

SIGNIFICANT BITS

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OLD HEAD'S REMARKS

by Prof. Bob Kinicki

On July 1, 1998 the CS Department Head baton was put in the capable hands of Professor Micha Hofri. I have been asked to share a few thoughts on the changes in the CS Department since I began my stint as CS Head.

Back in 1986 the world of CS was dramatically different. The Department, with 12 tenure-track faculty and around 160 undergraduate majors, was housed with the EE Department in Atwater-Kent. Our computational resources consisted of three friendly VAX780's named Larry, Moe and Curly. We were experimenting with the first Ethernet cable on the WPI campus, and WPI was not yet connected to Arpanet (the precursor of the Internet). Plans were just taking shape for moving CS to the yet to be built Fuller Labs which was expected to provide adequate space for 50 years. Our fledgling research activity was just beginning as Professor David Brown began AIRG, the first research group in the department.

Very few had an inkling of the changes we would experience in the next dozen years.

The CS Department moved into Fuller in January 1990 and most of the campus wondered what we would do with all that extra space. How things have changed!

When Micha took the helm on July 1st, Computer Science had 400 undergraduate majors, the largest minor program at WPI, 17 tenure-track faculty, more than 20 supported graduate students, and the number of research groups was approaching double digits. For the past two years, the percentage of entering freshmen declared as CS majors was the highest percentage at WPI. Plans are underway to take the department to 20 tenure-track faculty in the next few years, and becoming the largest department at WPI in five years is clearly possible.

For those old-time alumni who have not been on campus recently, I encourage you to stop by and visit. I think you will be pleasantly surprised at the current state of the WPI Computer Science Department.

NEW HEAD'S REMARKS

by Prof. Micha Hofri

This is my first opportunity to communicate with you, since I came on board this year, and I hope I will be able to do it often in the future.

I have found myself with a great, active, humming department. Bob left me a wonderful legacy and this is a welcome opportunity to cite his leadership, tenacity and vision.

Few things stay unchanged over time: academic departments less than most institutions. With the years, there is a

changeover of faculty and staff, and generations of students, etc. The department evolves, striving to achieve the best possible educational goals with the means at hand.

Over the last few years, WPI as a whole, and our department with it, has been pushing ahead a modest reform, leading to more faculty, expanded graduate studies, and more attention to cutting-edge research.

I tell you all this not only to keep you abreast of the changes around us and our changing profile, but also because we want you to continue to be a part of the growing Computer Science community. We want you to be proud of our activities, spread the word, and support us with the means to reach higher levels of excellence.

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These means have many forms: feedback about the courses you took; which helped, or did not help; support in organizing departmental events; and contributions of materials that complement our resources. When we have specific needs, we shall come to you with requests for pledges of financial support too.

I hope to see many of you here at class reunions, open-house days, or even without such an event: when you are in the area, when you have an idea that may lead to an interaction between you (or your company) and the department that will benefit us all.

WELCOME NEW FACULTY

by Prof. Dave Brown (Editor)

During the last few years we have gained so many new faculty members that the bulk of this newsletter will be taken up with introductions!

FACULTY PROFILES

Please welcome...Mark Claypool

I joined the department in August 1996 as a Visiting Assistant Professor and assumed a tenure-track position in July 1997. I received an MS and PhD from the University of Minnesota, and a B.A. from Colorado College. I developed software for several companies prior to joining WPI, including Unisys, 3M and Paradigm Computer Systems.

My teaching interests lie firmly in the area of software systems, such as operating systems and networks. Software systems are, I believe, the soul of computer systems. Without software the mass of electronic circuits and chips that we call computers would just be expensive lumps of metal! While most computer science professionals do not write operating system or network code, we all use networks and operating systems. All computer science professionals, whether they are software engineers, computer technicians or academics, are more effective with a solid understanding of the software that controls the computers on which they work and research.

My own research interests are in two areas: multimedia performance and collaborative filtering. Today's applications support images and animations along with text, while tomorrow's applications promise to support high-quality audio and video, too. Obtaining good performance for these resource-intensive applications is a challenging problem.

Typically, a server captures an audio or video stream and sends it over the network to the client. Some of the many components in between the audio/video source on the server and the destination on the client that affect performance are: the operating system, network protocol and routers, media encoding, and the hardware devices. My research concentrates on the effects of these components on delay jitter, one measure critical to the performance of multimedia.

