.

Speakers also presented case studies on the application of Hadoop in various contexts, demonstrating the growing industry acceptance of using Hadoop to solve large-scale, data-intensive problems on highly scalable computing clusters. Case studies were presented by speakers from Amazon, Autodesk, Intel/Carnegie Mellon, Yahoo!, and the University of Maryland, respectively, on using Hadoop to support Amazon Web Services, online search for engineering content, building ground models of Southern California, analyzing web pages, and natural language processing. It became apparent that Hadoop, backed by the power of the open source community, is likely poised to be the default implementation of a parallel computing platform that is rapidly gaining in popularity.

Data-Intensive Computing Symposium

The day after the Hadoop Summit, about 100 researchers from academia, industry, and government laboratories and agencies attended the Data-Intensive Computing Symposium at Yahoo!'s Sunnyvale headquarters. Hosted by Yahoo! and the CCC, the symposium brought together experts in system design, programming, parallel algorithms, data management, scientific applications, and information-based applications to better understand existing capabilities in the development and application of large-scale computing systems, and to explore future opportunities. We co-chaired the symposium, and Bryant opened with a talk contrasting the difference between conventional supercomputers and data-intensive scalable computing (DISC), highlighting the research issues that need to be addressed in the DISC environment.

Experts from several application areas spoke at the DISC Symposium. Alex Szalay from Johns Hopkins discussed the data explosion in astronomy, and how his group has been building data management systems to deal with data issues. Jill Mesirov from the Broad Institute at MIT and Harvard talked about the data explosion in genomic medicine, and the difficulty of replicating scientific experiments that involve the preservation and manipulation of multiple datasets from disjoint data sources. ChengXiang Zhai, University of Illinois at Urbana-Champaign, proposed that Web search application should move towards maximizing personalization, understanding the semantics, and helping users more effectively navigate the information space. Marc Najork of Microsoft Research discussed the mining of large-scale Web graphs, and argued for

the need of a theory of the semantics of hyperlinks. Lastly, Jon Kleinberg covered the algorithmic perspectives of modeling social processes within large datasets, and how this might influence the design of systems to support online communities. He also raised the issues surrounding the privacy implications of these datasets.

In data management, Joe Hellerstein from U.C. Berkeley discussed the use of declarative specification and dataflow execution of network protocols and distributed systems; Raghu Ramakrishnan, Yahoo! Research, illustrated how his group is prototyping a system that relaxes constraints in traditional database systems to handle scalability and consistency issues in distributed database systems for Web-scale applications.

Speakers from the systems area included Dan Reed from Microsoft Research, Jeff Dean from Google, Garth Gibson from Carnegie Mellon, and Phil Gibbons from Intel Research. Reed emphasized the need to have user experience in mind when designing systems, and challenged systems designers to build simple and easy-to-use tools. Dean described the distributed systems infrastructure at Google, and Gibson provided insights into the unavoidable failure of components in systems at scale and the need to hide the complexity of scale from developers. Gibbons described techniques for improving multicore cache performance and argued for pushing the processing and querying of data to where the sensors are at.

At the symposium, Jeannette Wing, NSF's Assistant Director for CISE, also discussed the agency's broad longer-term interest in data-intensive computing (see her article in the March issue of *Computing Research News*), and Christophe Bisciglia of Google gave an update on the NSF Cluster Exploratory (CluE) program, a partnership including NSF, Google, and IBM. Lastly, Ed Lazowska gave a talk during dinner, describing CCC's origin, goals, and activities, and outlined research challenges for the computing field.

Concluding Thoughts

The interest in exploring data-intensive computing by industry is clearly gaining momentum. In addition to the Google/IBM partnership, late last year Yahoo! announced its partnership with Carnegie Mellon University—the first university to benefit from Yahoo!'s 4,000-processor cluster and expertise in Hadoop. More recently, just a day ahead of the Hadoop Summit, Yahoo! announced an agreement with Computational Research Laboratories (CRL), a subsidiary of Tata Sons Limited in India, where CRL will make the world's fourth fastest supercomputer available to researchers in India for cloud computing research. It is a hopeful sign that others in industry will follow.

Overall, the Hadoop Summit and the DISC Symposium were very well received. At the symposium, Bryant explained that one of the goals of the Big-Data Computing Study Group is to recruit around 20 individuals from academia, industry, and government laboratories to serve as advocates for data-intensive computing research. We believe the Hadoop Summit and DISC Symposium were successful in galvanizing a community of practitioners and researchers to help move the field forward, and we look forward to participation from the broader community.

Randal E. Bryant is Dean of the School of Computer Science at Carnegie Mellon University. Thomas T. Kwan is Director, Research Operations, at Yahoo! Research, Sunnyvale, CA. ■

Grace Hopper Celebration of Women in Computing

'WE BUILD A BETTER WORLD'

Keystone Resort, Colorado—October 1-4, 2008

<http://www.gracehopper.org>

Ricoh Innovations, Inc. California Research Center from Page 1

implementation for digital cameras, and wavelet-based image processing for Ricoh's modern copiers. CRC researchers were instrumental in developing the technology behind JPEG 2000 and shepherding it through the standards process.

CRC develops technology for improving electro-optimal imaging systems, making them smaller, cheaper, and easier to manufacture than traditional systems. Specifically, CRC introduced a new design method for optical systems, which optimizes both the lenses and image processing *simultaneously*, a method we call Joint Optics/Image Processing Optimization, or JOIPO. Traditional optical design methods are sequential: optical engineers design the lens system to minimize the point spread function of the image focused on the sensor, and then image-processing experts design a filter to enhance the captured image. In contrast, in JOIPO, lens design and image-processing parameters are adjusted simultaneously during the search for the optimal system, even if the quality of the intermediate optical image suffers. JOIPO consistently leads to designs that are less expensive and of higher quality than traditional designs, and also leads to higher manufacturing yields because such designs are more robust to fabrication errors. Because most of Ricoh's products contain optical elements, JOIPO design tools are being explored in many areas of the company.

For many years, Ricoh has been interested in linking the physical and electronic world to support business workflow and document retrieval. The most popular approach was to print a visible marker such as a glyph or bar code somewhere on the document. Recently, CRC invented a technique for identifying a document that works without modifying the document itself. Using this new technology, it is possible to distinguish a text patch as small as one square inch that can act as a unique fingerprint of the document. This patch can be used either to access the original electronic document or to link multimedia data to the document. Our technology thus allows a piece of paper to work like a web page. "Hot spots" can be defined on a printed document; when a user points a cell-phone camera at one of these hot spots, the related web site or media appears on the phone. This technology has recently been used to supplement the NetRicoh office supply catalog by providing cell phone users with video and other multimedia related to specific catalog pages.

Research projects at CRC have always been initiated by the researchers themselves. However, recognizing that many innovations come from users, we have recently taken several steps to connect with Ricoh customers in an effort to apply our research strengths to issues that affect customers directly.

Users are the direct beneficiaries of better products and they often invent improvements in their own

work processes. Ricoh, with leadership from CRC, creates products that allow customization by the user, including a Java-based SDK for customizing a user-interface on a multi-function copier and an award-winning digital camera containing a web server. The Advanced Business Center (ABC), a sister organization within RII, gains insights into the needs of actual customers by collaborating with them in the field. ABC studies a customer site looking for user needs and then delivers a solution, closely watching how that solution is adopted and bringing their findings back to Ricoh business units. CRC researchers have begun working closely with ABC to determine new research directions.

Of course, one of the most important products of CRC is intellectual property. After filing patents, CRC researchers are encouraged to publish and present technical results and take an active role in the larger research community and professional organizations. We work not just with researchers from Ricoh in Japan, but often with researchers from the academic community and occasionally with other research labs, recognizing that innovation can benefit by cross-organizational collaboration. RII provides some financial support to young professors at universities around the world, including professors at Stanford and Berkeley. CRC balloons in size in the summer when it brings on a number of summer interns to become an integral part of our research teams.

With only 20 researchers, CRC is relatively small and will stay that way. What makes CRC unique is its power to weight ratio. Our impact on Ricoh and the research community is much larger than one would expect from such a small group. CRC researchers are passionate about their work, and we've been fortunate to play an important role in a large and successful company and to work in the dynamic and inspiring atmosphere of Silicon Valley.

John Barrus became Director of the California Research Center (CRC) of Ricoh Innovations, Inc. on April 1, 2008.

New CRA Academic Members

Korea Advanced Institute of Science & Technology CS

Rutgers University, Camden CS

Science Community Seeks Supplemental Funding for FY08

By Peter Harsha

Despite the elimination of most of the requested increases for key federal science agencies in the FY2008 appropriations process,¹ some members of the science advocacy community are holding out hope that a last-ditch strategy might help mitigate some of the budget shortfalls.

A coalition of academic groups, companies and key members of Congress are attempting to secure additional funding in planned FY 08 supplemental appropriations for the National Science Foundation, Department of Energy's Office of Science, and National Institute of Standards and Technology. Congress will begin consideration of so-called "emergency" supplemental appropriations in late April to pay for ongoing operations in Afghanistan and the war in Iraq that are not part of the normal appropriations process.

In recent years, the supplemental appropriations bill has become a vehicle for spending beyond the operations in Iraq and Afghanistan. The bill has been used to fund ongoing relief activities after Hurricanes Katrina and Rita, provide drought aid to farmers, help beef up U.S. anti-terrorism measures, issue low-income home energy assistance, and help prepare for pandemic flu

outbreaks. A broad coalition of science advocacy groups (including CRA), U.S. high-tech companies, and several key Senators are urging the Congressional leadership to include funding that would restore some of the requested increases for science called for in both the President's budget and the 2007 America COMPETES Act—increases that would put NSF, DOE's Office of Science, and NIST on the path to doubling their research funding in seven years.

Allowing the budget shortfall for FY08 for the agencies to stand would imperil U.S. scientific jobs, close lab facilities, and force the U.S. to renege on international science obligations, argues the Task Force on the Future of American Innovation—a collection of high-tech companies, trade and scientific associations (including CRA)—that has joined the effort to urge Congress to fund science in the supplemental.

"Our organizations cheered when Congress passed the 'America COMPETES Act' with overwhelming margins in both the House and the Senate," the Task Force wrote in a letter to the House and Senate leadership in late February. "However, [we] are dismayed and deeply disappointed that Congress and the

Administration failed to provide the funds needed to fulfill the promise of the COMPETES Act," they wrote.

Though this community of advocacy groups and associations is broadly united in their desire to see the effects of the FY08 final appropriation mitigated with funding in the supplemental, the amounts they are requesting vary by group. In letters, the Task Force on the Future of American Innovation and the American Association of Universities urged appropriators to fund just over \$1 billion in increases authorized in the America COMPETES Act, but not appropriated in FY08. Failing that, the Task Force urged that, at minimum, "devoting \$300 million to the Department of Energy Office of Science and \$200 million to the National Science Foundation would address the most acute short-term losses in jobs, facility closures and America's international standing."

On March 17, eight U.S. Senators sent a letter to the Senate Appropriations Committee leadership urging support for \$350 million in additional funding. Senators Lamar Alexander (R-TN), Jeff Bingaman (D-NM), Bob Corker (R-TN), Pete Domenici (R-NM), Richard Durbin (D-IL), Dianne Feinstein (D-CA), Ted

Kennedy (D-MA), and Chuck Schumer (D-NY) cited the need "to support our critically important scientific workforce, avoid cost increases to our major scientific projects, and fulfill commitments to the International Thermonuclear Experimental Reactor (ITER) Project," in requesting \$250 million for DOE's Office of Science and \$100 million for NSF.

A number of science advocacy groups, including the Coalition for National Science Funding, the Energy Sciences Coalition, and the Task Force on the Future of American Innovation, will mount a grassroots effort April 8-10 asking the members of their participating organizations to call their representatives in Congress to urge them to support the inclusion of science in the supplemental appropriations bill. CRA's Computing Research Advocacy Network² will be taking part in the effort, geared towards generating attention and putting pressure on lawmakers to act.

The likelihood of success in the effort is not clear as this goes to press in early April. Though there is broad support in Congress for science funding and, according to

Science Community Seeks Supplemental Funding Continued on Page 18

2006-2007 Taulbee Survey

Ph.D. Production Exceeds 1,700; Undergraduate Enrollment Trends Still Unclear

By Stuart Zweben

This article and the accompanying figures and tables present the results of the 37th annual CRA Taulbee Survey¹ of Ph.D.-granting departments of computer science (CS) and computer engineering (CE) in the United States and Canada. This survey is conducted annually by the Computing Research Association to document trends in student enrollment, employment of graduates, and faculty salaries.

Information is gathered during the fall. Responses received by February 8, 2008 are included in the analysis. The period covered by the data varies from table to table. Degree production and enrollment (Ph.D., Master's, and Bachelor's) refer to the previous academic year (2006-2007). Data for new students in all categories refer to the current academic year (2007-2008). Projected student production and information on faculty salaries and demographics also refer to the current academic year. Faculty salaries are those effective January 1, 2008.

The data were collected from Ph.D.-granting departments only. We surveyed a total of 234 departments, one fewer than last year. Of these, 186 departments returned their survey forms, for a response rate of 79%. This is down slightly from last year's 80%, but is still quite comprehensive (see Figure 1). The return rate of 10 out of 30 (33%) for CE programs is, as usual, very low. Many CE programs are part of an Electrical and Computer Engineering (ECE) department and do not keep separate statistics for CE vs. EE. In addition, many of these departments may not be aware of the Taulbee Survey or its importance. We again had a very good response rate from U.S. CS departments (155 of 176, or 88%), and a reasonable response rate (21 of 28, or 75%) from Canadian departments.

The set of departments responding varies slightly from year to year, even when the total numbers are about the same; thus, we must approach any trend analysis with caution. We must be especially cautious in using the data about CE departments because of the low response rate. Nevertheless, we continue to report CE departments separately because there are some significant differences between CS and CE departments.

Figure 1. Number of Respondents to the Taulbee Survey

Year	US CS Depts.	US CE Depts.	Canadian	Total
1995	110/133 (83%)	9/13 (69%)	11/16 (69%)	130/162 (80%)
1996	98/131 (75%)	8/13 (62%)	9/16 (56%)	115/160 (72%)
1997	111/133 (83%)	6/13 (46%)	13/17 (76%)	130/163 (80%)
1998	122/145 (84%)	7/19 (37%)	12/18 (67%)	141/182 (77%)
1999	132/156 (85%)	5/24 (21%)	19/23 (83%)	156/203 (77%)
2000	148/163 (91%)	6/28 (21%)	19/23 (83%)	173/214 (81%)
2001	142/164 (87%)	8/28 (29%)	23/23 (100%)	173/215 (80%)
2002	150/170 (88%)	10/28 (36%)	22/27 (82%)	182/225 (80%)
2003	148/170 (87%)	6/28 (21%)	19/27 (70%)	173/225 (77%)
2004	158/172 (92%)	10/30 (33%)	21/27 (78%)	189/229 (83%)
2005	156/174 (90%)	10/31 (32%)	22/27 (81%)	188/232 (81%)
2006	156/175 (89%)	12/33 (36%)	20/28 (71%)	188/235 (80%)
2007	155/176 (88%)	10/30 (33%)	21/28 (75%)	186/234 (79%)

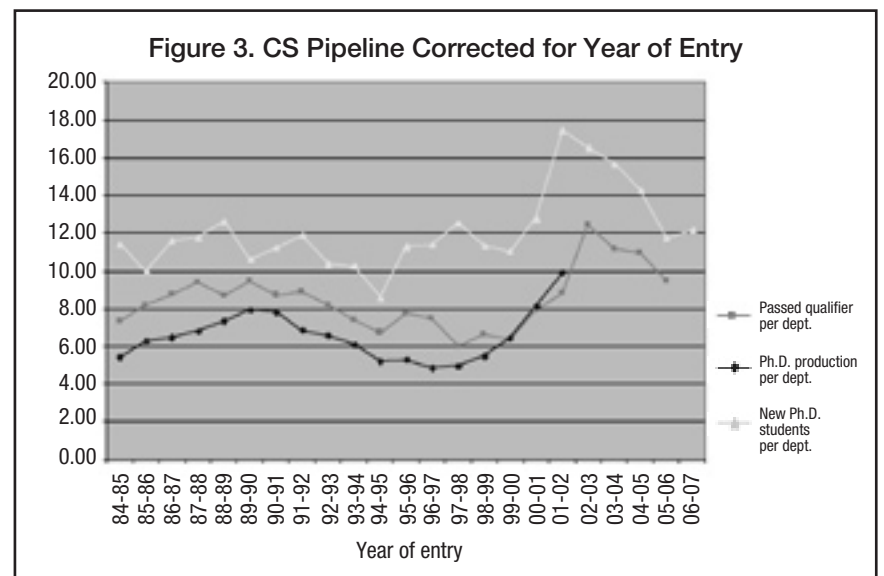
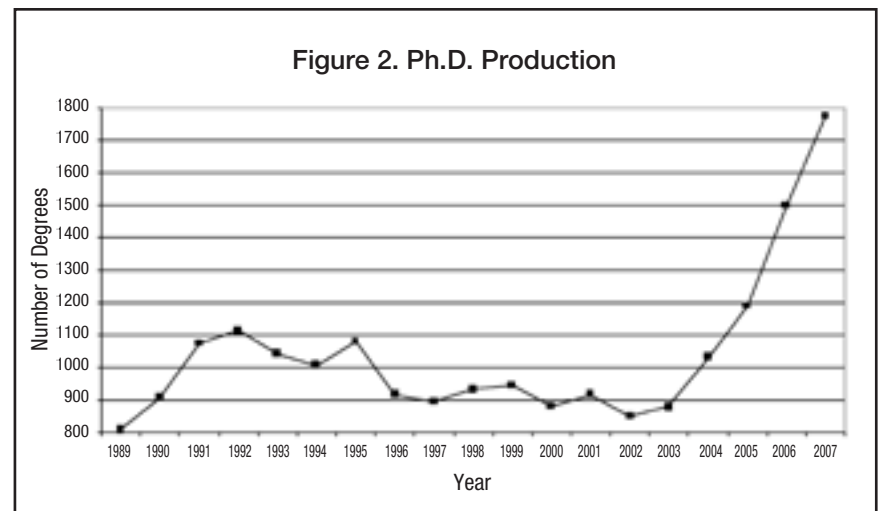
The survey form itself is modified slightly each year to ensure a high rate of return (e.g., by simplifying and clarifying), while continuing to capture the data necessary to understand trends in the discipline and also reflect changing concerns of the computing research community. This year's salary survey reports contain more information within the senior faculty ranks, as we can report many of the salaries based on number of years in rank.

