

SIGNIFICANT BITS

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OLD HEAD'S REMARKS

by Prof. Micha Hofri

Dear alumnae and alumni:

It is with some disbelief that I write this, realizing five years have passed since I wrote my first note to you. The time has been very busy: the undergraduate student population has more than doubled, but with a recent dip in reaction to the subsidence of the hi-tech boom. The number of full time graduate students increased even more, especially those studying for the PhD degree.

Correspondingly, the faculty expanded, in number and range of interests. The research activity of the department has been significantly enhanced. That favorably affects our teaching as well, allowing us to change our program so that future alumni will be able to adapt to new technologies, easily and effectively. For example, we are revamping the entire sequence of five introductory programming courses!

Let me use this opportunity to draw your attention to our web site. For various reasons I needed to refer to many web sites of other computer science departments, and have been dismayed by what I all too often found. Our's is an exceptionally usable site. Please refer to it, use it, and if you have comments about slips, errors, or suggestions for improvement, please let us know!

We have now a new department Head, that many of you know: Professor

Michael Gennert applied and was selected for the position.

Please consider helping him in his efforts by contributing to the department. The contributions can be of many kinds: some through your positions in industry, such as sponsoring projects, funding research activities, providing unique equipment to enhance our computing resources; others can be personal, by providing direct funds for departmental activities. I shall leave it to the new Head to face the main challenge facing us now: raising a new building for CS!

Wishing you all success, Micha Hofri.

NEW HEAD'S REMARKS

by Prof. Michael Gennert

Dear Friends of WPI Computer Science:

It is an honor and a privilege to serve as CS Department Head. My predecessors have built an excellent department that truly values both teaching and scholarship.

In taking stock of our Department, I am struck by what a great group of people we have assembled. We have a superb faculty, staff, and student body and we are making significant research advances while holding true to our educational mission.

Sadly, the Department suffered a serious loss this summer with the passing of Prof. Lee Becker after a 14-month battle with leukemia.

Many of you will remember him as a dedicated scholar and educator who cared passionately about WPI. He greatly enjoyed working with students, involving undergraduate and graduate students in his research. He leaves his wife Ying, son Joshua, daughter Rachel and many devoted friends and colleagues. A memorial service was held on Friday, July 30. A tribute to Prof. Becker, including testimonials and suggestions for memorial donations, may be found at the CS web site.

Looking forward to the coming academic year, there is much cause for excitement. We are introducing a new introductory Computer Science course sequence, whose goal is to teach students not just about programming, but about how to *design* programs. We are planning a new degree program in Interactive Media and Game Development, with the first courses being offered this year. Last, our Project Centers in Silicon Valley,

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NASA, Wall Street, Budapest, and elsewhere continue to bring together excellent students and sponsors to create some truly impressive MQPs. On the research side, we have secured more funding this year than ever before.

I hope to see many alumni, family, and friends at the CS Open House at Homecoming, Saturday, October 9. For those of you who can't attend, you are welcome to come visit us at any time.

FACULTY PROFILES

Please welcome...Murali Mani

I joined the department as an assistant professor in the Fall. I completed my Ph.D. in Computer Science at UCLA. I also have an M.S. in Computer Science and a B.Tech. in Computer Science and Engineering. I worked at IBM's Almaden research center for 15 months.

My research is in database systems, especially in XML databases, Web databases and sensor databases. Specifically, I am interested in the issues of how to design good XML databases, when they are designed from application requirements, or from existing relational/text/other databases. This has become increasingly important when XML is the standard for information exchange over the Web, and groups want to publish views of their data on the Web as XML.

My prior work in this area includes studying structural and constraint specification for XML schemas, normalization theory, and studying how conceptual models can be translated to XML and vice versa, which is used to translate between relational and XML models. My future interests include data integration when portions of data are stored as relational databases, and portions are stored in XML stores.

My interest spans Web technologies with respect to keyword search in XML documents. My interest in sensor systems spans managing sensor data and semantics for stored sensor data, when sensor data is collected periodically with data loss. Further, data mining of stored sensor data (data with holes) is an interesting research area.

At WPI, I will be teaching the undergraduate database systems class and a graduate seminar in XML and Web databases.

WORLD WIDE WILLS

WWW2004

Professor Craig Wills was selected as a Program Co-Chair, along with Marc Najork of Microsoft Research, for the 13th International World Wide Web Conference (WWW2004) held on May 17-22, 2004 in New York City. The Co-Chairs are responsible for putting together the technical program for the conference, which is the flagship venue for the Web community.

SPECT GREAT THINGS

Gennert Grant

Prof. Michael Gennert has received one of the largest grants the department has ever had, \$787,104 over 5 years. Entitled "Patient Motion Detection and Compensation in SPECT", it is a subcontract to the University of Massachusetts Medical School under an NIH grant.