Collaborative filtering uses peer opinions to predict the opinions of others. Imagine two users, John and Mary who read a lot of books in common. Books that John has liked, Mary has liked and vice versa. John reads a new book that Mary has not read and likes it. There is a good chance that Mary will like this book, too. When this sample is expanded to a large community, you can obtain extremely accurate predictions. Collaborative filtering research crosses many domains, including algorithms, user interfaces, distributed systems, artificial intelligence and performance analysis. Currently, I am seeking to improve existing collaborative filtering algorithms and interfaces, in addition to constructing a collaborative filtering system for on-line newspapers.

At home, my wife and I have 2 kids, 3 cats, 1 dog and a bunch of computers.

FACULTY PROFILES

Please welcome...Isabel Cruz

I received my PhD in Computer Science from the University of Toronto and was a postdoctoral fellow in the Department of Computer Science at Brown University. I started working at WPI in August 1997.

This is an exciting time to be in the Computer Science Department at WPI, a lively place for faculty and students to join in a variety of activities. Given my database and visualization interests, I take part in the Data/Knowledge Base and in the Image Science research groups.

In addition, I am the coordinator for the Advances in Information Systems (ADVIS) Research Group, that meets weekly to discuss research and hear talks given by group members or visitors. The group consists of graduate and undergraduate students. I am particularly proud of the accomplishments of my undergraduate students this year. Two of them have published their MQP results in the 7th International Conference on Electronic Publishing, and another has published independent project results in the 6th Symposium on Graph Drawing.

Information Systems (IS) is one of the fastest evolving areas in Computer Science. The research we perform closely follows the newest IS areas, including access to distributed information, information visualization, human-computer interaction, and knowledge discovery and data mining.

We have worked on the following topics: visual query languages for databases, algorithm visualization, user interfaces for information systems, data integration, constraints for graphics and visualization, multimedia authoring, and Web discovery. The group is also "home" to the ACM SIGMOD Digital Symposium Collection, a new electronic journal for which I am the founding editor.

I have been teaching Human-Computer Interaction both at the graduate and undergraduate levels. By analyzing and carefully evaluating current user interfaces on one hand, and by learning about human capabilities and limitations on the other, students learn how to design better user interfaces.

I currently have two grants from the National Science Foundation: one is a CAREER Award (\$225K), and the other a grant from NATO. I am regularly invited to be on the Program Committees

of the main conferences in my area, including ACM SIGMOD, IEEE Visual Languages, ACM Multimedia, and VLDB, and I am on the editorial board of the Journal of Visual Languages and Computing.

FACULTY PROFILES

Please welcome...George Heineman

I joined the Computer Science Department in August 1996. I received my PhD from Columbia University in 1996, and my Bachelor of Arts degree from Dartmouth College in 1989. I have worked at many research laboratories around the country, including AT&T Bell Laboratories in New Jersey, IBM Canada's Center for Advanced Studies in Toronto, and Bull Electronics in Billerica, Massachusetts.

Because of my long-term interest in computer programming, I have focused my teaching and research on software engineering. I believe that high quality software engineering is the highest goal that computer science students should aspire to. It combines the theory of computer analysis and algorithms with the practice of operating systems, database management systems, and network management systems.

I teach the introductory software engineering courses at both the undergraduate and graduate levels. In these courses, the focus is on understanding how to design software systems that can be easily changed and maintained. One question I ask my students is: How can one write a program that has no defects? The answer: Become a programmer who does not introduce defects into the code in the first place! I have revised these courses to include object-oriented analysis and design—a necessary precursor to using programming languages such as C++ and Java.

I also teach an advanced graduate seminar in software engineering that studies the powerful technology of component-based software engineering.

As software systems steadily increase in size, components may be the only solu-

tion that will allow programmers to develop such large systems.

My research addresses the problem of using components that may have been developed by third-party component designers. I envision a future where software engineers can develop specialized software components or reuse existing components that are available on the internet. To realize this goal, mechanisms are needed that will allow developers to adapt existing components to special needs. I was recently awarded a four-year National Science Foundation CAREER grant for \$205,000 to study how to design adaptable software components.

FACULTY PROFILES

Please welcome...Carolina Ruiz

I joined the Department as an Assistant Professor in 1996. I was on leave during my first year doing research as a visiting faculty member at the University of Pittsburgh. I obtained my PhD in Computer Science from the University of Maryland at College Park in 1996. I also have a Master's degree in Computer Science and Bachelor's degrees in both Computer Science and Mathematics.