Departments that responded to the survey were sent preliminary results for faculty salaries in December 2007; these results included additional distributional information not contained in this report. The CRA Board views this as a benefit of participating in the survey.

We thank all respondents who completed this year's questionnaire. Departments that participated are listed at the end of this article.

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

Ph.D. production continues to climb. A total of 1,775 new Ph.D.s were awarded between July 2006 and June 2007 (Table 1). This represents an increase of 18% over last year, and follows last year's 26% increase over the previous year. This year's production of more than 1,700 was predicted last year, and for the second straight year tracks the departments'



own estimates reasonably well. The "optimism ratio," defined as the actual number divided by the predicted number, was 0.95, similar to last

year's 0.94. If this year's optimism ratio holds again next year, there will be approximately 1,900 new Ph.D.s produced in 2007-2008. However, the

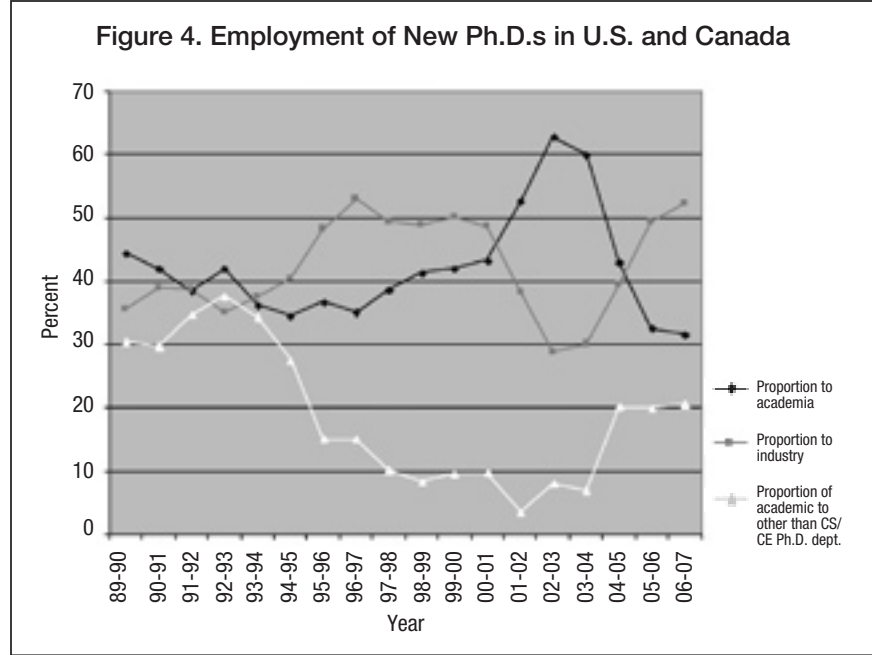
Table 1. Ph.D. Production by Type of Department and Rank

Department, Rank	Ph.D.s Produced	Avg. per Dept.	Ph.D.s Next Year	Avg. per Dept.	Passed Qualifier	Avg. per Dept.	Passed Thesis Ex. (# Depts)	Avg. per Dept.
US CS 1-12	288	24.0	335	27.9	257	21.4	146 (7)	20.9
US CS 13-24	264	22.0	240	20.0	216	18.0	232 (12)	19.3
US CS 25-36	182	15.2	213	17.8	151	12.6	89 (10)	8.9
US CS Other	835	7.7	926	8.6	839	7.8	614 (88)	7.0
Canadian	119	6.3	163	8.6	149	7.8	183 (17)	10.8
US CE	87	9.7	120	13.3	106	11.8	50 (6)	8.3
Total	1,775	10.3	1,997	11.6	1,718	10.0	1,314 (140)	9.4

2006-2007 Taulbee Survey

	CS		CE		CS&CE	
Male	1,279	80.7%	145	82.4%	1,424	80.9%
Female	306	19.3%	31	17.6%	337	19.1%
Total have Gender Data for	1,585		176		1,761	
Unknown	14		0		14	
Total	1,599		176		1,775	

	CS		CE		CS&CE	
Nonresident Alien	826	53.2%	127	79.4%	953	55.6%
African-American, Non-Hispanic	19	1.2%	1	0.6%	20	1.2%
Native American/Alaskan Native	4	0.3%	0	0.0%	4	0.2%
Asian/Pacific Islander	207	13.3%	7	4.4%	214	12.5%
Hispanic	20	1.3%	0	0.0%	20	1.2%
White, Non-Hispanic	430	27.7%	24	15.0%	454	26.5%
Other/Not Listed	48	3.1%	1	0.6%	49	2.9%
Total have Ethnicity Data for	1,554		160		1,714	
Ethnicity/Residency Unknown	45		16		61	
Total	1,599		176		1,775	



rate of increase would be less than half this year's rate.

The number of new students passing thesis candidacy exams (most, but not all, departments have such exams) declined 11%, although fewer departments reported such exams this year. However, even accounting for this smaller set of departments, the numbers are down. The number of students passing the qualifier also declined significantly (12%). This is an indication that Ph.D. production

should begin declining in the next couple of years.

Longer term, Ph.D. production trends are less clear. The total number of new CS Ph.D. students (Table 5) rose by 4%, following four straight years of a decline in the number of new students. Most of this increase was due to existing Master's level students becoming Ph.D. students, rather than the admission of a larger class of new students. Figure 3 shows a graphical view of the pipeline for computer

Continued on Page 8

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

	Artificial Intelligence/ Robotics	Hardware/ Architecture	Numerical Analysis/ Scientific Computing	Programming Languages/ Compilers	OS/Networks	Software Engineering	Theory/ Algorithms	Graphics/ Human Interfaces	Databases/ Information Systems	Other/ Unknown	Total	
North American Ph.D. Granting Depts.												
Tenure-track	21	13	3	10	29	20	13	22	14	21	166	11.4%
Researcher	9	4	6	1	7	2	2	5	5	6	47	3.2%
Postdoc	23	2	9	4	11	7	18	13	10	22	119	8.2%
Teaching Faculty	4	0	3	2	5	3	3	3	4	7	34	2.3%
											366	25.1%
North American, Other Categories												
Other CS/CE Dept.	12	4	1	3	9	7	7	5	12	9	69	4.7%
Non-CS/CE Dept.	4	0	1	0	6	2	3	2	6	2	26	1.8%
Industry	75	79	16	50	178	68	36	69	86	105	762	52.3%
Government	3	2	4	1	6	4	6	3	2	13	44	3.0%
Self-Employed	2	0	0	1	1	1	0	1	0	4	10	0.7%
Unemployed	1	0	0	0	1	1	1	1	0	7	12	0.8%
Other	3	1	1	0	2	1	1	1	0	11	21	1.4%
											944	64.8%
Outside North America												
Tenure-Track in Ph.D. Granting	7	5	0	0	18	3	3	5	7	7	55	3.8%
Researcher in Ph.D.	0	0	0	2	4	0	1	0	1	2	10	0.7%
Postdoc in Ph.D.	3	0	1	4	1	0	2	2	2	5	20	1.4%
Teaching in Ph.D.	2	0	0	0	0	1	0	0	0	1	4	0.3%
Other Academic	2	0	0	0	1	0	0	1	0	1	5	0.3%
Industry	6	3	1	3	13	1	4	1	3	7	42	2.9%
Government	0	1	0	0	2	1	1	0	0	1	6	0.4%
Other	1	0	0	1	0	0	0	0	0	2	4	0.3%
											146	10.0%
Total in North America	157	105	44	72	255	116	90	125	139	207	1,310	90.0%
Total Outside North America	21	9	2	10	39	6	11	9	13	26	146	10.0%
Total have Employment Data for	178	114	46	82	294	122	101	134	152	233	1,456	100.0%
Unknown	23	10	9	9	26	14	11	16	12	189	319	
Total	201	124	55	91	320	136	112	150	164	422	1,775	

2006-2007 Taulbee Survey

Table 5. New Ph.D. Students in Fall 2007 by Department Type and Rank

Department, Rank	CS				CE				CS&CE	
	New Admit	MS to Ph.D.	Total	Avg. per Dept.	New Admit	MS to Ph.D.	Total	Avg. per Dept.	Total	Avg. per Dept.
US CS 1-12	367	46	413	34.4	0	0	0	0.0	413	34.4
US CS 13-24	277	24	301	25.1	7	1	8	0.7	309	25.8
US CS 25-36	253	27	280	23.3	6	0	6	0.5	286	23.8
US CS Other	996	192	1,188	10.5	117	25	142	1.3	1,330	11.8
Canadian	178	19	197	9.4	0	0	0	0.0	197	9.4
US CE	0	0	0	0.0	89	6	95	10.6	95	10.6
Total	2,071	308	2,379	13.3	219	32	251	1.4	2,630	14.7

Table 5a. New Ph.D. Students from Outside North America

Department, Rank	CS	CE	CS&CE	Total New	% Outside North America
US CS 1-12	202	0	202	413	48.9%
US CS 13-24	170	0	170	309	55.0%
US CS 25-36	169	0	169	286	59.1%
US CS Other	650	95	745	1,330	56.0%
Canadian	85	0	85	197	43.1%
US CE	0	71	71	95	74.7%
Total	1,276	166	1,442	2,630	54.8%
Total New	2,379	251	2,630		
% Outside	53.6%	66.1%	54.8%		

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

Department, Rank	CS		CE		CS&CE	
US CS 1-12	2,190	18.0%	0	0.0%	2,190	16.2%
US CS 13-24	1,539	12.7%	23	1.7%	1,562	11.6%
US CS 25-36	1,415	11.6%	14	1.0%	1,429	10.6%
US CS Other	5,753	47.3%	761	56.7%	6,514	48.2%
Canadian	1,268	10.4%	0	0.0%	1,268	9.4%
US CE	0	0.0%	543	40.5%	543	4.0%
Total	12,165		1,341		13,506	

science programs. The data in this graph are normalized by the number of departments reporting. The graph offsets the qualifier data by one year from the data for new students, and offsets the graduation data by five years from the data for new students. These data have been useful in estimating the

timing of changes in production rates. Table 5a reports the fall 2007 data for new students from outside North America. Top-ranked U.S. departments continue to have a somewhat higher fraction of domestic students than do lower-ranked departments, and Canadian departments have a

lower percentage of Ph.D. students from outside North America than do their U.S. counterparts. However, this year, the distribution of new Ph.D. students who are not North American is more uniform across the ranks, ranging from 49% to 59% in U.S. programs. Among top-ranked U.S. programs, the fraction of new Ph.D. students from outside North America increased considerably. In Canadian programs, the fraction of new students who were not North American also rose. Overall, the fraction of new Ph.D. students who were not from North America rose from 53.1% in fall 2006 to 54.8% in fall 2007.

The trend toward employment in industry over academia continues for the 2006-07 Ph.D. graduates (Table 4). Of those who reported employment, 32% chose academic employment in North America (compared to 33%, 43% and 60%, respectively, in the previous three years). There also is a continued decline in the percentage who went to tenure-track positions in Ph.D.-granting programs (11.4% vs 12.8%, 17.5% and 27.5% in the previous three years) and to non-Ph.D.-granting CS/CE departments (4.7% vs. 5.2% and 7.0% in the past

two years). Nevertheless, the number of persons going into both types of positions stayed about the same. There were about the same number of new Ph.D.s going to postdoctoral positions as last year, although this also represents a somewhat smaller percentage of the total number of graduates. Industry hired 52.3% of new Ph.D. graduates, compared to 49.4% and 39.6% in the previous two years. Figure 4 shows the employment trend of new Ph.D.s in academia and industry, and the proportion of those going to academia who took positions in departments other than Ph.D.-granting CS/CE departments.

Despite the continued record Ph.D. production, unemployment of new Ph.D.s remains less than 1%. Perhaps surprisingly, the proportion of Ph.D. graduates who were reported taking positions outside of North America, among those whose employment is known, decreased this year from 13.1% to 10.0%.

Table 4 also indicates the areas of specialty of new CS/CE Ph.D.s. Year-to-year fluctuations among these data are common and multi-year trends are difficult to discern. This year, there was an increase in the software engineering area after a decline last year. There also was an increase in the graphics area and a more significant increase in the "unknown/other" category. It is not clear if departments are not tracking the areas in which graduates receive their degrees as carefully as they did previously, or if our survey is missing significant emerging areas.

For the second straight year, the proportion of women among new Ph.D.s rose to 19.1% in 2007 from 18.1% the previous year. Ethnicity characteristics of new Ph.D.s are similar to those reported last year

Figure 5. Nonresident Aliens as Fraction of Ph.D. Enrollments

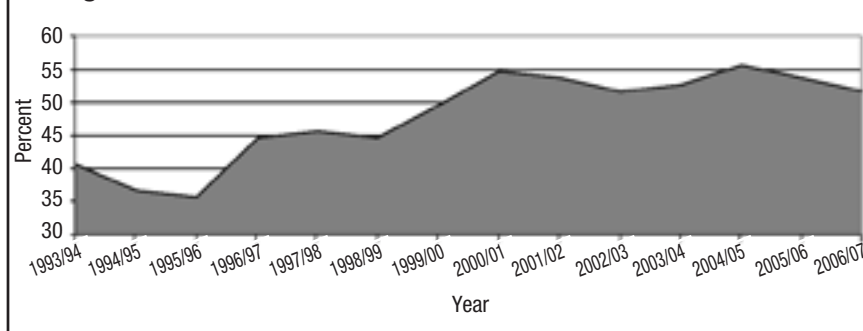


Figure 6. BS Production

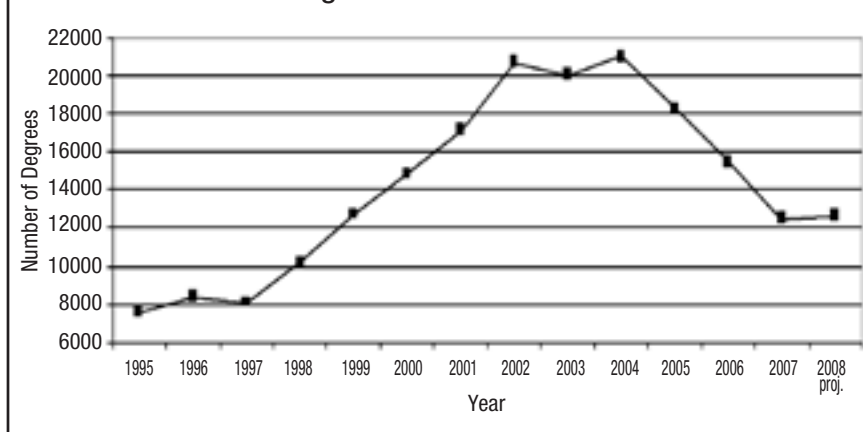
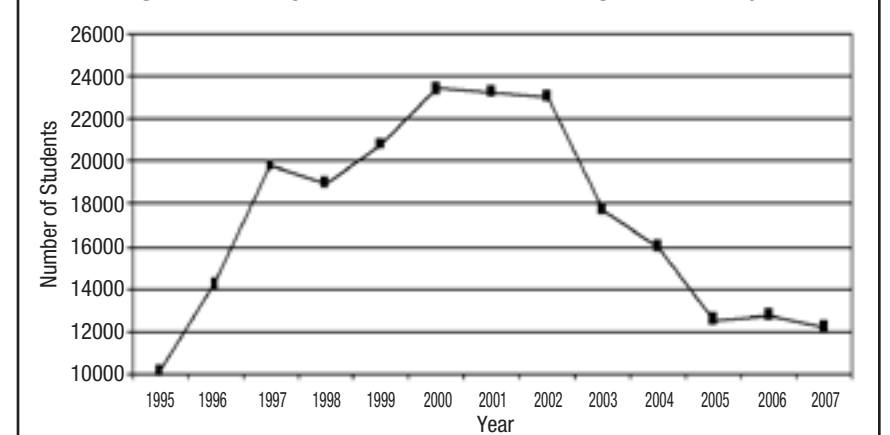


Figure 7. Newly Declared CS/CE Undergraduate Majors



2006-2007 Taulbee Survey

	CS		CE		CS&CE	
	Count	%	Count	%	Count	%
Male	9,511	80.4%	986	81.5%	10,497	80.5%
Female	2,314	19.6%	224	18.5%	2,538	19.5%
Total have Gender Data for	11,825		1,210		13,035	
Unknown	340		131		471	
Total	12,165		1,341		13,506	

	CS		CE		CS&CE	
	Count	%	Count	%	Count	%
Nonresident Alien	5,376	50.3%	792	71.0%	6,168	52.2%
African-American, Non-Hispanic	200	1.9%	21	1.9%	221	1.9%
Native American/ Alaskan Native	9	0.1%	4	0.4%	13	0.1%
Asian/Pacific Islander	1,204	11.3%	48	4.3%	1,252	10.6%
Hispanic	181	1.7%	10	0.9%	191	1.6%
White, Non-Hispanic	3,541	33.1%	223	20.0%	3,764	31.9%
Other/Not Listed	179	1.7%	18	1.6%	197	1.7%
Total have Ethnicity Data for	10,690		1,116		11,806	
Ethnicity/Residency Unknown	1,475		225		1,700	
Total	12,165		1,341		13,506	

(Table 3). There was an increase in the number of Hispanics, but this just offsets declines from last year. Collectively, African-American, Native-American/Alaskan Native, and Hispanics continue to account for less than 3% of the total.

Current Ph.D. enrollment proportions show similar gender and ethnicity breakdowns as they did last year (Tables 7 and 8). However, this year the number of students in the "Unknown" category increased markedly for both gender and ethnicity because a few departments did not report this information for any of their students.