The research concerns patient motion, an ever-present potential cause of artifacts that can limit the accuracy of diagnostic imaging. The problem is especially significant for imaging modalities such as SPECT and PET, which require the patient to remain motionless for protracted periods of time. Current compensation strategies for motion in SPECT imaging are inadequate for robust clinical usage. The goal of the proposed investigations is to determine if information from a visual-tracking-system will provide a robust compensation for patient motion as part of iterative reconstruction. By visual-tracking-system we meant a computational system that processes stereo images taken by optical cameras thereby providing a source of motion information that is independent of the SPECT system. Motion of the chest and abdomen will be determined by tracking the locations of a pattern that is part of a stretchy garment wrapped about the patient.

RDC GRANTS

Four this year

CS faculty were awarded four WPI Research Development Council (RDC) grants this year!

Craig Wills, for "An Adaptive Approach to Cluster-to-Cluster Network Flows"; Emmanuel Agu, for "Mobile Adaptive Graphics Framework (MADGRAF)"; Neil Heffernan, for "Programming by Demonstration for Intelligent Tutoring Systems"; George Heineman and Elke Rundensteiner, for "On-line Stream Monitoring Systems: Untethered Healthcare, Intrusion Detection, and Beyond".

FACULTY GRANTED PATENTS

Wills and Heffernan

Professors Craig Wills and Neil Heffernan have been issued patents for results derived from their research.

Craig Wills says: "I'm happy to report that a colleague, Bala Krishnamurthy of AT&T Research Labs, and I were just notified that our patent application entitled "Method for Cache Validation for Proxy Caches" was issued U.S. Patent Number 6,578,113. This is for a patent application that we filed back in June 1997! Takes a while."

Neil Heffernan's patent, co-authored by Ken Koedinger (CMU), has the following description: "The patent is for a novel way of presenting tutorial dialog in an intelligent tutoring system. We developed an architecture that separate the plan-recognition of the student's actions from the discourse planning that figure out what is the next best action to take to help the student achieve mastery. This patent fits in nicely with my current funded research to develop tools to make it easier to build intelligent tutoring systems so that one day, all interactions with a computer might be as easy as if you had access to an experienced and knowledgeable human tutor. This technology will also be used in our attempt to apply intelligent tutoring system to help student with the MCAS test. This technology was licensed by Carnegie Learning Inc., a company whose intelligent tutoring systems are being used by over 1,000 schools."

PROFESSOR OF PRACTICE

Gary Pollice

The Professor of Practice rank enables experienced professionals to share their particular industrial/business expertise and experience on a full-time basis with the WPI community. Gary Pollice joins Mike Ciaraldi as the department's second Professor of Practice.

Gary joins us from Rational Software, an IBM company. He has a B.A. in mathematics from Rutgers and an M.S. in computer science from U. Massachusetts, Lowell.

His research interests include empirical software engineering, programming methods, software quality, practical software processes, and programming languages and tools. So far he has taught CS525T Software Testing, CS562 Experiments in Software Engineering, and CS503 Foundations of Computer Science. He will be working with George Heineman and Mike Ciaraldi to help put together a stronger software engineering program for the department.

BEST PAPER AWARD

By students

A paper by undergraduate students Nathan Sheldon, Eric Girard, and Seth Borg, with Profs. Mark Claypool and Emmanuel Agu, titled "The Effect of Latency on User Performance in Warcraft III", received the Best Paper Award at the NetGames Conference, held at Redwood City, Calif. recently. The paper can be found online at www.cs.wpi.edu/~claypool/papers/. The paper was based on their MQP. Interactive network games can be affected by delays ("latency") during data transmission across the network. They conducted user studies that measured the impact of latency on user performance in the game Warcraft III. They concluded that while users noticed very high latency, it had a negligible effect on the game's outcome.

ALOK THE 12th

Alok Mehta.

The CS Department awarded its 12th Ph.D. degree to Alok Mehta. The advisor was George Heineman.

Alok successfully defended his thesis in public before his Ph.D. committee on November 13, 2002. His committee consisted of WPI Profs. George Heineman, Elke Rundensteiner and Mike Ciaraldi, plus Dr. Alexander L. Wolf from the Computer Science Department at the University of Colorado at Boulder.

His thesis title is "Evolving Legacy Systems by Locating System Features using Regression Test Cases".

There is a constant need for practical, efficient and cost-effective software evolution techniques. He proposed a novel evolution methodology that integrates the concepts of features, regression tests, and component-based software engineering (CBSE). Regression test cases are untapped resources, full of information about system features. By exercising each feature with their associated test cases using code profilers and similar tools, code can be located and refactored to create components. These components are then inserted back into the legacy system, ensuring a working system structure. Dr. Mehta's company, AFS, has successfully restructured its enterprise legacy system and reduced the costs of future maintenance.