My research interests are centered around the fields of artificial intelligence (AI) and databases. I am particularly interested in using AI tools for deductive databases and data mining. One of my main projects is the development of a declarative architecture for knowledge discovery and data mining (KDD). This architecture aims to provide a uniform suite of tools to integrate the various component layers of the KDD process.

In prior research I have addressed problems in the semantics of logic programs. These two streams of research share a common core that involves formal methods, which give the resulting systems greater transparency and reliability. I have twice co-organized the International Workshop on Logic Programming and Deductive Databases, one of the main worldwide forums for work in the field.

At WPI I teach both graduate and undergraduate courses in AI and theoretical computer science, and I advise student work that involves AI and KDD. Last year I served on the Department's Graduate Committee. This year I am organizing the CS Colloquium series, and invite you to participate in this important and exciting part of departmental life.

FACULTY PROFILES

Please welcome...Elke Rundensteiner

I joined the Department of Computer Science here at WPI in Fall 1996, after having been a faculty member in the EECS Department at the University of Michigan for a few years. However, due to the birth of the most perfect baby on this earth ("little Charlie"), I went on maternity leave for the remainder of 1996 and started teaching at WPI in January 1997. I was then promoted to Associate Professor in June 1998. I received a B.S. degree (Vordiplom) from the Johann Wolfgang Goethe University, Frankfurt, West Germany; an M.S. degree from Florida State University; and a PhD degree from the University of California, Irvine.

I have been active in the database research community for over 10 years now, and my current research interests include object-oriented databases, data warehousing for distributed systems, database and software evolution, multimedia and web database applications, and information visualization. My main teaching interests are database systems, object-oriented technologies, web applications, and software engineering.

I have 20 journal papers, several book chapters, and over 80 conference publications in these and related areas. In the past few years, my research has been funded by government agencies including NSF, ARPA, NASA, CRA, DOT; and by industry including IBM, AT&T, Intel, Informix and GE. I have been on Program Committees of the key conferences in the database field such as IEEE ICDE, ACM SIGMOD, VLDB, and others. I have received numerous honors and awards, including a Fulbright Scholarship, an NSF Young Investigator Award,



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an Intel Young Investigator Engineering Award, and an IBM Partnership Award.

Within the Data/Knowledge Base Research Group (DKBRG) at WPI, I have started, and funded, several new projects at WPI that involve PhDs, a few MS students, and many undergraduate MQP students. I have found WPI to be an exciting and supportive environment for conducting cutting-edge research and system development.

The EVE (Evolvable View Environment) project, for example, is concerned with the construction and maintenance of data warehouses (virtual data repositories) in large-scale environments composed of numerous distributed and evolving information sources (ISs) such as the WWW. Such environments are plagued with changing information because ISs tend to continuously evolve by modifying not only their content but also their query capabilities and interfaces, and by joining or leaving the environment at any time.

The DKBRG group is the first to address the problem of capability (schema) changes of ISs by adapting view queries in such evolving environments. Our group has identified several algorithms for this view adaptation process, new metrics to compare alternate solutions, as well as an innovative preference model for the view definer to direct the view adaptation process. Besides these theoretical contributions, we have also successfully developed a working proto-

type of our EVE system using Java, JDBC, RMI, Oracle, and MS Access. This system is currently running and we will be making it available on the group web page in a few months.

I would also like to mention the object-oriented schema evolution project, OOSE. We've developed an open extensible framework for schema transformations. Our SERF framework gives the user the flexibility to define the semantics of their choice, the extensibility of defining new complex transformations, and the power of re-using these transformations through templates.

To verify its feasibility we have implemented a working prototype system, called OQL-SERF, based on the ODMG standard, i.e., using OQL, ODMG Meta-Data and Java's binding of ODL. We used PSE, the Java-based persistent storage engine by Object Design, as the base platform for our implementation.

To avoid the risk of filling pages here to describe our endeavors, we ask you to instead browse our group home pages <http://www.cs.wpi.edu/Research/dsrg> <http://www.cs.wpi.edu/Research/dkbrg> at your leisure for more details about our currently active projects.

FACULTY PROFILES

Please welcome...Gabor Sarkozy

I finished my undergraduate studies at Eotvos University in Budapest, Hungary

in 1990. I received my PhD from Rutgers University in 1994. I spent a couple of years at the University of Pennsylvania as a lecturer before joining the Computer Science faculty here at WPI.

My research and teaching interests focus on graph theory, discrete mathematics and theoretical computer science.

ALUMNI

Let us hear from you!

We are interested in email from alumni. We can't include full messages in the newsletter, but we'll try to include selected information. Contact us via email 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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