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

Master's degree production rose slightly this year, by 2%, following a 13% decline last year (Tables 9, 10). Predictions of the change in Master's degrees in one year parallel the change in the number of Master's students in the previous year. This year, enrollment in Master's programs by new students (Table 13) is 2.6% higher than it was a year ago, suggesting another fairly small change in graduates next year. In contrast, the number of Master's students was much higher than the number predicted last year by the departments themselves. Table 12 shows these predictions for this year.

Once again, there was very little difference in gender characteristics

of Master's recipients compared to last year's survey. Consistent with the ethnicity changes in new Master's students reported last year, the fraction of Master's recipients this year who were Nonresident Aliens rose (from 47.3% to 52.5%). The fraction of Master's recipients who were White, non-Hispanic dropped from 32.5% to 28.3%. These one-year "trends" are the reverse of those observed last year. The overall fraction of new Master's students from outside North America remained about the same this year (56.5%), though increases were observed at U.S. departments ranked 13-36.

Bachelor's degree production (Tables 9 and 10) again was down significantly, by nearly 20% this year. This year's decline is in line with the 16% decline estimated by the departments last year, and follows the declining trends in the number of new

Bachelor's students that have been reported widely in recent years.

Perhaps even more alarming is the drop in the fraction of Bachelor's degrees awarded to women, from 14.2% last year to 11.8% this year (Table 9). The fraction of new female students is reported now to be less than 10% in many Bachelor's programs. Ethnicity is also less diverse, with the proportion of White, non-Hispanics receiving Bachelor's degrees rising to 66.0% from 59.6% just two years ago (Table 10). These are serious problems in achieving our field's diversity goals.

Actual Bachelor's degree production in departments reporting this year again was within 4% of the projection from last year's reporting departments. From this year's estimates (Table 11), it would appear that the number of Bachelor's graduates in academic year 2007-08 will be about the same as we report for 2006-07.

The number of new undergraduate majors fell by more than 4% this year, a disappointment following last year's slight rise (Table 14 and Figure 7). However, new majors in U.S. CS departments held steady; the decline is in the Canadian programs. In fact, the U.S. CS programs showed slight increases except for departments ranked 25-36.

Total enrollment in Bachelor's programs (Table 16) continues its downward trend. This suggests additional declines in the number of Bachelor's graduates, despite the mildly encouraging news each of the past two years in the number of new Bachelor's students and despite departmental predictions of a similar number of Bachelor's graduates for 2007-08 as we had in 2006-07. Enrollment today is more than 50% lower than it was five years ago.

Continued on Page 11

	Bachelor's						Master's					
	CS		CE		CS&CE		CS		CE		CS&CE	
Male	8,733	87.8%	1,922	90.1%	10,655	88.2%	5,526	77.3%	505	77.6%	6,031	77.4%
Female	1,208	12.2%	212	9.9%	1,420	11.8%	1,620	22.7%	146	22.4%	1,766	22.6%
Total have Gender Data for	9,941		2,134		12,075		7,146		651		7,797	
Unknown	343		80		423		415		46		461	
Total	10,284		2,214		12,498		7,561		697		8,258	

	Bachelor's						Master's					
	CS		CE		CS&CE		CS		CE		CS&CE	
Nonresident Aliens	496	6.5%	202	10.5%	698	7.3%	3,470	52.4%	329	53.5%	3,799	52.5%
African-American, Non-Hispanic	261	3.4%	82	4.3%	343	3.6%	132	2.0%	16	2.6%	148	2.0%
Native American/ Alaskan Native	30	0.4%	5	0.3%	35	0.4%	8	0.1%	0	0.0%	8	0.1%
Asian/Pacific Islander	1,115	14.6%	339	17.6%	1,454	15.2%	918	13.9%	59	9.6%	977	13.5%
Hispanic	412	5.4%	101	5.2%	513	5.3%	109	1.6%	12	2.0%	121	1.7%
White, Non-Hispanic	5,158	67.3%	1,170	60.7%	6,328	66.0%	1,851	28.0%	196	31.9%	2,047	28.3%
Other/Not Listed	191	2.5%	30	1.6%	221	2.3%	132	2.0%	3	0.5%	135	1.9%
Total have Ethnicity Data for	7,663		1,929		9,592		6,620		615		7,235	
Ethnicity/Residency Unknown	2,621		285		2,906		941		82		1,023	
Total	10,284		2,214		12,498		7,561		697		8,258	

2006-2007 Taulbee Survey

Department, Rank	CS		CE		CS&CE	
US CS 1-12	1,016	9.6%	203	9.8%	1,219	9.6%
US CS 13-24	774	7.3%	197	9.5%	971	7.7%
US CS 25-36	1,053	10.0%	9	0.4%	1,062	8.4%
US CS Other	4,834	45.8%	1,145	55.3%	5,979	47.3%
Canadian	2,751	26.0%	77	3.7%	2,828	22.4%
US CE	135	1.3%	440	21.2%	575	4.6%
Total	10,563		2,071		12,634	

Department, Rank	CS		CE		CS&CE	
US CS 1-12	747	12.7%	81	11.2%	828	12.5%
US CS 13-24	1,249	21.2%	1	0.1%	1,250	18.9%
US CS 25-36	455	7.7%	0	0.0%	455	6.9%
US CS Other	2,889	49.1%	450	62.4%	3,339	50.6%
Canadian	543	9.2%	0	0.0%	543	8.2%
US CE	0	0.0%	189	26.2%	189	2.9%
Total	5,883		721		6,604	

Department, Rank	CS		CE		CS & CE		Outside North America	
	Total	Avg. per Dept.	Total	Avg. per Dept.	Total		Total	%
US CS 1-12	574	47.8	67	5.6	641	53.4	255	39.8%
US CS 13-24	920	76.7	2	0.2	922	76.8	655	71.0%
US CS 25-36	519	43.3	0	0.0	519	43.3	400	77.1%
US CS Other	2,930	24.8	429	3.6	3,359	28.5	1,897	56.5%
Canadian	535	25.5	0	0.0	535	25.5	226	42.2%
US CE	0	0.0	183	20.3	183	20.3	46	25.1%
Total	5,478		681		6,159	33.5	3,479	56.5%

Department, Rank	CS			CE			CS&CE Majors	
	Pre-Major	Major	Avg. Major per Dept.	Pre-Major	Major	Avg. Major per Dept.	Major	Avg. Major per Dept.
US CS 1-12	186	844	84.4	0	178	89.0	1,022	102.2
US CS 13-24	21	576	52.4	0	232	46.4	808	73.5
US CS 25-36	255	763	76.3	0	54	27.0	817	81.7
US CS Other	2,483	5,732	60.3	784	1,546	42.9	7,278	76.6
Canadian	351	1,844	102.4	0	56	28.0	1,900	105.6
US CE	0	51	51.0	53	319	35.4	370	370.0
Total	3,296	9,810		837	2,385		12,195	84.1

Department, Rank	CS		CE		CS&CE	
US CS 1-12	1,070	7.2%	80	4.4%	1,150	6.9%
US CS 13-24	1,914	13.0%	4	0.2%	1,918	11.6%
US CS 25-36	821	5.6%	0	0.0%	821	4.9%
US CS Other	9,299	63.0%	1,216	66.9%	10,515	63.4%
Canadian	1,667	11.3%	0	0.0%	1,667	10.0%
US CE	0	0.0%	517	28.5%	517	3.1%
Total	14,771		1,817		16,588	

Department, Rank	CS			CE			CS&CE Majors	
	Pre-Major	Major	Avg. Major per Dept.	Pre-Major	Major	Avg. Major per Dept.	Total	Avg. Major per Dept.
US CS 1-12	326	3,203	266.9	0	671	55.9	3,874	322.8
US CS 13-24	253	2,786	232.2	5	800	66.7	3,586	298.8
US CS 25-36	500	3,062	255.2	0	186	15.5	3,248	270.7
US CS Other	4,469	19,624	173.7	1,263	5,272	46.7	24,896	220.3
Canadian	309	8,366	398.4	0	273	13.0	8,639	411.4
US CE	0	336	37.3	81	1,648	183.1	1,984	220.4
Total	5,857	37,377	208.8	1,349	8,850	49.4	46,227	258.3

2006-2007 Taulbee Survey

Faculty Demographics (Tables 17-23)

Total faculty sizes held steady during the past year. Tenure-track faculty size is within 1% of last year's value. Significant increases were observed in the number of researchers and post-docs, while there was a sharp decline in the number of teaching faculty. Coupled with the data in Table 4, it appears that postdocs may be staying longer in these positions than they have in the past.

The fraction of women hired into tenure-track positions rose from 19.5% last year to 23.9% this year. This is a higher fraction than the 19.1% of female Ph.D.s produced (Table 2). The fraction of White, non-Hispanics hired into tenure-track positions rose from 43.0% last year to 48.3% this year. There also was an increase in Asian/Pacific Islanders, offset by a decrease in Nonresident Aliens. Disappointingly, only five tenure-track hires were reported among African Americans, Native Americans and Hispanics combined. Gender and ethnicity characteristics of current faculty are similar to those of last year (Tables 21 and 22).

Last year, the reporting departments predicted a 4% increase in faculty size. This year's reporting departments forecast a 5% growth next year. Table 17 shows these predictions by category of faculty, Table 18 by ranking strata, and Table 18a by both (the latter for U.S. CS programs only). It is clear that expected faculty growth rates are modest these days.

Table 18b shows the recruiting results from last year's hiring cycle. As was the case last year, the data indicate that roughly one of every three open tenure-track positions went unfilled last year. However, the top 24 U.S. CS departments and Canadian departments filled a smaller fraction of their vacant positions than did lower-ranked U.S. CS departments.

There appears to be more movement of faculty to new academic positions than in recent years. This year's

Table 17. Actual and Anticipated Faculty Size by Position

	Actual		Projected		Expected Two-Year Growth	
	2007-2008	2008-2009	2009-2010			
Tenure-Track	4,390	4,575	4,774	384	8.7%	
Researcher	633	642	660	27	4.3%	
Postdoc	400	436	483	83	20.8%	
Teaching Faculty	353	421	467	114	32.3%	
Other/Not Listed	131	138	139	8	6.1%	
Total	5,907	6,212	6,523	616	10.4%	

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

	Actual		Projected		Expected Two-Year Growth	
	2007-2008	2008-2009	2009-2010			
US CS 1-12	730	776	802	72	9.9%	
US CS 13-24	571	611	644	73	12.8%	
US CS 25-36	572	614	651	79	13.8%	
US CS Other	2,929	3,088	3,266	337	11.5%	
Canadian	895	912	931	36	4.0%	
US CE	210	211	229	19	9.0%	
Total	5,907	6,212	6,523	616	10.4%	

survey reported 103 such changes (Table 23), while the past two years reported 74 and 61, respectively. Other categories of faculty losses showed little change from last year.

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

Table 24-1 shows the department's total expenditure (including indirect costs or "overhead" as stated on project budgets) from external sources of support. Table 24-2 shows the per capita expenditure, where capitation is computed two ways. The first is relative to the number of tenured and tenure-track faculty members. The second is relative to researchers and postdocs, as well as tenured and tenure-track faculty. Canadian levels are shown in Canadian dollars. The data indicate that the higher the department's ranking, the more external

funding it receives (both in total and per capita).

Mean total expenditures declined slightly this year in all CS ranking strata except U.S. departments ranked greater than 36. Median total expenditures increased in U.S. departments ranked 1-12 and decreased in departments ranked 13-36. U.S. departments ranked 1-12 also improved with respect to per capita expenditures, as did Canadian departments, while U.S. departments ranked 25-36 declined. Other CS ranking strata showed mixed results with respect to per capita expenditures.

Table 25 shows the number of graduate students supported as full-time students as of fall 2007, further categorized as teaching assistants (TAs), research assistants (RAs), fellows, or computer systems supporters, and split between those on institutional vs. external funds. The number of TAs held steady again this year, with

U.S. departments ranked 1-12 showing a strong increase and Canadian departments a correspondingly strong decrease. There are about the same number of RAs this year as there were last year, but there are significant differences among the ranking strata compared to last year. Among U.S. departments: those ranked 1-12 show considerable gains in both total and externally supported RAs and fewer RAs supported on institutional funds; departments ranked 13-24 show losses in total and externally supported RAs and gains in institutionally supported RAs; departments ranked 25-36 show a shift from externally supported to institutionally supported RAs, with little change in the total; and departments ranked greater than 36 show little change from last year in either externally or institutionally supported RAs. Canadian departments showed little change in externally supported RAs, but a significant decline in

Continued on Page 12

Table 18a. Actual and Anticipated CS Faculty Size by Position and Department Rank

	Actual		Projected				Expect 2-Yr Growth	
	2007-2008		2008-2009		2009-2010		#	%
US CS 1-12	Total	Average	Total	Average	Total	Average		
TenureTrack	486	40.5	504	42.0	518	43.2	32	6.6%
Research	56	4.7	64	5.3	66	5.5	10	17.9%
Postdoc	64	5.3	71	5.9	75	6.3	11	17.2%
Teaching	86	7.2	98	8.2	103	8.6	17	19.8%
Other	38	3.2	39	3.3	40	3.3	2	5.3%
US CS 13-24	Total	Average	Total	Average	Total	Average	#	%
TenureTrack	392	32.7	415	34.6	433	36.1	41	10.5%
Research	40	3.3	42	3.5	43	3.6	3	7.5%
Postdoc	83	6.9	90	7.5	98	8.2	15	18.1%
Teaching	53	4.4	60	5.0	66	5.5	13	24.5%
Other	3	0.3	4	0.3	4	0.3	1	33.3%
US CS 25-36	Total	Average	Total	Average	Total	Average	#	%
TenureTrack	386	32.2	409	34.1	426	35.5	40	10.4%
Research	39	3.3	39	3.3	40	3.3	1	2.6%
Postdoc	59	4.9	66	5.5	73	6.1	14	23.7%
Teaching	44	3.7	56	4.7	68	5.7	24	54.5%
Other	44	3.7	44	3.7	44	3.7	0	0.0%
US CS Other	Total	Average	Total	Average	Total	Average	#	%
TenureTrack	2,239	19.6	2,345	20.6	2,471	21.7	232	10.4%
Research	423	3.7	426	3.7	437	3.8	14	3.3%
Postdoc	138	1.2	153	1.3	174	1.5	36	26.1%
Teaching	106	0.9	138	1.2	158	1.4	52	49.1%
Other	23	0.2	26	0.2	26	0.2	3	13.0%

2006-2007 Taulbee Survey

Table 18b. Vacant Positions 2006-2007 by Position and Department Rank and Type

	Vacant Positions 2006-2007			
	Tried to fill	Filled	Unfilled	% Unfilled
US CS 1-12				
TenureTrack	20	12	8	40.0%
Research	3	3	0	0.0%
Postdoc	6	6	0	0.0%
Teaching	28	28	0	0.0%
Other	0	0	0	0.0%
US CS 13-24				
TenureTrack	26	15	11	42.3%
Research	1	1	0	0.0%
Postdoc	6	4	2	33.3%
Teaching	21	15	6	28.6%
Other	0	0	0	0.0%
US CS 25-36				
TenureTrack	41	31	10	24.4%
Research	17	16	1	5.9%
Postdoc	14	12	2	14.3%
Teaching	22	21	1	4.5%
Other	1	1	0	0.0%
US CS Other				
TenureTrack	158	118	40	25.3%
Research	76	72	4	5.3%
Postdoc	23	23	0	0.0%
Teaching	65	63	2	3.1%
Other	0	0	0	0.0%
Canadian				
TenureTrack	30	15	15	50.0%
Research	5	4	1	20.0%
Postdoc	34	33	1	2.9%
Teaching	20	20	0	0.0%
Other	1	1	0	0.0%
US CE				
TenureTrack	19	11	8	42.1%
Research	9	9	0	0.0%
Postdoc	24	24	0	0.0%
Teaching	20	20	0	0.0%
Other	0	0	0	0.0%
Total				
TenureTrack	294	202	92	31.3%
Research	111	105	6	5.4%
Postdoc	107	102	5	4.7%
Teaching	176	167	9	5.1%
Other	2	2	0	0.0%

institutionally supported RAs. These changes generally are consistent with the changes in external research expenditures noted above.

The number of externally supported, full-support fellows is down considerably this year in U.S. departments ranked 1-12 and 25-36, and in Canadian departments. Some compensating gains in U.S. departments ranked 1-12 are observed in fellows supported institutionally.

Respondents were asked to "provide the net amount (as of fall 2007) of an academic-year stipend for a first-year doctoral student (not including tuition or fees)." The results are shown in Table 26. Canadian stipends are shown in Canadian dollars. The data show healthy stipend increases for TAs in U.S. departments ranked 1-12, slight increases in departments ranked greater than 36, decreases for TAs in departments ranked 13-24, and essentially no change in departments ranked 25-36. Canadian departments also showed an increase in stipends. There also are mixed results for RA stipends. Fellow stipends were fairly steady compared to last year, with U.S. departments ranked 25-36 showing the greatest increases.

Faculty Salaries (Tables 27-34)

Each department was asked to report individual (but anonymous) faculty salaries if possible; otherwise, the department was requested to provide the minimum, median, mean, and maximum salaries for each rank (full, associate, and assistant professors and non-tenure-track teaching faculty), and the number of persons at each rank. The salaries are those in effect on January 1, 2008. For U.S. departments, nine-month salaries are reported in U.S. dollars. For Canadian departments, twelve-month salaries are reported in Canadian dollars.

Respondents were asked to include salary supplements such as salary monies from endowed positions.

The tables contain data about ranges and measures of central tendency only. Departments reporting individual salaries were provided more comprehensive distributional information in December 2007. A total of 148 departments (85% of those reporting salary data) provided salaries at the individual level.

It is well known that, particularly at the associate professor level, time in rank is an important element when trying to draw comparisons in salaries. Therefore, this year we obtained information about time in rank for associate and full professors. Thus the salary tables this year are more comprehensive than those of prior years.

The minimum and maximum of the reported salary minima (and maxima) are self-explanatory. The range of salaries in a given rank among departments that reported data for that rank is the interval ["minimum of the minima," "maximum of the maxima"]. The mean of the reported salary minima (maxima) in a given rank is computed by summing the departmental reported minimum (maximum) and dividing by the number of departments reporting data at that rank.