Dr. Mehta is senior vice president and chief technology officer at AFS, American Financial Systems Inc. In his spare time, he is a highly competitive racquetball player, winning a silver medal last year in the National Racquetball Tournament.

THIRTEENTH Ph.D.

Mikhail Mikhailov

Thirteenth Ph.D.: unlucky for some? Not for Mikhail Mikhailov, as the Computer Science Department has awarded him its 13th Ph.D. degree. The advisor was Craig Wills.

Mikhail successfully defended his thesis in public before his Ph.D. committee on

January 3, 2003. His committee consisted of WPI Profs. Craig Wills, Robert Kinicki and David Finkel, with Dr. Balachander Krishnamurthy of AT&T Labs.

His thesis title is "Deterministic Object Management in Large Distributed Systems". He proposed an alternative approach to strong cache consistency, called MONARCH, which does not require servers to maintain per-client state. The approach builds on a few key observations. Large and popular sites, which attract the majority of the traffic, construct their pages from distinct components with various characteristics. Components may have different content types, change characteristics and semantics. These components are merged together to produce a monolithic page, and the information about their uniqueness is lost. In his view, pages should serve as containers holding distinct objects with heterogeneous type and change characteristics and preserving the boundaries between these objects. Servers compile object characteristics and information about relationships between containers and embedded objects and piggyback it onto existing request/response traffic. This knowledge is used by clients (caches) to make object management decisions.

Dr. Mikhailov has a Diploma with Honors from the Business School of the American University in Moscow, Russia, as well as a joint B.S./M.S. in Computer Science from Moscow Bauman State Technical University. He has been at WPI since August 1995. He has already published two journal articles on his research with Craig Wills, as well as six conference papers.

MARSHALL SCHOLARSHIP

Nicholas Baker

Nicholas Twomey Baker '03, has been awarded a Marshall Scholarship for graduate study in the United Kingdom. Nick, from Milford, N.H., completed a double major in Computer Science and Philosophy at WPI. He is studying computer games technology and digital games as a Marshall Scholar at Liverpool John Moores University.



Each year, 40 young American scholars are selected to spend two years in graduate school at a British University, with all expenses paid by the British government. The scholarships give US students who are potential leaders, opinion-formers and decision-makers an understanding and appreciation of Britain.

Nick was one of two regional finalists for the Marshall Scholarship from WPI. CS faculty Dave Brown and Mike Ciaraldi were among those who strongly supported his application.

SYMPOSIUM & WORKSHOP

NEPLS & Exploring Databases

CS department faculty and students recently played a major role in two important events on campus.

The "From Data to Knowledge" workshop in March brought decision-makers, scientists, and engineers who routinely perform data analysis tasks together with researchers who develop exploratory data analysis technology. The workshop was intended to help establish and expand communications among the commercial, industrial and academic sectors; and identify key directions for advancing data analysis technology. Professors Matt Ward and Carolina Ruiz organized the event.

The program included tutorials on the major concepts and current state of the art in exploratory data analysis and knowledge discovery in databases;

domain and/or technology specific breakout sessions to identify the critical needs of those who routinely generate and analyze large complex data sets; and posters and demonstrations of on-going research activities.

NEPLS: the New England Programming Languages and Systems Symposium Series was hosted by WPI on October 15, 2002. Profs. Dan Dougherty, Mike Gennert and Kathi Fisler helped with coordinating and hosting the event.

NEPLS brought roughly 50 languages and software-systems researchers from greater New England to campus for a day of talks.

The keynote speaker was Paul Graham (www.paulgraham.com), who has written extensively on design, LISP and software engineering. He's a very good speaker and a large audience greeted his presentation enthusiastically.

One of the presentations during the day was given by CS Ph.D. student John N. Shutt, who spoke on "Decomposing Lambda: the Kernel Programming Language".

BITS OF NEWS

Alumni and others

Patricia Bray, CS '84, has received the Compton Crook award for best first novel in the Science Fiction/Fantasy field for 2002. She is with IBM in Endicott, NY :: Matt Streeeter, who did his CS B.S. and M.S. at WPI, will be a Ph.D.

student at CMU in the fall. :: Paul Lee-mans (Ph.D. '01) is now senior manager at the Microsoft Solution Center at KPMG CT Information Technology in The Netherlands. :: Gregory Vail '87 is co-founder and President of Data Innovations, Inc. <www.datainnovations.com>. :: Esteban Burbano works for Macosa, producing banking software for Latin America. :: Bob Dugan is a faculty member at Stonehill College about 20 miles south of Boston.

ALUMNI

Let us hear from you!

We want to hear from CS alumni. We'll try to include selected information in the newsletter. Contact us via e-mail or real mail. Please let us know any changes to your address as soon as possible, so that we can keep you informed about the department. Let us know your Web home page URL, too. We'd like to add pointers from our pages to yours.

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