

# SIGNIFICANT BITS

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## HEAD'S REMARKS

by Prof. Micha Hofri

Dear CS Alumni: Another year begins, with more people—students, faculty and TAs—than ever before. This expansion is part of our contribution to WPI's effort to enhance its academic ranking.

Until 1997, WPI was ranked among the "Regional Institutions" and since then among the "National Universities". In that list we hover around the 50th spot. Not bad for a university with 200 faculty! But we want to get higher, and this requires pushing our research and teaching programs harder.

With all the changes, we remain committed to the WPI Plan that has served you well. For example, over the last few years we have seen the sizes of the introductory courses increase and nearly fill Perrault Hall. This year we start providing multiple lectures for these courses. While they won't be 'small classes' they will be far more congenial. We also continue to provide more courses at the 4000 level, to expose students to a larger variety of areas.

A continuing major challenge is to make the MQP the critical keystone component of the four-year plan. This is one area where you can make a contribution by sponsoring such projects through your employers or your own companies. To do this, contact a faculty member with interests in the proposed area.

And last, an important issue. You have received information about the fund rais-

ing campaign that WPI started about a year ago. I hope you will take part in this important effort. When you do submit your gift or commitment, please make sure you convey, in writing, that the gift is to be vested in the **Computer Science Endowment Fund**. You can do this retroactively, even if you have already made your gift!

## FACULTY PROFILES

Please welcome...Kathi Fisler

Kathi Fisler joins the department this fall as an Assistant Professor. Kathi grew up in Staten Island, NY. She has a BA in Computer Science and Asian Studies from Williams College, and an MS and PhD from Indiana University, both in Computer Science. Since 1996, she has been a research associate and instructor at Rice University. During her graduate and postdoc years, she interned at Bell Labs in NJ and at Intel in Haifa, Israel.

Kathi's current research interests are in computer-aided verification and diagrammatic reasoning. Computer-aided verification statically analyzes designs (of hardware, software, or protocols) to provide more exhaustive error detection than traditional testing and simulation techniques. Diagrammatic reasoning research explores diagrams as tools in problem solving. Kathi is interested in whether diagrams suggest more efficient data structures for certain computational problems than conventional textual notations.

Kathi will be teaching software engineering and a verification seminar during her first year at WPI. In addition, she will continue her work with two educational outreach projects: the TeachScheme! project, which trains high school computer science teachers in a curriculum based on a methodological approach to program design, and the Formal Methods Education Repository, which collects and promotes resources to aid university instructors in using formal methods in their courses.

Outside of work, Kathi enjoys traveling, reading, walking, and eating good vegetarian food. She continues her quest for good NY style pizza outside of NY (and sadly concludes that neither Indiana nor Texas has any). Kathi lives in Providence, RI (which has some very good pizza) with her husband Shriram, a Computer Science professor at Brown University.

## INDEX

Head's Remarks	1
Kathi Fisler	1
Mark Stevens	1
AID'00	2
Promotion	2
Sabbatical	2
Tenured	2
Doctors	3
New Center	3
Awards	3
Silicon Valley	4
Alumni	4
Contacts	4

## FACULTY PROFILES

*Please welcome...Mark Stevens*

My research explores the relationship between Computer Graphics and Computer Vision. In graphics, algorithms are given knowledge about the world in the form of models, cameras, lighting, etc., and infer (or render) an image of the scene. In vision, the process is the exact opposite: algorithms are presented with an image, and infer (or interpret) the configuration of the world. My work focuses on using computer graphics to interpret camera images: using iterative rendering to predict what should be visible by the camera and then testing and refining that hypothesis.

Recently, I have become interested in a field of research known as Image Based Rendering (IBR). IBR techniques construct a 3D model representation from a series of camera images. The idea is to provide an algorithm with a set of images of an object and a 3D representation is automatically constructed. This domain is another example of how computer vision and computer graphics techniques can be integrated to solve interesting problems.