The median salary at each rank is the average of the median salaries reported at that rank by each of the departments. Thus, it is not a true median of all the salaries. The average salary at each rank is computed by summing the individual means reported at each rank and dividing by the number of departments reporting at that rank. Thus, it is not a true average of all the salaries.

Overall U.S. CS average salaries (Table 27) increased between 3.6% and 4.6%, depending on tenure-track rank, and 6.8% for non-tenure-track teaching faculty. These increases are somewhat similar to the levels experienced in the past two years for tenure-track faculty, and exceed the 4.2% and 4.8% levels for non-tenure-track teaching faculty from these two years. Full professors received larger average increases this year than did faculty of lower rank at lower-ranked departments, with associate professors receiving the highest average salary increases at rank 1-24 departments. Canadian salaries (Table 33) rose 1.5% to 4.7%, with the greater increase at the full professor rank and the smaller at the assistant professor rank. Non-tenure-track teaching faculty salaries

Continued on Page 14

Table 19. Gender of Newly Hired Faculty

	Tenure-track		Researcher		Postdoc		Teaching Faculty		Total	
Male	137	72.9%	42	85.7%	84	78.5%	31	73.8%	294	76.2%
Female	45	23.9%	7	14.3%	21	19.6%	11	26.2%	84	21.8%
	6		0		2		0		8	
Total	188		49		107		42		386	

Table 20. Ethnicity of Newly Hired Faculty

	Tenure-Track		Researcher		Postdoc		Teaching Faculty		Total
Nonresident Alien	30	17.4%	13	31.7%	32	37.2%	2	4.8%	77
African-American, Non-Hispanic	1	0.6%	1	2.4%	0	0.0%	2	4.8%	4
Native American/Alaskan Native	2	1.2%	0	0.0%	0	0.0%	0	0.0%	2
Asian/Pacific Islander	47	27.3%	7	17.1%	21	24.4%	5	11.9%	80
Hispanic	2	1.2%	0	0.0%	2	2.3%	1	2.4%	5
White, Non-Hispanic	83	48.3%	20	48.8%	31	36.0%	32	76.2%	166
Other/Not Listed	7	4.1%	0	0.0%	0	0.0%	0	0.0%	7
Total have Ethnicity Data for	172		41		86		42		341
Ethnicity/Residency Unknown	16		8		21		0		45
Total	188		49		107		42		386

2006-2007 Taulbee Survey

	Full		Associate		Assistant		Teaching Faculty		Research Faculty		Postdocs		Total	
Male	1,738	89.1%	1,172	86.6%	904	80.4%	537	73.7%	340	83.7%	277	82.0%	4,968	84.2%
Female	212	10.9%	181	13.4%	221	19.6%	192	26.3%	66	16.3%	61	18.0%	933	15.8%
Total gender known	1,950		1,353		1,125		729		406		338		5,901	
Gender unknown	0		0		0		0		0		8		8	
Total	1,950		1,353		1,125		729		406		346		5,909	

	Full		Associate		Assistant		Teaching Faculty		Research Faculty		Postdocs		Total	
Nonresident Alien	11	0.6%	24	2.0%	167	16.6%	13	2.3%	47	12.8%	130	43.8%	392	7.6%
African-American, Non-Hispanic	8	0.5%	11	0.9%	21	2.1%	15	2.6%	5	1.4%	2	0.7%	62	1.2%
Native American/Alaskan Native	0	0.0%	1	0.1%	2	0.2%	0	0.0%	0	0.0%	0	0.0%	3	0.1%
Asian/Pacific Islander	383	22.0%	265	22.4%	290	28.8%	46	8.1%	65	17.8%	54	18.2%	1,103	21.4%
Hispanic	28	1.6%	31	2.6%	19	1.9%	9	1.6%	1	0.3%	6	2.0%	94	1.8%
White, Non-Hispanic	1298	74.4%	838	71.0%	494	49.0%	481	84.4%	246	67.2%	103	34.7%	3,460	67.0%
Other/Not Listed	16	0.9%	11	0.9%	15	1.5%	6	1.1%	2	0.5%	2	0.67%	52	1.0%
Total Have Ethnicity Data For	1,744		1,181		1,008		570		366		297		5,166	
Ethnicity/Residency Unknown	206		172		117		159		40		49		743	
Total	1,950		1,353		1,125		729		406		346		5,909	

	Total
Full Professor	98
Associate Professor	42
Assistant Professor	46
Teaching Faculty	176
Research Faculty	60
Postdoctorate	20
Total	442

	Total
Died	7
Retired	60
Took Academic Position Elsewhere	103
Took Nonacademic Position	42
Remained, but Changed to Part-Time	17
Other	25
Unknown	5
Total	259

Department, Rank	Total Expenditure			
	Minimum	Mean	Median	Maximum
US CS 1-12	\$3,600,000	\$19,732,686	\$14,860,365	\$82,819,390
US CS 13-24	\$3,333,717	\$10,530,722	\$8,291,594	\$23,471,792
US CS 25-36	\$461,840	\$5,746,572	\$4,294,663	\$19,398,076
US CS Other	\$24,000	\$2,706,095	\$1,738,518	\$24,699,463
Canadian	\$158,081	\$3,155,678	\$2,316,978	\$10,799,100
US CE	\$1,000,000	\$2,873,088	\$2,175,000	\$9,017,611

Department, Rank	Per Capita Expenditure (Tenure-Track Faculty Only)				Per Capita Expenditure (Tenure-Track, Research, and Postdoctorate Faculty)			
	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	Maximum
US CS 1-12	\$112,441	\$406,520	\$372,103	\$985,945	\$99,467	\$318,942	\$315,755	\$583,235
US CS 13-24	\$138,235	\$321,224	\$273,021	\$847,833	\$123,684	\$227,478	\$237,124	\$322,984
US CS 25-36	\$24,307	\$168,346	\$160,935	\$304,723	\$24,307	\$129,946	\$136,231	\$221,617
US CS Other	\$1,791	\$127,750	\$96,653	\$833,123	\$1,791	\$107,091	\$85,195	\$714,105
Canadian	\$3,856	\$85,320	\$79,549	\$229,768	\$3,764	\$72,392	\$75,269	\$196,347
US CE	\$62,052	\$133,756	\$115,382	\$250,000	\$50,561	\$121,647	\$103,571	\$214,286

2006-2007 Taulbee Survey

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

Department, Rank	Number on Institutional Funds					Number on External Funds														
	Teaching Assistants	Research Assistants	Full-Support Fellows	Graduate Assistants for Computer Systems Support	Other	Teaching Assistants	Research Assistants	Full-Support Fellows	Graduate Assistants for Computer Systems Support	Other										
US CS 1-12	488	20.6%	96	4.0%	127	5.4%	0	0.0%	2	0.1%	0	0.0%	1,480	62.4%	180	7.6%	0	0.0%	0	0.0%
US CS 13-24	285	20.6%	128	9.3%	124	9.0%	0	0.0%	2	0.1%	12	0.9%	749	54.2%	81	5.9%	0	0.0%	0	0.0%
US CS 25-36	332	29.7%	144	12.9%	59	5.3%	19	1.7%	1	0.1%	0	0.0%	474	42.5%	40	3.6%	40	3.6%	7	0.6%
US CS Other	1,817	36.1%	547	10.9%	188	3.7%	67	1.3%	69	1.4%	4	0.1%	2,018	40.1%	116	2.3%	1	0.0%	204	4.1%
Canadian	276	24.3%	172	15.2%	216	19.0%	2	0.2%	160	14.9%	2	0.2%	158	13.9%	102	9.0%	0	0.0%	46	4.1%
US CE	94	22.4%	8	1.9%	20	4.8%	0	0.0%	0	0.0%	34	8.1%	241	57.7%	20	4.8%	0	0.0%	1	0.2%
Total	3,291	28.7%	1,095	9.6%	734	6.4%	88	0.8%	234	2.0%	52	0.5%	5,120	44.7%	539	4.7%	41	0.4%	258	2.3%

Table 26-1. Fall 2007 Academic-Year Graduate Stipends by Department Type and Rank

Department, Rank	Teaching Assistantships				Research Assistantships			
	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	Maximum
US CS 1-12	\$10,000	\$17,334	\$18,212	\$22,061	\$15,570	\$19,315	\$19,400	\$27,600
US CS 13-24	\$4,640	\$14,727	\$15,418	\$26,100	\$9,288	\$18,324	\$18,372	\$26,100
US CS 25-36	\$6,138	\$15,143	\$15,078	\$19,547	\$7,500	\$15,334	\$15,696	\$19,547
US CS Other	\$1,100	\$14,228	\$14,486	\$38,800	\$1,200	\$14,582	\$15,000	\$24,502
Canadian	\$1,214	\$9,875	\$9,794	\$19,000	\$3,405	\$13,816	\$12,872	\$24,300
US CE	\$1,345	\$12,006	\$14,500	\$16,400	\$1,250	\$12,230	\$14,500	\$16,740

Table 26-2. Fall 2007 Academic-Year Graduate Stipends by Department Type and Rank

Department, Rank	Full-Support Fellows				Assistantships for Computer Systems Support			
	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	Maximum
US CS 1-12	\$16,245	\$20,207	\$19,927	\$27,600	*	*	*	*
US CS 13-24	\$9,288	\$19,718	\$20,000	\$26,100	*	*	*	*
US CS 25-36	\$12,000	\$18,528	\$18,191	\$25,000	\$5,500	\$14,438	\$15,782	\$18,756
US CS Other	\$1,750	\$18,515	\$18,000	\$52,500	\$2,400	\$13,187	\$14,000	\$24,637
Canadian	\$8,783	\$19,424	\$16,725	\$40,000	*	*	*	*
US CE	\$13,500	\$19,333	\$19,000	\$27,500	*	*	*	*

*Numbers not reported due to low number of respondents

Table 26-3. Fall 2007 Academic-Year Graduate Stipends by Department Type and Rank

Department, Rank	Other Assistantships			
	Minimum	Mean	Median	Maximum
US CS 1-12	\$20,025	\$24,008	\$25,000	\$27,000
US CS 13-24	*	*	*	*
US CS 25-36	\$2,000	\$12,752	\$17,500	\$18,756
US CS Other	\$1,000	\$14,301	\$15,056	\$30,000
Canadian	\$5,500	\$10,832	\$12,041	\$14,955
US CE	*	*	*	*

*Numbers not reported due to low number of respondents

for Canadian departments rose 6.8%, the same increase as was observed for U.S. CS programs.

Average salaries for new Ph.D.s (those who received their Ph.D. last year and then joined departments as tenure-track faculty) increased 3% from those reported in last year's survey (Table 34). This is the same level of increase observed last year for new Ph.D.s and, as has been the case in recent years, is somewhat smaller than the average increases for continuing faculty. New Ph.D. salaries in Canadian departments rose 1.5%, to \$83,043 for twelve months in tenure-track positions, which is the same level of increase as for Canadian assistant professors overall. However, this is based on only six data points, so we do not show a separate table for new Ph.D.s in the Canadian departments.

Concluding Observations

We have not yet reached the peak of Ph.D. production, although we appear to be getting close. Most of the Ph.D. graduates continue to go to industry, with the number of available academic positions changing little in the past three years.

Undergraduate degree production continues its downward trend, although this trend should cease within the next two years, at least in U.S. CS departments. However, signs of recovery from the sharp decline that has lasted several years have yet to materialize.

Rankings

For tables that group computer science departments by rank, the rankings are based on information collected in the 1995 assessment of research and doctorate programs in

the United States conducted by the National Research Council (NRC) [see <http://www.cra.org/statistics/nrcstudy2/home.html>]. New NRC rankings are anticipated later in 2008, and future Taulbee reports may be modified as a result.

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

CS departments ranked 13-24 are: Brown, Yale, University of California (Los Angeles), University of Maryland (College Park), New York University, University of Massachusetts (Amherst), Rice, University of Southern California, University of Michigan, University of California (San Diego), Columbia, and University of Pennsylvania.² All schools in this ranking participated in the survey this year.

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

CS departments that are ranked above 36 or that are unranked that responded to the survey include: Arizona State University, Auburn, Boston University, Brandeis, Case Western Reserve, City University of New York Graduate Center, Clemson, College of William and Mary, Colorado School of Mines, Colorado State, Dartmouth, DePaul, Drexel, Florida Institute of Technology, Florida International, Florida State, George Mason, George Washington, Georgia State, Illinois Institute of Technology, Iowa State, Johns Hopkins, Kansas State, Kent State, Lehigh, Louisiana State, Michigan State, Michigan Technological, Mississippi State, Missouri University of Science and Technology, Montana State, Naval Postgraduate School, New Mexico State, North Carolina State, North Dakota State, Northeastern, Northwestern, Nova Southeastern, Oakland, Ohio State, Oklahoma State, Old Dominion, Oregon State, Pace, Pennsylvania State, Polytechnic, Portland State, Rensselaer Polytechnic, Southern Methodist University, Stevens Institute of Technology, Syracuse, Temple, Texas A&M, Texas Tech, Toyota Technological Institute (Chicago), Tufts, Vanderbilt, Virginia Tech, Washington State, Washington (St. Louis), Wayne State, Western Michigan, Worcester Polytechnic, and Wright State.

University of: Alabama (Birmingham, Huntsville, and Tuscaloosa), Albany, Arkansas (Fayetteville and Little Rock), Buffalo-SUNY, California (at Davis,

Continued on Page 17

2006-2007 Taulbee Survey

Table 27. Nine-month Salaries, 147 Responses of 176 US Computer Science Departments

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	404	*	\$129,349	\$233,062	\$139,656	\$138,006	*	\$149,457	\$255,900
Full, in rank 16-20 years	299	\$74,189	\$125,205	\$197,037	\$134,854	\$134,454	\$94,860	\$146,936	\$213,421
Full, in rank 11-15 years	224	\$80,808	\$122,318	*	\$133,130	\$132,749	\$90,399	\$146,722	*
Full, in rank 6-10 years	167	*	\$116,554	\$190,000	\$127,698	\$126,101	*	\$142,203	\$281,779
Full, in rank 0-5 years	150	\$80,595	\$111,456	\$201,798	\$124,416	\$122,363	\$93,670	\$141,574	\$294,975
Full, yrs in rank not given	234	\$85,900	\$111,321	*	\$133,782	\$132,271	\$107,808	\$164,757	*
Full Professor: total	1,478	\$72,983			\$129,617				\$294,975
Assoc, in rank 21 years +	40	\$67,769	\$92,910	*	\$94,994	\$95,055	\$68,964	\$96,161	*
Assoc, in rank 16-20 years	73	*	\$90,635	*	\$92,257	\$91,777	*	\$93,927	*
Assoc, in rank 11-15 years	91	*	\$95,859	\$141,848	\$97,277	\$97,899	*	\$100,838	\$159,902
Assoc, in rank 6-10 years	125	\$65,263	\$97,165	\$136,000	\$100,016	\$100,000	\$69,316	\$102,224	\$137,749
Assoc, in rank 0-5 years	478	*	\$94,673	\$129,945	\$100,207	\$99,622	*	\$107,003	\$158,004
Assoc yrs in rank not given	178	\$50,667	\$88,237	\$109,000	\$96,928	\$96,941	\$86,200	\$107,353	\$132,150
Associate Professor: total	985	\$50,667			\$98,299				\$159,902
Assistant Professor	898	\$67,300	\$83,437	\$121,217	\$87,703	\$87,512	\$73,411	\$92,092	\$122,104
Non-Tenure-Track									
Teaching Faculty	433	\$30,024	\$60,215	*	\$67,796	\$67,158	\$36,609	\$76,937	*
Research Faculty	228	\$20,862	\$72,241	\$156,000	\$83,851	\$83,216	\$50,000	\$98,691	\$219,050
Postdoctrates	269	*	\$39,909	\$60,000	\$45,455	\$45,211	*	\$51,350	\$121,092

Table 28. Nine-month Salaries, 10 Responses of 12 US Computer Science Departments Ranked 1-12

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	29	\$112,095	\$143,295	\$175,700	\$171,830	\$167,177	\$151,950	\$207,033	\$255,900
Full, in rank 16-20 years	18	\$102,369	\$135,410	*	\$147,580	\$143,867	\$134,149	\$166,478	*
Full, in rank 11-15 years	40	\$104,894	\$126,200	\$176,325	\$150,395	\$148,957	\$145,059	\$188,322	\$215,000
Full, in rank 6-10 years	51	\$100,400	\$129,205	\$190,000	\$147,874	\$146,416	\$130,351	\$177,404	\$213,900
Full, in rank 0-5 years	54	\$83,176	\$110,436	\$149,200	\$125,664	\$124,479	\$116,000	\$144,718	\$170,900
Full, yrs in rank not given	55	\$112,800	\$114,200	\$115,600	\$141,666	\$138,675	\$163,500	\$203,850	\$244,200
Full Professor: total	247	\$83,176			\$144,481				\$255,900
Assoc, in rank 21 years +	1	*	*	*	*	*	*	*	*
Assoc, in rank 16-20 years	2	*	*	*	*	*	*	*	*
Assoc, in rank 11-15 years	0	*	*	*	*	*	*	*	*
Assoc, in rank 6-10 years	5	*	*	*	*	*	*	*	*
Assoc, in rank 0-5 years	61	\$93,976	\$101,451	\$121,800	\$108,507	\$108,468	\$97,671	\$115,421	\$131,600
Assoc yrs in rank not given	21	\$93,000	\$100,500	\$108,500	\$105,633	\$105,800	\$100,000	\$112,200	\$118,600
Associate Professor: total	90	\$83,077			\$107,905				\$131,600
Assistant Professor	89	\$76,900	\$86,917	\$92,700	\$92,613	\$92,912	\$90,000	\$97,361	\$108,425
Non-Tenure-Track									
Teaching Faculty	52	\$36,421	\$73,735	*	\$87,886	\$88,995	\$74,135	\$101,776	*
Research Faculty	57	\$51,900	\$65,924	\$82,503	\$92,128	\$87,937	\$86,850	\$131,669	\$219,050
Postdoctrates	92	\$23,138	\$39,520	\$60,000	\$49,774	\$49,891	\$48,750	\$61,978	\$75,700

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

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	28	\$111,411	\$156,948	\$210,800	\$171,050	\$170,402	\$139,605	\$185,136	\$254,700
Full, in rank 16-20 years	27	\$88,750	\$136,881	*	\$158,903	\$163,996	\$139,600	\$175,729	*
Full, in rank 11-15 years	25	\$80,808	\$151,726	*	\$170,761	\$173,561	\$140,740	\$188,474	*
Full, in rank 6-10 years	55	*	\$126,508	\$183,300	\$148,504	\$146,645	*	\$175,656	\$229,400
Full, in rank 0-5 years	64	\$88,457	\$123,925	\$156,804	\$143,275	\$140,565	\$131,148	\$168,563	\$260,000
Full, yrs in rank not given	19	*	\$97,500	*	\$145,589	\$140,000	*	\$201,000	*
Full Professor: total	218	\$80,808			\$153,456				\$290,667
Assoc, in rank 21 years +	0	*	*	*	*	*	*	*	*
Assoc, in rank 16-20 years	7	*	*	*	*	*	*	*	*
Assoc, in rank 11-15 years	5	*	*	*	*	*	*	*	*
Assoc, in rank 6-10 years	17	\$73,013	\$106,547	\$129,252	\$111,115	\$111,973	\$99,000	\$114,663	\$137,749
Assoc, in rank 0-5 years	50	\$82,100	\$103,001	\$129,945	\$114,660	\$112,167	\$113,661	\$128,769	\$158,004
Assoc yrs in rank not given	5	*	*	*	*	*	*	*	*
Associate Professor: total	84	\$73,013			\$112,626				\$158,004
Assistant Professor	86	\$84,500	\$91,765	\$121,217	\$95,981	\$95,896	\$89,720	\$101,440	\$122,104
Non-Tenure-Track									
Teaching Faculty	39	\$54,600	\$73,454	\$91,608	\$81,372	\$80,092	\$55,000	\$92,470	\$120,000
Research Faculty	40	\$20,862	\$70,443	\$101,887	\$81,533	\$83,715	\$60,000	\$99,007	\$154,999
Postdoctrates	52	\$32,304	\$43,499	\$53,748	\$53,584	\$51,732	\$55,000	\$69,584	\$121,092

2006-2007 Taulbee Survey

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

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	12	\$103,598	\$128,525	*	\$138,054	\$138,507	\$111,400	\$147,273	*
Full, in rank 16-20 years	23	\$97,008	\$122,154	\$161,475	\$137,041	\$136,868	\$102,948	\$152,833	\$203,292
Full, in rank 11-15 years	38	\$97,442	\$125,598	\$165,726	\$140,744	\$140,548	\$110,000	\$157,700	\$198,264
Full, in rank 6-10 years	25	\$100,194	\$114,694	\$131,625	\$134,753	\$132,979	\$113,099	\$158,670	\$281,779
Full, in rank 0-5 years	59	\$95,600	\$111,220	\$121,387	\$133,080	\$125,653	\$117,900	\$174,585	\$294,975
Full, yrs in rank not given	27	\$101,160	\$113,037	\$122,000	\$140,017	\$142,761	\$107,808	\$185,090	\$242,063
Full Professor: total	184	\$95,600			\$139,881				\$294,975
Assoc, in rank 21 years +	2	*	*	*	*	*	*	*	*
Assoc, in rank 16-20 years	4	*	*	*	*	*	*	*	*
Assoc, in rank 11-15 years	12	\$68,462	\$92,092	\$119,154	\$99,053	\$95,347	\$87,755	\$115,000	\$159,902
Assoc, in rank 6-10 years	12	\$92,103	\$104,110	*	\$106,420	\$106,409	\$95,500	\$108,006	*
Assoc, in rank 0-5 years	58	\$88,849	\$98,522	\$121,000	\$103,388	\$102,996	\$94,900	\$111,113	\$142,749
Assoc yrs in rank not given	11	\$92,500	\$96,228	\$99,500	\$104,438	\$105,050	\$104,736	\$111,295	\$119,150
Associate Professor: total	99	\$68,462			\$102,649				\$159,902
Assistant Professor	96	\$77,741	\$85,480	\$90,683	\$89,913	\$89,330	\$87,156	\$95,199	\$108,426
Non-Tenure-Track									
Teaching Faculty	37	\$44,454	\$63,619	\$85,729	\$73,360	\$70,786	\$58,000	\$85,828	\$122,500
Research Faculty	43	\$50,000	\$60,336	\$67,782	\$79,041	\$76,913	\$63,850	\$104,950	\$148,950
Postdoctrates	31	\$28,786	\$38,497	\$52,000	\$46,642	\$46,700	\$30,195	\$53,148	\$81,600

Table 31. Nine-month Salaries, 113 Responses of 140 US Computer Science Departments Ranked Higher than 36 or Unranked

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	81	\$72,983	\$122,662	*	\$129,490	\$128,031	\$72,983	\$135,515	*
Full, in rank 16-20 years	99	\$74,189	\$122,556	\$197,037	\$128,991	\$128,270	\$94,860	\$139,119	\$213,421
Full, in rank 11-15 years	121	\$84,785	\$117,165	*	\$124,052	\$123,437	\$90,399	\$134,193	*
Full, in rank 6-10 years	168	\$90,321	\$114,045	\$173,900	\$121,690	\$120,223	\$93,168	\$131,981	\$201,000
Full, in rank 0-5 years	227	\$80,595	\$109,820	\$201,798	\$120,724	\$119,256	\$93,670	\$134,234	\$258,180
Full, yrs in rank not given	133	\$85,900	\$111,454	*	\$131,678	\$129,906	\$114,582	\$156,783	*
Full Professor: total	829	\$72,983			\$124,499				\$266,667
Assoc, in rank 21 years +	37	\$67,769	\$92,794	*	\$95,097	\$95,164	\$68,964	\$96,381	*
Assoc, in rank 16-20 years	60	*	\$89,587	*	\$91,318	\$90,701	*	\$93,108	*
Assoc, in rank 11-15 years	74	*	\$94,133	*	\$95,149	\$96,250	*	\$98,137	*
Assoc, in rank 6-10 years	91	\$65,263	\$94,165	*	\$96,726	\$96,618	\$69,316	\$98,984	*
Assoc, in rank 0-5 years	309	*	\$92,794	\$127,271	\$97,487	\$97,090	*	\$103,440	\$152,431
Assoc yrs in rank not given	141	\$50,667	\$83,709	\$108,219	\$93,088	\$92,943	\$86,200	\$104,741	\$132,150
Associate Professor: total	712	\$58,852			\$95,369				\$122,435
Assistant Professor	627	\$67,300	\$82,040	\$108,160	\$86,115	\$85,926	\$73,411	\$90,306	\$119,975
Non-Tenure-Track									
Teaching Faculty	305	\$30,024	\$56,829	\$117,165	\$63,412	\$62,896	\$36,609	\$71,506	\$130,000
Research Faculty	88	\$38,004	\$75,987	\$156,000	\$84,227	\$83,674	\$50,000	\$92,647	\$208,000
Postdoctrates	94	*	\$39,489	\$60,000	\$43,027	\$42,996	*	\$46,007	\$108,466

Table 32. Nine-month Salaries, 9 Responses of 30 US Computer Engineering Departments

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	5	*	*	*	*	*	*	*	*
Full, in rank 16-20 years	5	*	*	*	*	*	*	*	*
Full, in rank 11-15 years	5	*	*	*	*	*	*	*	*
Full, in rank 6-10 years	18	*	\$128,190	\$226,204	\$122,596	\$120,010	*	\$134,501	\$173,300
Full, in rank 0-5 years	24	\$94,488	\$102,040	\$116,000	\$110,598	\$108,850	\$98,400	\$125,129	\$214,348
Full, yrs in rank not given	12	\$95,600	\$96,300	\$97,000	\$111,239	\$115,250	\$111,100	\$126,550	\$142,000
Full Professor: total	69	\$88,100			\$118,866				\$214,348
Assoc, in rank 21 years +	1	*	*	*	*	*	*	*	*
Assoc, in rank 16-20 years	2	*	*	*	*	*	*	*	*
Assoc, in rank 11-15 years	4	*	*	*	*	*	*	*	*
Assoc, in rank 6-10 years	5	*	*	*	*	*	*	*	*
Assoc, in rank 0-5 years	27	\$80,000	\$92,002	*	\$94,950	\$94,884	\$83,257	\$98,340	*
Assoc yrs in rank not given	17	\$53,000	\$79,248	\$92,400	\$90,652	\$87,640	\$89,165	\$95,766	\$106,600
Associate Professor: total	56	\$53,000			\$95,082				\$113,800
Assistant Professor	55	\$77,438	\$81,754	\$88,300	\$85,328	\$85,643	\$81,900	\$89,544	\$94,725
Non-Tenure-Track									
Teaching Faculty	16	*	\$61,701	\$85,950	\$64,844	\$64,358	*	\$69,794	\$89,000
Research Faculty	2	*	*	*	*	*	*	*	*
Postdoctrates	9	*	*	*	*	*	*	*	*

2006-2007 Taulbee Survey

Table 33. Twelve-month Salaries, 19 Responses of 28 Canadian Computer Science Departments (Canadian Dollars)

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	19	\$105,744	\$138,464	*	\$140,703	\$140,581	\$106,306	\$143,145	*
Full, in rank 16-20 years	26	\$115,748	\$137,268	\$177,929	\$144,289	\$142,064	\$128,647	\$153,645	\$180,886
Full, in rank 11-15 years	31	*	\$129,579	*	\$134,614	\$133,297	*	\$141,120	*
Full, in rank 6-10 years	50	\$112,316	\$128,165	\$153,696	\$140,300	\$138,298	\$115,294	\$154,797	\$212,448
Full, in rank 0-5 years	55	\$99,100	\$119,140	\$145,397	\$129,544	\$127,175	\$113,597	\$148,056	\$209,600
Full, yrs in rank not given	101	\$94,668	\$114,581	\$154,802	\$134,785	\$128,124	\$130,358	\$174,492	\$232,731
Full Professor: total	282	\$94,668			\$135,415				\$232,731
Assoc, in rank 21 years +	8	*	*	*	*	*	*	*	*
Assoc, in rank 16-20 years	12	*	\$110,406	\$126,387	\$116,819	\$116,512	*	\$123,848	\$153,762
Assoc, in rank 11-15 years	17	*	\$110,337	\$120,511	\$113,677	\$113,653	*	\$115,952	\$143,163
Assoc, in rank 6-10 years	28	*	\$106,523	\$119,695	\$111,686	\$112,599	*	\$116,442	\$137,878
Assoc, in rank 0-5 years	114	\$81,630	\$98,360	\$117,805	\$106,218	\$105,204	\$95,816	\$116,581	\$141,213
Assoc yrs in rank not given	66	\$76,010	\$91,393	\$124,020	\$105,536	\$105,014	\$102,448	\$118,005	\$154,676
Associate Professor: total	245	\$76,010			\$106,434				\$154,676
Assistant Professor	152	\$62,648	\$83,964	\$110,000	\$92,233	\$92,506	\$79,654	\$101,391	\$133,665
Non-Tenure-Track									
Teaching Faculty	67	\$43,143	\$67,913	\$94,068	\$78,539	\$78,715	\$52,896	\$88,383	\$136,501
Research Faculty	17	\$36,000	\$57,409	\$82,812	\$66,702	\$66,088	\$50,000	\$77,718	\$100,992
Postdoctrates	23	\$24,600	\$32,120	\$45,000	\$42,098	\$43,400	\$35,000	\$50,489	\$65,000

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

Faculty Rank	Number of New Ph.D.s	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Tenure-Track	78	\$70,000	\$84,796	\$100,000	\$85,044	\$84,999	\$70,000	\$85,306	\$100,000
Non-Tenure-Track									
Teaching Faculty	18	\$40,000	\$57,108	\$75,000	\$57,720	\$57,877	\$40,000	\$57,163	\$80,000
Research Faculty	18	\$38,004	\$65,338	\$98,325	\$65,915	\$65,915	\$38,004	\$66,492	\$98,325
Postdoctrates	68	\$24,000	\$44,687	\$65,000	\$47,113	\$47,152	\$30,000	\$49,565	\$70,000

Table 34a. Twelve-month Salaries for New Ph.D.s, Responding Canadian Departments

Faculty Rank	Number of New Ph.D.s	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Tenure-Track	6	*	*	*	*	*	*	*	*
Teaching Faculty	0	*	*	*	*	*	*	*	*
Research Faculty	0	*	*	*	*	*	*	*	*
Postdoctrates	2	*	*	*	*	*	*	*	*

Riverside, Santa Barbara, and Santa Cruz), Cincinnati, Colorado (Boulder), Connecticut, Delaware, Denver, Florida, Georgia, Illinois (Chicago), Iowa, Kansas, Kentucky, Louisiana (Lafayette), Louisville, Maine, Maryland (Baltimore Co.), Massachusetts (at Boston and Lowell), Minnesota, Mississippi, Missouri (at Columbia and Kansas City), Nebraska (Lincoln and Omaha), Nevada (Las Vegas and Reno), New Hampshire, New Mexico, North Carolina (Charlotte), North Texas, Notre Dame, Oklahoma, Oregon, Pittsburgh, South Carolina, South Florida, Tennessee (Knoxville), Texas (at Arlington, Dallas, El Paso, and San Antonio), Tulsa, Utah, and Wisconsin (Milwaukee).

Computer Engineering departments participating in the survey this year include: Boston University, Iowa State, Northeastern, Princeton, Purdue,

Rensselaer Polytechnic, Virginia Tech, and the Universities of California (Santa Barbara and Santa Cruz) and New Mexico.

Canadian departments participating in the survey include: Concordia, Dalhousie, McGill, Memorial, Queen's, Simon Fraser, and York universities. University of: Alberta, British Columbia, Calgary, Manitoba, Montreal, New Brunswick, Ottawa, Regina, Saskatchewan, Toronto, Victoria, Waterloo, Western Ontario, and Université Laval.

Acknowledgments

Betsy Bizot once again provided valuable assistance with the data collection, tabulation, and analysis for this survey. Jean Smith and Moshe Vardi suggested many valuable improvements to the presentation of this report.

Endnotes

1. The title of the survey honors the late Orrin E. Taulbee of the University of Pittsburgh, who conducted these surveys for the Computer Science Board until 1984, with retrospective annual data going back to 1970.
2. Although the University of Pennsylvania and the University of Chicago were tied in the National Research Council rankings, CRA made the arbitrary decision to place Pennsylvania in the second tier of schools.

3. All tables with rankings: Statistics sometimes are given according to departmental rank. Schools are ranked only if they offer a CS degree and according to the quality of their CS program as determined by reputation. Those that only offer CE degrees are not ranked, and statistics are given on a separate line, apart from the rankings.
4. All ethnicity tables: Ethnic breakdowns are drawn from guidelines set forth by the U.S. Department of Education.
5. All faculty tables: The survey makes no distinction between faculty specializing in CS vs. CE programs. Every effort is made to minimize the inclusion of faculty in electrical engineering who are not computer engineers. ■

BLS Predicts Strong Job Growth and High Salaries for IT Workforce through 2016

By Jay Vegso

In its employment projections for 2006-2016, the Bureau of Labor Statistics (BLS) predicts that professional level IT occupations will continue to enjoy high salaries and more than twice the growth rate as the overall workforce.

Every two years, BLS releases workforce projections covering a 10-year period. The definition for the 'professional IT workforce' used here is that used by the Department of Commerce's Office of Technology Policy. This adds two occupations to those listed under the "Computer specialists" category (15-0000 through 15-1099) in the BLS tables: Computer and information system managers (11-3021) and Computer hardware engineers (17-2061).

BLS estimates that the professional-level IT workforce will create 1 in 19 new jobs between 2006 and 2016. In addition, many of these jobs will pay well.

In 2006, there were 3.5 million IT professionals out of a total workforce of 150.6 million. This part of the IT workforce is projected to add about 854,000 new jobs between 2006 and 2016, an increase of about 24%. Total job openings, which combine new jobs and net replacements, are projected to be 1.64 million for IT professionals. The overall workforce is expected to grow about 10% between 2006 and 2016, adding 15.6 million new jobs. This number increases to 50.73 million jobs once net replacements are added in.

Five of the 30 occupations that are projected to grow the fastest (i.e., percent gain) between 2006 and 2016 are in the IT profession. Among the 30 fastest-growing occupations, 11 have median salary earnings of \$46,360 or above, including all five IT occupations.

Three of the five IT occupations listed as the fastest growing also rank among the 30 that are projected to have the largest numeric growth. Only 7 of these 30 have median salary earnings of \$46,360 or more, including all three IT occupations.

Note: The 2006-2016 projections appear in five articles in the November 2007 issue of the *Monthly Labor Review*, published by the Bureau of Labor Statistics, U.S. Department of Labor: <http://www.bls.gov/pub/mlr/2007/11/contents.htm> ■

Science Community Seeks Supplemental Funding from Page 5

many in the community, a clear sense of embarrassment from some in the Congressional leadership about what happened to science funding in the FY08 omnibus appropriation, there is some opposition from both sides of the aisle to using the supplemental as the vehicle. Fiscal conservatives are likely to balk at any spending that does not clearly meet emergency status or does not directly impact the operations in Iraq or Afghanistan. There is also potential opposition from those who oppose the war in Iraq, and plan to vote against any supplemental that does not call for the immediate withdrawal of troops.

For the science advocacy community, the effort will be worth it even if the full extent of the shortfall is not restored. The effort they expend making the case for FY08 will help advance their goals for FY09 as well—and the process in FY09 is poised to be just as difficult as in FY08.

For all the latest, visit the Computing Research Policy Blog at <http://cra.org/blog>.

Notes:

1. See *Computing Research News* (Vol. 20/No.2) "Science Increases Abandoned in Final 08 Spending Bill" for more detail: http://www.cra.org/CRN/articles/march08/harsha_science_abandoned.html
2. To join the Computing Research Advocacy Network (CRAN), visit: <http://www.cra.org/govaffairs/advocacy/cran/> ■

Employment by occupation, 2006 and projected 2016 (Numbers in thousands)								Source: BLS
Title	Code	Employment		Percent Distribution		Change		Total job openings due to growth & net replacements 2006-2016
		2006	2016	2006	2016	Number	Percent	
Total, all occupations	00-0000	150,620	166,220	100	100	15,600	10.36	50,732
Computer and information systems managers	11-3021	264	307	0.18	0.18	43	16.36	86
Computer specialists	15-1000	3,200	4,006	2.12	2.41	807	25.21	1,524
Computer and information scientists, research	15-1011	25	31	0.02	0.02	5	21.53	12
Computer programmers	15-1021	435	417	0.29	0.25	-18	-4.14	91
Computer software engineers	15-1030	857	1,181	0.57	0.71	324	37.86	449
Computer software engineers, applications	15-1031	507	733	0.34	0.44	226	44.55	300
Computer software engineers, systems software	15-1032	350	449	0.23	0.27	99	28.18	150
Computer support specialists	15-1041	552	624	0.37	0.38	71	12.88	242
Computer systems analysts	15-1051	504	650	0.33	0.39	146	28.98	280
Database administrators	15-1061	119	154	0.08	0.09	34	28.56	47
Network and computer systems administrators	15-1071	309	393	0.21	0.24	83	26.95	154
Network systems and data communications analysts	15-1081	262	402	0.17	0.24	140	53.41	193
All other computer specialists	15-1099	136	157	0.09	0.09	21	15.12	57
Computer hardware engineers	17-2061	79	82	0.05	0.05	4	4.6	28
Total, all professional-level IT occupations		3,543	4,395			854	24.05	1,638

USENIX Announces Open Access to Conference Proceedings

USENIX is pleased to announce open public access to all its conference proceedings.

This significant decision will allow universal access to some of the most important technical research in advanced computing. In making this move USENIX is setting the standard for open access to information, an essential part of its mission.

USENIX could not achieve such goals without the support and dedication of its membership. We urge you to encourage others to join USENIX. Membership helps us present over 20 influential conferences each year and offer open access to the technical information presented there.

USENIX conference proceedings can be found at: <http://www.usenix.org/publications/library/proceedings/>

Questions? Contact: papersinfo@usenix.org. ■

CRA-W Travel Support for Women in Research Labs

Submission deadline: Ongoing
Award notification: Within 4 weeks of submission
Contact: travelsupport@cra.org

Rationale

One of the challenges of working in an industry or government lab is having one's budget determined by the overall economic climate. When times are tough, organizations typically respond by cutting back, including on such "non-essential" expenses as travel, computer equipment, and books. Academic research conferences and workshops do not directly benefit the bottom line of the organization or its customers, and therefore travel to such conferences is usually cut. These budget shortfalls can be short—a quarter or as long as a year or two—and they can occur quite suddenly.

Attending conferences and workshops is extremely important for women in research labs, particularly for those in the early stages of their careers. Because of the proprietary work that often occurs in industrial research labs and the classified work that sometimes occurs in government institutions, women in these positions are often more intellectually isolated than their academic colleagues. Thus conference attendance is particularly important. Beyond presenting one's work, such participation provides important networking opportunities that are key to increasing one's visibility and stature as a professional member of one's field.

If one's employer cannot provide travel support for attending conferences, women in research labs often have no other resources available to them. Our intent with this program is to provide a "safety net" for women in research labs by providing grants for travel support to send women to conferences when their home institution cannot.

CRA-W Travel Support Grant

CRA-W will provide full or partial support for actual travel expenses to conferences or workshops in the applicant's area of research. Up to \$2,000 will be available per trip. If the applicant's employer is able to cover part of the cost, CRA-W will reimburse the remaining amount of actual expenses up to the \$2,000 limit. However, support from the home institution is not required to apply for this program.

This project supports women for whom traveling to a conference/workshop without financial support from one's employer would constitute a hardship, and where attending the event would provide valuable opportunities to network and grow professionally.

Eligibility

To be eligible for this program, the applicant must:

- Be a full-time or part-time female employee of a corporate-funded or government-funded research laboratory;
- Provide evidence of being an active researcher, either by having a PhD granted from an accredited institution or a record of publications in academic conferences;
- Do research in a subfield of computer science, or be traveling to a conference related to computer science.

Students are not eligible for this program. They often have additional sources of support. This program is geared towards women in research labs who typically don't have any other means of travel support.

Travel funds are provided by the CRA-W organization; therefore the conference or the applicant's research must be in an area related to computer science. Travel grants are limited to one per person per calendar year.

Preference is given to women just starting out in a research career. Slight preference is given to women with a paper or poster to present at the conference, though this is not a requirement for acceptance.

Application Process

Important: Before proceeding, please carefully read the section on "Eligibility" above!

Since conferences occur throughout the year, applications will be considered on a rolling basis. A panel of CRA-W members will consider each application and make a decision within 4 weeks of receiving the application.

To apply for a CRA-W Travel Support grant, please send the following materials by email to travelsupport@cra.org:

- A current CV;
- A personal statement (1 page) explaining why attending this conference/workshop is important to you;
- A letter from your supervisor at your home institution attesting you are a full- or part-time employee of a corporate-funded or government-funded research lab, and that your institution cannot cover the full costs of your travel to this event;
- A budget estimating the costs for attending the meeting; see details below.

If accepted, reasonable uncovered travel expenses, up to a limit of \$2,000, will be reimbursed. Grant recipients are encouraged to volunteer their time to the CRA-W (e.g., serving on a panel at a workshop, helping judge future grant applications, or mentoring younger women).

Budget

Please provide a detailed and realistic budget, including conference registration, airfare, lodging, meals, and transportation. International travel is acceptable. You should plan to stay in the conference hotel or in a less expensive hotel. If part of your travel costs can be covered by your employer, state the amount clearly. Decisions will be made based on the amount of funds available to the program, as well as our evaluation of whether the amount requested is appropriate. ■

Keeping Up on the News? Check Out These CRA Sites

CRA Bulletin www.cra.org/bulletin

Subscribe to its RSS feed or sign up for a digest version sent out by e-mail.

CRA Policy Blog <http://cra.org/blog>

All the latest in computing research policy news.

Sample Headlines:

Employment and Salaries of Recent CS Graduates

Enrollments and Degree Production at US CS Departments Drop Further in 2006-07

Visions for Theoretical Computer Science

NAE Grand Challenges in Engineering

Recent BLS IT Workforce Projections

BLS Projected IT Employment by Detailed Occupation

BLS Expects Professional-Level IT Workforce to Create 1 in 19 New Jobs Between 2006 and 2016

Continued Growth in Science and Engineering Doctorate Production

Continued Drop in Foreign Total Enrollment in CIS

Sample Headlines:

S&E Supply Up, Unemployment Down in 2006, Says NSF

Grassroots Effort to Urge Support for Science Funding in Supplemental Reports of AP CS Demise Are Greatly Exaggerated

AEA Cyberstates 2008 Report Released

Microsoft-Intel Investment in University Research Motivated by DARPA's Lack of Support

Gates Tells Congress to Support Research

FY09 House Budget Resolution Help Urge Congress to Support Increases in Science, Computing Research

Interest in Computer Science Degrees Improving?

* * * * *

Sign up for CRA Announcements

Receive e-mail messages about CRA projects and events on a regular basis. To subscribe, see details at <http://www.cra.org>.

For the latest on the **Computing Community Consortium (CCC)**, visit its website at: <http://www.cra.org/ccc/>



When meeting in Washington, DC, CRA board members often take time to visit their Congressmen to discuss issues of concern to computing research. Pictured above on the right is Rep. Michael McCaul (R-TX) with J Strother Moore, chair of the Department of Computer Science at the University of Texas at Austin during a recent visit. Congressional Visits Day is an annual event organized for the board members by CRA's Committee on Government Affairs.

Photo Credit: Jemah Altemus, Congressman McCaul's Office

Professional Opportunities

CRN Advertising Policy

See <http://www.cra.org/main/cra.jobshow.html>

City College of New York
Computer Science Department
Assistant or Associate Professor Position
Position Detail: Tenure Track
FLSA Status: Exempt
Compensation: Assistant Professor: \$38,801 - \$67,092, Associate Professor: \$50,321 - \$80,020
College Web Site: www.cuny.edu
Notice Number: FY 13414
Closing Date: Open until filled with review of applications to begin May 1, 2008.

POSITION DESCRIPTION AND DUTIES:

The Computer Science Department of the City College of New York is seeking outstanding candidates for a tenure track position at the assistant or associate professor level in the area of geographic information science.

The position is intended to support environmental modeling and remote sensing research within the Cooperative Remote Sensing Science and Technology Center funded by NOAA. The successful candidate will be actively involved in research and teaching and have expertise in geographic information science techniques and technology as well as possessing strong capabilities in geospatial data analysis, modeling and statistics.

Synergistic research areas in the Computer Science Department at CCNY include databases, data compression and archiving, graphics and image processing, visualization, pattern analysis, distributed computing and networking, and computational geometry.

QUALIFICATION REQUIREMENTS

An outstanding academic or industrial record and a PhD in Computer Science or related field are required. The successful candidate must demonstrate a strong commitment to excellence in undergraduate and graduate teaching and the ability to attract significant research funding. Applicants for the associate level position should, in addition, demonstrate a history of scholarly research and leadership in their field.

The City College of New York has a strong institutional commitment to the principle of diversity. In that spirit, we are particularly interested in receiving applications from a broad spectrum of people, including women and under-represented groups. Upon request, reasonable accommodations will be provided for individuals with disabilities **TO APPLY:**

Please send curriculum vitae, the name of three references and a statement of research and teaching goals to:

Professor Douglas Troeger, Chair
Department of Computer Science
The North Academic Center,
Room 8/206

The City College of New York
160 Convent Avenue
New York, New York 10031

The City University of New York
An Equal Employment Opportunity/
Affirmative Action/Immigration Reform
and Control Act/Americans with
Disabilities Act Employer.

Claremont McKenna College Department of Mathematics and Computer Science

Visiting Assistant Professor

Claremont McKenna College Department of Mathematics and Computer Science invites applications for a one-year visiting assistant professor in Computer Science starting July 1, 2008. Teaching load is five courses per year.

See complete job posting at:
<http://www.cmc.edu/math/>

Institute for Defense Analyses Center for Computing Sciences

Ph.D. Level Scientists Position

The Institute for Defense Analyses Center for Computing Sciences is looking for outstanding Ph.D. level scientists, mathematicians and engineers to address problems in high-performance computing, cryptography and network security. IDA/CCS is an independent research center sponsored by the National Security Agency. IDA/CCS scientists and engineers work on difficult scientific problems, problems vital to the nation's security. Stable funding provides for a vibrant research environment and an atmosphere of intellectual inquiry free of administrative burdens. Research at IDA/CCS emphasizes computer science, computer architecture, electrical engineering, information theory and all branches of mathematics. Because CCS research staff work on complex topics often engaging multidisciplinary teams, candidates should demonstrate depth in a particular field as well as a broad understanding of computational science and technology. Developing imaginative computational solutions employing novel digital technology is one of several long-term themes of work at CCS.

The Center is equipped with a very large variety of hardware and software. The latest developments in high-end computing are heavily used and projects routinely challenge the capability of the most advanced architectures. IDA/CCS offers a competitive salary, an excellent benefits package and a superior professional working environment.

IDA/CCS is located in a modern research park in the Maryland suburbs of Washington, DC. U.S. citizenship and a DoD TS//SI clearance are required. CCS will sponsor this clearance for those selected.

Please send responses or inquiries to:
Dawn Porter
Administrative Manager
IDA Center for Computing Sciences
17100 Science Drive
Bowie, MD 20715-4300
dawn@super.org
(301) 805-7528

The Institute for Defense Analyses is proud to be an equal opportunity employer.

Iowa State University CyberInnovation Institute Postdoctoral Positions

The CyberInnovation Institute (CII) at Iowa State University seeks applications for four postdoctoral positions. These are full-time, two-year positions starting July 1, 2008 (with possible extension subject to availability of funding). Successful applicants will work with faculty teams addressing research in one or more of the following targeted areas of interest:

- 1) High-performance computing,
- 2) Data Mining, information integration, semantic web,
- 3) Visualization,
- 4) Information assurance/network modeling, and
- 5) Information infrastructure and sensor network applications

An earned Ph.D. in Computer Science, Computer Engineering, or in the Mathematical and Physical Sciences with significant training and experience in computer and information sciences, a strong research and publication record, and interest in interdisciplinary research is required. For some of the positions, experience with large software and information systems projects is a plus. Candidates with interdisciplinary research experience are especially encouraged to apply.

Successful candidates will work closely with faculty and students on cross-disciplinary research projects involving the development and use of advanced cyberinfrastructure for applications in

bioinformatics, materials informatics, security informatics, computational fluid dynamics (among others).

For full consideration, candidates must submit a cover letter, resume, and references electronically to:

postdoc@cyber.iastate.edu

Review of applications begins immediately and the search will remain open until the positions are filled.

Iowa State University is an Affirmative Action/Equal Opportunity Employer.

KAIST

Department of Computer Science Tenure-Track Faculty Positions

The Department of Computer Science at KAIST, the top Science & Engineering University in Korea, invites applications for multiple tenure-track faculty positions at all levels. Applicants are welcome in all major fields of computer science, computer engineering and their interdisciplinary areas. Applicants must have a Ph.D. or an equivalent degree in computer science or a closely related field by the time of appointment. Strong candidates who are expected to achieve the Ph.D. degrees within a year can be offered our appointment.

Applicants must demonstrate strong research potential and commitment to teaching. KAIST offers a competitive start-up research fund and joint appointment with KAIST Institutes, which will expand opportunities in interdisciplinary research and funding. KAIST attracts nationwide top students pursuing B.S., M.S., and Ph.D. degrees. The teaching load is three hours per semester. KAIST also provides housing for five years.

KAIST is committed to increasing the number of female and non-Korean faculty members.

Applicants should submit the application form and CV along with the required documents to:

Head, Department of Computer Science
(email: kschoi@cs.kaist.ac.kr)

or
Chair, Search Committee,
Department of Computer Science
(email: kywhang@cs.kaist.ac.kr)

For more information on available positions, please visit the KAIST website: <http://cs.kaist.ac.kr/departmen/recruit.htm>

Kean University

Department of Computer Science Tenure-Track/Assistant Professor Position

Computer Science—teach undergraduate/graduate courses in the newly organized Information Technology program starting September 2008. Expertise in the following areas desirable: telecommunications, networking, pervasive/physical computing, multimedia/gaming/visualization systems/web systems. Ph.D. in Computer Science/Engineering/IT required, ABD considered with completion date by June 2008. Excellent communication skills required; demonstrated commitment to and success in teaching at the undergraduate level highly desirable.

Contact CS/IT Search Committee Chair, at search2008@eve.kean.edu or by mail to department.

Kean University
1000 Morris Avenue
Union, NJ, 07083

Review of applications will begin immediately and continue until position is filled. Send letter of interest, resume and names and contact information for three professional references Official transcripts for degrees and three current letters of recommendation required before appointment. Salary is competitive, commensurate with qualifications and experience. Comprehensive benefits program included.

Contingent on Budgetary Approval and Appropriated Funding.

http://www.kean.edu/about_faculty-jobs.html and <http://eve.kean.edu/jobs.html>

Kean University is an EOE/AA Institution.

King Abdullah University of Science and Technology (KAUST)

Faculty Openings in Computer Science and Applied Mathematics

King Abdullah University of Science and Technology (KAUST) is being established in Saudi Arabia as an international graduate-level research university dedicated to inspiring a new age of scientific achievement that will benefit the region and the world. As an independent and merit-based institution and one of the best endowed universities in the world, KAUST intends to become a major new contributor to the global network of collaborative research. It will enable researchers from around the globe to work together to solve challenging scientific and technological problems. The admission of students, the appointment, promotion and retention of faculty and staff, and all the educational, administrative and other activities of the University shall be conducted on the basis of equality, without regard to race, color, religion or gender.

KAUST is located on the Red Sea at Thuwal (80km north of Jeddah). Opening in September 2009, KAUST welcomes exceptional researchers, faculty and students from around the world. To be competitive, KAUST will offer very attractive base salaries and a wide range of benefits. Further information about KAUST can be found at:

<http://www.kaust.edu.sa/>

KAUST invites applications for faculty positions at all ranks (Assistant, Associate, Full) in Applied Mathematics (with domain applications in the modeling of biological, physical, engineering, and financial systems) and Computer Science, including areas such as Computational Mathematics, High-Performance Scientific Computing, Optimization, Computer Systems, Software Engineering, Algorithms and Computing Theory, Artificial Intelligence, Graphics, Databases, Human-Computer Interaction, Computer Vision and Perception, Robotics, and Bio-Informatics (this list is not exhaustive). KAUST is also interested in applicants doing research at the interface of Computer Science and Applied Mathematics with other science and engineering disciplines. High priority will be given to the overall originality and promise of the candidate's work rather than the candidate's sub-area of specialization within Applied Mathematics and Computer Science.

An earned Ph.D. in Applied Mathematics, Computer Science, Computational Mathematics, Computational Science and Engineering, or a related field, evidence of the ability to pursue a program of research, and a strong commitment to graduate teaching are required. A successful candidate will be expected to teach courses at the graduate level and to build and lead a team of graduate students in Master's and Ph.D. research.

Applications should include a curriculum vita, brief statements of research and teaching interests, and the names of at least 3 references for an Assistant Professor position, 6 references for an Associate Professor position, and 9 references for a Full Professor position. Candidates are requested to ask references to send their letters directly to the search committee. Applications and letters should be sent via electronic mail to kaust-search@cs.stanford.edu. The review of applications will begin immediately, and applicants are strongly encouraged to submit applications as soon as possible; however, applications will continue to be accepted until December 2009, or all 10 available positions have been filled.

In 2008 and 2009, as part of an Academic Excellence Alliance agreement between KAUST and Stanford University, the KAUST faculty search will be conducted by a committee consisting of professors from the Computer Science Department and the Institute of Computational and Mathematical Engineering at Stanford University.

Professional Opportunities

This committee will select the top applicants and nominate them for faculty positions at KAUST. However, KAUST will be responsible for actual recruiting decisions, appointment offers, and explanations of employment benefits. The recruited faculty will be employed by KAUST, not by Stanford. Faculty members in Applied Mathematics and Computer Science recruited by KAUST before September 2009 will be hosted at Stanford University as Visiting Fellows until KAUST opens in September 2009. At Stanford, these Visiting Fellows will conduct research with Stanford faculty and will occasionally teach courses.

Lawrence Berkeley National Laboratory

Computational Research
Energy Sciences Network (ESnet)
Department Head

Are you interested in leading an international network? The Energy Sciences Network (ESnet) is the international high performance networking facility of the Department of Energy (DOE) Office of Science at Lawrence Berkeley National Laboratory. ESnet is looking for a leader with demonstrated technical excellence and an international reputation to provide vision and direction to this leading-edge networking facility.

For more information or to apply, please go to:

<http://jobs.lbl.gov/LBNLCareers/details.asp?jid=21495&p=1&sid=2113>

Berkeley Lab is an affirmative action/equal opportunity employer committed to the development of a diverse workforce.

Massachusetts Institute of Technology

House_n Research Group
Research Programmer and Project Manager

Seeking a research programmer to join a multi-disciplinary effort investigating how in-home sensors can be used for ubiquitous computing.

Areas of expertise: web programming, sensors, ubiquitous and mobile computing, research with human subjects.

Details: <http://www.mit.edu/~intille/ResearchPositionNSF.html>

Morgan Stanley

Sales and Trading Division
Desk Strategists and Quantitative Modelers

Morgan Stanley's Desk Strategists are key participants, together with traders and sales people, in the revenue generating activities of our Sales and Trading Division. Desk Strategists, as the name suggests, sit on the trading desks and team with the traders to develop and deliver innovative trade ideas, models, and systems. Desk Strategists have numerous market related responsibilities. Our Desk Strategists are the primary modelers for new products and work extensively with the traders on using models to analyze risks and opportunities in trading books for complex derivatives.

Morgan Stanley's Desk Strategists will have the opportunity to develop and master the analytical, quantitative and interpersonal skills they will need to succeed. The Firm's flat organizational structure and open trading floor allow Ideas Desk Strategists the opportunities to collaborate with more experienced colleagues and learn from senior professionals. A fast-paced and intense environment requires an aptitude for analyzing and interpreting often complex information in a timely manner. Responsibilities will likely include creating models and strategies that the desk will use to drive trading decisions, analyzing and managing the risk of the positions currently on the books, creating pricing and marking models and creating trader efficiency tools.

Requirements:

- Strong Quantitative Skills: A degree in a quantitative science or finance field with an emphasis on mathematical finance is preferred.
- Superior programming skills: Knowledge of efficient coding and good code structure is more important than knowledge of a particular coding language. Strong technology skills are key to this role (C++ programming and statistical packages such as

SAS or Matlab).

- Financial Expertise: A good background in asset pricing theory, economics, econometrics, or statistics is desirable.
- Commitment: The strong desire to participate in a market focused fast paced collaborative environment

Morgan Stanley's Quantitative Modelers create models and desk strategies that the desk uses to drive trading decisions, as well as create pricing and marking models/tools for securities that are currently on the books and/or about to be purchased or bid on. Quantitative modelers also conduct empirical research, and work with large data sets in support of investment, trading and risk management decisions and have proven track-records of developing models that positively impact the revenue-generating capabilities of their trader counterparts. Candidates must have demonstrated excellence in computer science, programming, mathematics, statistics and quantitative modeling. This role will "add value" to the Firm through the creation of models and valuation tools to be used by the trading desk.

Requirements:

- Statistical Packages such as Matlab, R, SAS
- Strong Programming Skills (C/C++, Java, etc)
- Advanced Degree in Math, Engineering, or Computer Science from a top university

Please indicate in your cover letter which area you are most interested in pursuing. In addition to sending your resume and cover letter to:

maria.lopez@morganstanley.com

Please apply for the position through our website at:

www.morganstanley.com/careers

For a thorough description of Sales & Trading and other product areas, please visit our website at:

www.morganstanley.com

Morgan Stanley is an equal opportunity employer and does not discriminate on the basis of race, color, religion, gender identity, sexual orientation, national origin, age, citizenship, disability, marital status, pregnancy, veteran status or any other characteristic protected by law. Morgan Stanley complies with applicable federal, state and local laws prohibiting discrimination in employment in every jurisdiction in which it maintains facilities. Morgan Stanley also provides reasonable accommodation to individuals with disabilities in accordance with its obligations under applicable law.

Pacific Northwest National Laboratory

Applied Computer Science Group
Computer Scientist Opportunity

The Applied Computer Science Group of the Pacific Northwest National Laboratory is currently seeking applicants for a position to help develop innovative software platforms and tools for high-performance and distributed computing systems.

The ideal candidate would have experience in at least two of the following:

1. systems level software;
2. parallel computing;
3. distributed computing; or
4. middleware platforms

They must also have the ability to design and develop innovative quality software products, and understand issues related to achieving performance and scalability in software systems.

To learn more, please contact recruiter:

Gary Worrell
gary.worrell@pnl.gov
(509) 372-4721

You may also apply online at www.jobs.pnl.gov by referencing job posting 114668.

Palo Alto Research Center

Intelligent Systems Laboratory
Member of the Research Staff: Document Image Analysis

The Palo Alto Research Center seeks a researcher in Computer Vision or related fields to join an established team building systems for advanced document image understanding.

The position requires formulation of theory and algorithms based on document analysis needs, and building of software prototypes that can be integrated into solutions. A Ph.D. or equivalent experience is required. We especially seek candidates demonstrating domain experience in Document Image Analysis informed by advances in Computer Vision, Machine Learning, and Artificial Intelligence.

Polytechnic University Electrical and Computer Engineering Department

Faculty Position in Computer Engineering

The Department of Electrical and Computer Engineering at Polytechnic University announces open faculty position in the area of computer engineering.

The areas of interest for the computer engineering position include microprocessor architecture, chip multiprocessors, embedded systems, parallel processing and reconfigurable computing. The successful candidate will contribute to substantial on-going efforts in high performance computing and other topics in computer engineering.

Because Polytechnic University and New York University are in an advanced stage of merger proceedings, the successful candidates will have excellent opportunities to initiate interdisciplinary research and educational collaborations with the many schools, institutes and departments of NYU.

To apply, please format your CV and cover letter in one pdf file and use the following link to submit it:

http://wicat.poly.edu/resume_submit.php

If you have any questions, please contact us at:

eceseach@poly.edu

Polytechnic University Computer and Information Science Professor of Computer Science in Cyber Security

Polytechnic University invites applications for a faculty who will take on a leadership role in the area of cyber security. The position requires a strong track record of high impact funded research, along with the ability to create innovative partnerships that bring together academia, industry and government. Because Polytechnic University and New York University are in an advanced stage of merger proceedings, the successful candidate will have excellent opportunities to initiate interdisciplinary research and educational collaborations with the diverse institutes and departments of NYU.

Polytechnic is an NSA Center of Excellence in Information Assurance Education and has received two rounds of funding in the Scholarship For Service (SFS) program. Over a dozen security courses are offered regularly and an on-line graduate level cyber security certificate program is also available. Current research focus of the program at the MS and PhD level is on trusted hardware, trusted software systems, digital forensics, multimedia security, biometrics, application security, network security, etc. The ideal candidate would help us expand in some of these areas as well as expand to new areas of expertise in cyber security.

The Computer and Information Science Department (CIS) of Polytechnic University has a strong faculty with a vibrant research program and strong course offerings in a wide area of computing.

Please submit a CV, Research Statement and the names of three references to:

Professor Stuart Steele
Cyber Search Committee
Polytechnic University
Six MetroTech Center
Brooklyn, NY, 11201

or by e-mail to securitysearch@poly.edu

Polytechnic is an Equal Opportunity Employer.

UNIVERSITY OF MISSOURI-COLUMBIA

DEPARTMENT OF COMPUTER SCIENCE

The University of Missouri-Columbia (MU) invites applications for the position of non-tenure track resident instruction assistant professor or resident instructor in the Computer Science Department. We are seeking candidates with excellent knowledge in core CS areas including database management systems and operating systems. Applicants must have a graduate degree in Computer Science or in a closely related field. Ph.D. degree is required if hired as a resident instruction assistant professor, while a Master's degree is sufficient if hired as a resident instructor.

The responsibilities of the instructor include:

- Instruct core CS courses including database management systems and operating systems with a full teaching load.
- Participate in curriculum development with the CS Undergraduate Committee.

Salary is competitive and commensurate with qualifications. MU is the first state university west of the Mississippi River and recognized as one of the most comprehensive schools in the United States. Columbia has consistently been ranked by Money magazine as one of the nation's top places to live because of its excellent education system, economy, health care, housing opportunities and general quality of life. Additional information about the Department of Computer Science can be found at <http://www.cs.missouri.edu>, which contains direct links to the College and University for detailed information. The starting date for this position can be as early as September 2008. Review of applications will begin immediately, and will continue until the position is filled. Interested applicants should send letter of application, a curriculum vitae, a teaching statement, and the names of at least three professional references to: **Chair of CS Instructor Search Committee, 201 Engineering Building West, University of Missouri-Columbia, Columbia, MO 65211, Email to HallPat@missouri.edu.**

The University of Missouri-Columbia is an equal opportunity/affirmative action employer and is designated a Doctoral/Research Extensive Institution by the Carnegie Foundation for the Advancement of Teaching. To request Americans With Disability (ADA) accommodations, please contact Trish Hall at 573-882-3842 or email hallpat@missouri.edu.



Visit the University of Missouri-Columbia's web site at <http://mujobs.missouri.edu>

Professional Opportunities

Polytechnic University
Computer and Information Science
Department
Professor of Computer Science in Data Management

<http://www.poly.edu/cis/>

Polytechnic University seeks a senior faculty member who will take a leading role in the general area of data management, including databases, data mining, information retrieval, web search and mining, and closely related areas. The position requires a strong track record of high impact publications and funded research, along with the ability to create innovative partnerships that bring together academia, industry, and government. Exceptional candidates at lower ranks will be considered.

Polytechnic University and New York University are in an advanced stage of merger proceedings, so the successful candidate will have excellent opportunities to initiate interdisciplinary research and educational collaborations with the diverse institutes and departments of NYU. Polytechnic is located in downtown Brooklyn, minutes from New York City's financial district and with easy access to New York's wide array of cultural and educational institutions.

The Computer and Information Science Department (CIS) of Polytechnic University has a strong faculty with a vibrant research program. It offers BS, MS, and PhD degrees. The ideal candidate will work in an area that complements the department's existing strength in web search technology, P2P content distribution, or information security.

Polytechnic University is an Equal Opportunity Employer

Please submit a CV, Research Statement and the names of three references by e-mail to:

cisresearch@poly.edu
or hard copy to:
Chair, Faculty Search Committee
(Data Management)
Polytechnic University

6 Metrotech Center
Brooklyn, NY 11201
USA

Singapore Management University (SMU)
School of Information Systems
Openings for Faculty

Applications for research focused tenure-track and applications oriented practice-track are invited at all levels.

The SIS research mission is to address deep technology challenges and management issues in information systems that have the potential to transform the way businesses operate.

Real-world industry sectors provide SIS with a test-bed and laboratory for experimentation, as well as a fertile breeding ground for new ideas. Our faculty and students apply their research results to solve real problems in the context of industry settings, and to create innovative information technology applications, systems, and management methods. At the same time, our faculty actively publish in top quality computer science and management science conference and journal outlets.

The Singapore Management University (SMU) was officially incorporated in January 2000. It is a public-funded institution chartered in a unique way to provide the flexibility and operating characteristics of an American-style private university. Today, SMU is comprised of six schools, and is home to over 6,000 undergraduate students. It has a rapidly growing number of Master's & Ph.D. programmes and students.

We are seeking faculty candidates in the following research areas:

1. Data Management and Business Intelligence
2. Information Security and Trust
3. Software Systems, Architecture and Integration
4. Intelligent Decision Support Systems
5. Information Systems Management

Specifics on our hiring strategy within each of these areas are given at:

www.sis.smu.edu.sg/careers

SIS faculty members in all areas are strongly encouraged to collaborate on innovative research projects and also on integrative and interdisciplinary projects. SMU's Office of Research, the SIS's Research Centre and the Singapore government provide generous support for high quality research proposals.

SIS undergraduate and post-graduate programmes produce people who have depth in technology and innovative applications, and also understand IT management. The SIS undergraduate programme is committed to innovative pedagogy. SIS launched the first PhD programme in SMU in August 2006. SIS also launched Master of IT in Business programme in August 2007.

Tenure-track applicants must have a PhD from an internationally recognised university in the areas of Computer Science, Information Technology, Information Systems, or related disciplines and an outstanding record of academic research and publishing that is commensurate with their desired rank. Tenure-track faculty should also demonstrate a strong interest in innovative research oriented applications. Practice-track faculty applicants must have a PhD in the related IT disciplines from an internationally recognised university, an outstanding record of contributing to leading-edge IT systems, software applications and professional activities that impact IT and business practice, and a prior record of research oriented publications, and/or a current record of professionally relevant applied publications.

Qualified candidates should initially submit a cover letter, curriculum vitae, research and teaching statements and samples of published work. Candidates may submit softcopy or hardcopy of their application materials to:

SIS Faculty Recruiting
Singapore Management University
School of Information Systems
80 Stamford Road
Singapore 178902
E-mail: siscv@smu.edu.sg
Website: www.sis.smu.edu.sg

SMU-Carnegie Mellon Partnership
Selected candidates will be asked to interview at Carnegie Mellon University. In 2003, SMU and Carnegie Mellon University (Pittsburgh, USA) entered into a close partnership to jointly establish the SMU School of Information Systems (SIS). Carnegie Mellon faculty are actively participating in SIS faculty selection, mentoring and development, and in the design of the SIS undergraduate curriculum, research centre, and post-graduate and professional programmes.

Texas A&M University
Sketch Recognition Lab, Computer Science Department
PostDocs Position

Currently seeking multiple postdocs for the Sketch Recognition Lab in the Computer Science Department at Texas A&M University starting Summer 2008 in the following areas:

- Postdoc in Machine Learning
- Postdoc in Speech Recognition
- Postdoc in HCI
- Postdoc in Sketch Recognition

Positions are for one year with yearly extensions dependent on available funding and performance. Salary will be highly competitive. Interested candidates please send CV, research statement, and letter of interest to:

hammond@cs.tamu.edu

University of California, Berkeley
Reliable Adaptive Distributed Systems Laboratory
Postdoctoral Scholar - Employee

The Reliable Adaptive Distributed Systems Laboratory ("RAD Lab") at University of California, Berkeley has an opening for a Postdoctoral Scholar - Employee beginning in July 1, 2008. A doctoral degree in Computer Science or related discipline with emphasis on Computer Systems, Computer Networking, or Machine Learning is

required. Salary range is \$39,636-\$56,856 depending on qualifications. Applicants must have received their Ph.D. within the last three years.

The position is appointed for one year, with a likely extension to two years. The RAD Lab includes experts in Computer Systems (Armando Fox, Anthony Joseph, and David Patterson), Computer Networking (Randy Katz, Ion Stoica, and Scott Shenker) and Machine Learning (Michael Jordan). We are particularly interested in candidates who want to work at the intersection of systems and machine learning or networking and machine learning. To learn more about the mission of the RAD Lab, see <http://radlab.cs.berkeley.edu>. Financial support for the RAD Lab is primarily from industry, with Google, Microsoft, and Sun Microsystems as our foundation partners.

The University of California offers a competitive benefits package including medical, dental, vision, life insurance, accidental death and dismemberment insurance, and short and long term disability insurance.

The closing date for this position is June 1, 2008. Candidates should submit a full academic Curriculum Vitae with a letter of interest and include three references. Please refer to the UC Berkeley Statement of Confidentiality at:

<http://apo.chance.berkeley.edu/evalltr.html>

Minorities and women encouraged to apply.

Candidates should apply to:
radlab-postdoc@cs.berkeley.edu
Cindy Kennon, HR Operations Manager

University of California, Berkeley
Engineering Research Support Organization
199MA Cory Hall
Berkeley, CA 94720

Electronic submission of application materials should be sent to:

radlab-postdoc@cs.berkeley.edu
The subject line should include:
Postdoctoral Scholar Positions - "Rad Lab"

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

University of Connecticut
School of Engineering
Tenure-Track Assistant Professor

The University of Connecticut is seeking an exceptional candidate for a tenure track Assistant Professor in Biomedical Engineering in the School of Engineering. The Biomedical Engineering program offers B.S., M.S. and Ph.D. degrees and has over 50 faculty members. Detailed information about the Biomedical Engineering program is available at:

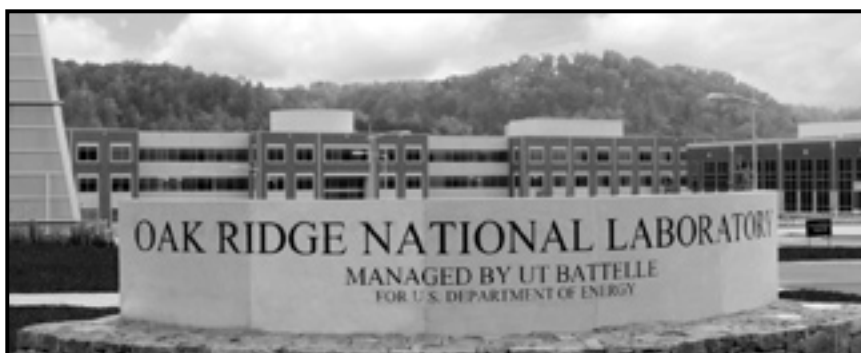
<http://www.bme.uconn.edu/>

Preference will be given to candidates with Ph.D. and B.S. degrees in biomedical engineering with a biomedical image processing, biomedical data mining and visualization, biomolecular/cellular modeling and simulation, computational genomics, or systems biology emphasis. Consideration will be given to candidates with Ph.D. and B.S. degrees in computer science & engineering, computational biology, or other related fields, provided a strong and broad background in biomedical engineering is demonstrated. A Ph.D. is required by June 30th for Fall semester start and October 30th for Spring semester start. Candidates are expected to build and sustain an externally-funded research program, supervise and support MS and PhD graduate students, and teach undergraduate and graduate BME courses.

Nomination letters, and applications that include a letter of interest, a current curriculum vitae, and the names of at least three references should be sent to:

Prof. John Enderle, Chair of Biomedical Engineering
Faculty Search Committee
260 Glenbrook Road, Unit 2247
University of Connecticut
Storrs, CT 06269-2247
phone: (860) 486-5521
email: jenderle@bme.uconn.edu

Salary, benefits, and a competitive start-up package for the position will be



The DOE Oak Ridge National Laboratory, a world leader in critical scientific research, is seeking a:

Director of the Computer Science and Mathematics Division

The division conducts advanced computer science research, evaluates future computer technologies and develops new algorithms for the highest performing computers in the world. Successful candidate will be challenged to support the laboratory's goals in extreme-scale computing, as well as developing program funding and attracting highly qualified staff through effective management of all division functions. Strategic planning, top-level program development and execution, and aggressive managerial and technical leadership will be key responsibilities.

A PhD or equivalent education/experience in computational science or computer science, an internationally recognized record of research, and 10 years experience are required. Five years of management experience are also required, along with excellent communication, planning, and organization skills.

For a full job description and to apply, please visit www.jobs.ornl.gov

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

OAK RIDGE NATIONAL LABORATORY
MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY

Professional Opportunities

commensurate with the record of the applicant. The position is full-time at the rank of Assistant Professor. Applicant screening will begin immediately and continue until the position is filled.

The University of Connecticut encourages applications from minorities, women, and people with disabilities.

University of Nebraska at Omaha College of Information Science and Technology Associate/Full Professor of Information Assurance (IA)

The University of Nebraska at Omaha's (UNO) College of Information Science & Technology invites applications from faculty candidates for a tenure track position in Information Assurance at the Associate/Full Professor level starting fall 2008. Candidates should have a well-established, active and vigorous research program in IA or affiliated disciplines and a demonstrated ability to generate external research and development grants. Candidates must have a doctorate in CS (Computer Science) or IS (Information Systems) or a related field and have a demonstrated commitment to undergraduate and graduate education in IA. Teaching experience and publication record must be commensurate with the rank sought. Contributions to service in the form of interactions with university, business, government agencies and professional organizations are expected and important requirements for this position. The successful candidate should have the ability to obtain US government clearance. To apply and for more information please visit our web site at: <http://careers.unomaha.edu> All applicants are required to submit a cover letter, curriculum vita and a list of references via the web site.

Review of applications will begin immediately and will continue until the position is filled.

UNO has a strong commitment to achieving diversity. We encourage applications from under-represented groups, women and persons of color.

University of Southern California, Los Angeles

Center for Interactive Smart Oilfield Technologies
Postdoctoral Associate Position

We are seeking applicants to join the Integrated Asset Management (IAM) project and apply advanced computer science technologies to challenging problems in IT-enabled oilfield operations. IAM is part of CiSoft - a USC-Chevron Center of Excellence for Research and Academic Training on Interactive Smart Oilfield Technologies. Established in December 2003, the Center includes participating research scientists from various departments in the USC Viterbi School of Engineering and from Chevron.

The successful applicant will have a PhD in Computer Science or Computer Engineering with a willingness to receive the necessary cross-training in the basics of oilfield operation and the challenges in achieving the vision of IT-enabled smart oilfields. Research experience in one or more of the following areas is required: semantic web, information integration, metadata management, grid computing, web services and service oriented architectures. Software development experience is highly desirable.

The successful candidate will be a highly motivated self-starter with prior research experience that demonstrates creativity and independent thinking. A key component of your role will be interacting with various stakeholders to understand the requirements of the sponsor and translate business needs into short-term and long-term research directions for graduate students. Excellent communication, organizational, technical writing, and presentation skills are therefore essential.

The position offers a competitive salary and a flexible work environment.

To apply, please send your CV (including publication record and the names and contact information of 3 references), a brief (1-2 pages) description of your thesis work and related research interests, and your two best publications.

The application must be sent by email to Prof. Viktor K. Prasanna (prasanna@usc.edu).

More information:
Prof. Prasanna: <http://ceng.usc.edu/~prasanna/>
IAM Project: <http://pgroup.usc.edu/iam/>
CiSoft Center: <http://cisoft.usc.edu/>

Vitae Pharmaceuticals, Inc. Computational Research Scientist Position

VITAE PHARMACEUTICALS, Inc., headquartered in Fort Washington, PA is seeking a Computational Research Scientist to help develop and maintain the company's proprietary drug discovery technology, develop and implement fast and accurate methods for making predictions to aid decision-making during preclinical drug discovery, and design and code algorithms for calculating molecular properties and simulating biological systems. The successful candidate will work on Vitae's Contour Drug Discovery System, a Java-based, three-tiered molecular data management application.

You must have a PhD in physical chemistry, chemical physics, physics, or biophysics from a top tier graduate program, 4+ years of independent research experience with computational simulations of biological phenomena such as protein folding or protein-ligand binding; experience developing algorithms for optimization, sampling, machine learning, and/or molecular dynamics; extensive programming experience in C++ (C++ and Java preferred) and strong interpersonal and communication skills. Experience with machine learning techniques a plus.

If interested, please send your CV to careers@vitaepharma.com with CRS-CRA in the subject line. You can also visit our website at: www.vitaepharma.com

Wayne State University Computer Science Department Postdoctoral Fellows Position

The Visual Informatics and Intelligence group (VII) (including the Machine Vision & Pattern Recognition Lab., and the Graphics and Imaging Lab.) in the Department of Computer Science at Wayne State University is seeking postdoctoral fellows to work on projects related to graphical and visual informatics. The successful applicant must have a PhD degree and have expertise in one or more of the following areas: Computer Graphics, Data Mining, Image Understanding, Computational Geometry, and Visualization. Moreover, excellent communication, technical writing, and software development skills are essential.

Initial appointment as a postdoctoral fellow will be for one year with possible renewal for an additional 2-3 years. Applications for the postdoctoral position are accepted on a continuing basis and starting dates can be adjusted, however, a starting date of August 2008 is ideal. Please send your curriculum vita and contact information of three references to:

Prof. Jing Hua
(jinghua@wayne.edu)
or
Prof. Ming Dong
(mdong@wayne.edu)
More Information:
Prof. Dong: <http://www.cs.wayne.edu/~mdong>
Prof. Hua: <http://www.cs.wayne.edu/~jinghua>

Transitions and Awards

CRA board member **William Aspray** will join the School of Information at the University of Texas in Austin in fall 2008 as the Bill and Lewis Suit Professor in Information Technologies, and will hold a courtesy faculty appointment in the Department of Computer Sciences. He is leaving his position as Rudy Professor in the School of Informatics at Indiana University.

John Barrus has been appointed Director of Ricoh Innovations, Inc. California Research Center, effective April 1, 2008.

CRA's former board chair, **Jim Foley**, has been selected to receive the Georgia Tech Class of 1934 Distinguished Professor Award. As part of this award, Jim will deliver the summer commencement address. This is the first time a computing faculty member has received this award. The College of Computing is hosting a reception to honor Jim for this award and for his recently announced membership into the National Academy of Engineering. Congratulations Jim!

Congratulations to **Susan Landau**, Distinguished Engineer, Sun Microsystems Inc., who is the winner of the Anita Borg Institute 2008 Women of Vision Award in the Social Impact category. Landau's focus is on the interplay between security and public policy. She is a leading scholar in the areas of wiretapping and encryption policy; computational algebra and number theory (mathematics intimately related to cryptography); and in developing numerous programs to benefit women in computer science.

The winners of two prizes were recently announced by Carnegie Mellon University and the Tokyo University of Technology.

Christos Papadimitriou, professor of electrical engineering and computer science at the University of California at Berkeley, was awarded the Katayanagi Prize for Research Excellence for his achievements and expertise in algorithms and complexity.

The Katayanagi Emerging Leadership Prize was won by **Erik D. Demaine**, professor of electrical engineering and computer science at MIT. Demaine is known for his work in computational geometry, which has led him to experiment with algorithms for origami, the art of paper folding. ■

African-American Researchers from Page 2

- Each student participant is assigned a faculty and a graduate-student mentor based on research interests. These groups meet at AARCS to establish mentoring relationships and to discuss research, graduate school, and other topics.
- The FFM group also attends the AARCS mini-conference. Sessions targeted to the FFM group are conducted by senior African-American faculty and former FFM group members.
- Research writing and presentation sessions are conducted.
- A targeted presentation is given.
- Grant-writing workshops are conducted.

Conclusion

The AARCS program is entering its third year. In the first two years of the program more than 200 students have seen the targeted presentation. These students have self-reported behavior change with respect to their career options after viewing the targeted presentation. After the first two years, the AARCS Conference attendance has exceeded more than 130 registrants with a growing demand for more travel scholarships. Additionally, the AARCS Conference has gained support from corporate sponsors such as Microsoft and IBM. The Future Faculty Mentoring (FFM) component has mentored

more than 22 students into faculty, research scientist, postdoc and corporate positions. More than 90 percent of the FFM program participants reported that the "program provided them with concrete information with regards to pursuing faculty positions."

While the AARCS program is designed to increase the number of African-Americans seeking faculty and research appointments in the computing sciences, the program is not exclusive to African-Americans. In fact, only 78 percent of the FFM participants are African-Americans. The program aims to broaden participation in computing amongst all under-represented groups. For more information on the AARCS Program, please contact Dr. Juan E. Gilbert at gilbert@auburn.edu.

Juan Gilbert is the TSYS Distinguished Associate Professor in the Computer Science and Software Engineering Department and a Center for Governmental Services Fellow at Auburn University where he directs the Human Centered Computing Lab.

Jerlando Jackson is an Associate Professor of Higher and Postsecondary Education in Educational Leadership and Policy Analysis at the University of Wisconsin-Madison.

Cheryl Seals is an Assistant Professor in the Computer Science and Software Engineering Department at Auburn University. ■

CRA CONFERENCE AT SNOWBIRD 2008 ♦ JULY 13–15, 2008 ♦ SNOWBIRD, UTAH

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

Computer Science: The Transformative Science of Our Age

Computer Science is the transformative science of our age. Its principles are increasingly fundamental to many disciplines. We face ubiquitous opportunities to transform and unify other fields. We provide the engine and many of the ideas that drive innovation and discovery in virtually all disciplines, from science, engineering and medicine to marketing, fine arts and humanities. This year's Snowbird will explore this theme and the implications it has for what we teach and where our research will lead the world.

Preliminary Program

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

Sunday, July 13

CRA Board of Directors Meeting (begins Saturday 6PM) **8:30AM - 2:45PM**
Conference Registration **2:00PM - 7:30PM**
Workshop for New Department Chairs **3:00PM - 5:30PM**
Co-Chairs:
 Susanne Hambrusch (Purdue University)
 Darrell Whitley (Colorado State University)
Speakers:
 Jean Ferrante (UC San Diego)
 Diane Souvaine (Tufts University)
 Robert Walker (Kent State University)
 Xiaodong Zhang (Ohio State University)

Welcome Reception **6:00PM - 7:00PM**
Dinner **7:00PM - 9:00PM**
Speaker:
 Shree Nayar, Ph.D.
 T.C. Chang Chaired Professor
 Department of Computer Science, Columbia University
"Computational Cameras: Redefining the Image"

Monday, July 14

Breakfast Buffet **7:00AM - 8:30AM**
Registration **7:30AM - 6:00PM**
Welcome **8:30AM - 8:40AM**
Speakers:
 J Strother Moore, University of Texas at Austin (Academic Snowbird Chair)
 Marek Rusinkiewicz, Telcordia Technologies (Labs/Centers Snowbird Chair)

PLENARY SESSION I **8:40AM - 10:00AM**
Innovation in the Knowledge Economy
Chair: Cita Furlani (NIST)
Speaker:
 Irving Wladawsky-Berger (MIT)

Break **10:00AM - 10:30AM**
Workshop I (three parallel sessions) **10:30AM - Noon**

1. Exploring the Interaction between Computational Science and both Art and Music
Chair and Speaker: Christopher Raphael (Indiana University)
Speakers:
 Mark Hansen (UCLA)
 One TBD

2. Paper and Proposal Reviews: Is the Process Flawed?
Chair: Hank Korth (Lehigh University)
Panelists:
 Phil Bernstein (Microsoft)
 Mary Fernandez (AT&T – Research)
 Le Gruenwald (National Science Foundation)
 Phokion Kolaitis (IBM)
 Kathryn McKinley (University of Texas at Austin)
 Tamer Oszu (University of Waterloo)

3. Web 2.0
Chair: Natalie Glance (Google)
Speakers:
 Nicole Ellison (Michigan State University)
 Jure Leskovec (Carnegie Mellon University '08)
 Steve Skiena (New York University)

Luncheon **Noon - 1:30PM**
PLENARY SESSION II **1:30PM - 3:00PM**
Industrial Hiring Expectations: The Big Picture
Chair: Alon Halevy (Google)
Speakers:
 Alan Eustace (Google)
 Eric Grimson (MIT)

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

1. Defining the Computer Science in Biomedical Informatics: Opportunities for CS Research in Biomedical Domains
Co-Chairs: Edward Shortliffe (University of Arizona)
 Sethuraman (Panch) Panchanathan (Arizona State)
Speakers:
 Atul Butte (Stanford University)
 Jim Karkani (Microsoft Research)
 Peter Szolovits (MIT)

2. Industry/Academic Partnerships
Chair: Gabby Silberman (CA Labs)
Speakers:
 Helen Meng (Chinese University of Hong Kong)
 Hausi A. Muller (University of Victoria, Canada)
 Josep Lluís Larriba-Pey (Larri) (Polytechnic University of Catalunya, Barcelona)

3. Graduate School Immigration and Emigration
Chair: Kim Bruce (Pomona College)
Panelists:
 Randal Nelson (University of Rochester)
 Mor Harchol-Balter (Carnegie Mellon University)
 Jeff Klingner or Adam Beberg (Stanford University)

4. Practical Solutions to a Continuing Problem: Sexual Harassment and Gender Discrimination
Chair and Speaker: Susanne Hambrusch (Purdue University)
Speakers:
 Eric Grimson (MIT)
 Maria Klawe (Harvey Mudd College)
 Valerie Taylor (Texas A&M)

Dinner and State of the CRA Address **6:30PM - 9:00PM**
Presentations:
 CRA's Distinguished Service Award to Rick Adrion (by Dan Reed)
 CRA's Habermann Award to Richard Ladner (by Andy Bernat)
Speakers:
 Dan Reed (CRA Board Chair)
 Andrew Bernat (CRA Executive Director)

Tuesday, July 15

Breakfast Buffet **7:00AM - 8:30AM**
PLENARY SESSION III **8:30AM - 10:00AM**
Computing Research Funding: The Federal Picture
Chair: Andrew Bernat (CRA)
Speaker: Jeannette Wing (NSF CISE)

Break **10:00AM - 10:30AM**
Workshop III (four parallel sessions) **10:30AM - Noon**

1. Communicating the Excitement of CS: K-12 Outreach Practices
Chair: Eric Grimson (MIT)
Speakers:
 Maureen Biggers (Georgia Tech)
 Mark Snir (University of Illinois, Urbana-Champaign)
 Chris Stephenson (Computer Science Teachers Association)

2. Innovative Undergraduate Curricula
Chair: Mark Guzdial (Georgia Tech)
Speakers:
 Merrick Furst (Georgia Tech)
 Deepak Kumar (Bryn Mawr)
 Lynn Stein (Olin College)
 Andre van der Hoek (UC Irvine)

3. Research on a Small Scale
Chair and Speaker: Karen Sutherland (Augsburg College)
Speakers:
 Ishwar Sethi (Oakland University)
 Holly Yanco (UMass, Lowell)

4. Wikinomics & Researchnomics: Accelerating CS Research
Chair: David Tennenhouse (New Venture Partners, LLC)
Speakers:
 Randy Bryant (Carnegie Mellon University)
 Sailesh Chutani (Microsoft)
 Ron Larsen (University of Pittsburgh)
 Larry Peterson (Princeton University)
 Alon Halevy or Alfred Spector (Google)

Luncheon **Noon - 1:30PM**
Hot Topics **1:30PM - 2:30PM**
Chair: David Notkin (University of Washington)
 Wish you had asked a question at a session? Wish you had run a session? Wish you had planned Snowbird? Have something (at least) somewhat related to computing research on your mind? Don't like the alcohol rules in Utah? If so, the inaugural Hot Topics session is for you. Five-minute blocks (any projector setup is considered as charged time) are available, with comments and opinions that are six sigmas out preferred. Selection is entirely at the discretion of the session chair, who will entertain requests by email and on site.

PLENARY SESSION IV **2:30PM - 4:00PM**
Computing Community Consortium
CCC—The Computing Community Consortium—is a CRA-organized initiative that supports the computing research community in creating compelling research visions and the mechanisms to realize these visions.
NetSE—Network Science & Engineering—is one such vision. In short, our networks, broadly interpreted, have evolved to be extremely complex and we do not understand them. Tackling this is a "grand challenge" for our field, for which an inclusive and compelling research agenda is currently being defined.
GENI—The Global Environment for Network Innovation—is an attempt to design a research instrument to support some of the research opportunities in the NetSE space. In this plenary we will discuss CCC, NetSE, and GENI.
Chair and Speaker: Ed Lazowska (University of Washington)
Speakers: Susan Graham (UC Berkeley)
 Chip Elliott (BBN)
 Ellen Zegura (Georgia Tech)

Workshop for IT Deans **5:00PM - 9:00PM**
Chair: Bobby Schnabel (Indiana University)
Wednesday, July 16 **8:00AM - Noon**

CRA Conference at Snowbird 2008 Sponsors
 Association for Computing Machinery, Avaya, Inc., Bell Labs (Alcatel-Lucent), CA Labs, Google, IBM Research, IEEE Computer Society, Intel, Microsoft Research, Mitsubishi Electric Research Labs, SRI International, Sun Microsystems, Inc., USENIX Association