I have taught three courses while at WPI: Undergraduate and Graduate Computer Graphics, and Social Implications of Information Processing. The latter course was extremely challenging as many students often do not see anything wrong with violating certain copyright laws. For instance, almost 95% of the class admitted to having MP3 files on their personal computers for which they did not own a copy of the CD. Many heated discussions arose as to the nature and validity of copyright law in a digital society. Next year I am slated to teach both computer graphics courses again as well as an advanced graduate graphics course in Image Based Rendering.

I received my PhD and MS degrees from Colorado State University and a BS degree from the University of Maine at Orono (all of these degrees were in CS).

## AID'00

*At WPI*

Every other year, researchers in the field of Artificial Intelligence (AI) in Design gather to share their findings. WPI hosted AID'00, the 6th International Conference on AI in Design, from June 26 to 29, 2000. The conference was preceded by two days of workshops on the latest research topics.

AI in Design is a discipline that involves making computers design, or support the design of, man-made objects. The field examines how to store design knowledge in computers and how to make computers reason to produce intelligent results. A full conference schedule can be found at: [www.arch.usyd.edu.au/kcdc/conferences/aid00/](http://www.arch.usyd.edu.au/kcdc/conferences/aid00/)

The local conference chair was Prof. David Brown, coordinator of the AI in Design Group. Brown has been involved for more than 15 years in a variety of design-related projects.

The conference will help to shape the future of artificial intelligence in design. "The sort of things people are talking about here will end up in computer-aided design software 5-10 years from now," Brown said. Among the topics were theories of design, as well as shape grammars, design rationale, multi-agent design systems, machine learning in design, and evolutionary systems.

John Gero, the conference chair, is a professor of design science and co-director of the Key Centre of Design Computing and Cognition at the University of Sydney in Australia.

About 100 attendees came from many countries, including Australia, Japan, England, Scotland, Spain, Brazil, Germany, Switzerland and China. Papers were accepted from 12 countries.

To support student travel to the June conference, Brown received a \$10,000 grant from the National Science Foundation. The conference was sponsored by NIST, Charles River Analytics, the National Science Foundation, Knowledge Technologies International, Trilogy Software, Inc., and EMC Corporation.

Keynote speaker Rodney A. Brooks, professor of computer science and director of MIT's AI Laboratory, enthralled the more than 100 participants with a presentation on robots that interact with human beings.

Janet Burge of Stow, Mass., a 2nd year CS PhD student, was one of three people who gave talks at the conference based on research they've done with Brown. Burge won the Best Presentation Award at the conference for her presentation of the paper, entitled "Reasoning With Design Rationale". An international committee of researchers from Scotland, Australia, Israel, and England judged the award.

Dan Grecu of Newton, Mass., who earned his CS PhD in May, talked about how design teams evolve over time. Cirrus Shakeri of Westborough, Mass., who earned his ME PhD a year ago, spoke on design problems involving multiple disciplines.

AID'02 will be held in Cambridge, England. For more information, contact Brown at 508-831-5618, by e-mail at [dcb@cs.wpi.edu](mailto:dcb@cs.wpi.edu)

## PROMOTION

*Matt Ward to Full Prof*

The department is very pleased to announce that Matt Ward has been promoted from Associate Professor to Professor of Computer Science. An Associate Professor since 1992, he was an Assistant Professor from 1986-92. Before that, he worked at AT&T Bell Laboratories and Skantek Corp. His research centers on the field of data and information visualization. He earned PhD and MS degrees in Computer Science from the University of Connecticut and a BS degree in Computer Science from WPI in 1977.

## SABBATICAL

*Matt Ward*

Matt Ward began his second sabbatical in July, 2000 with a move to the West Coast. He and his family will be living in Berkeley, California for the year. Matt will be working half-time at SGI in

Mountain View, where he'll be a consultant on the design and development of their data mining package, MineSet. The rest of the time, Matt will be (hopefully) making progress on a textbook about data visualization, as well as interacting with some of the visualization research groups in the Bay area. He also plans to go out for beers with several WPI CS alums in the region, where he hopes to learn which up-and-coming companies he should invest money in!

## TENURED

*Elke Rundensteiner*

The department is very pleased to announce that Elke Rundensteiner has received tenure as an Associate Professor of Computer Science, a position she has held since 1998. She was an Assistant Professor from 1996-98 and previously an Assistant Professor of Electrical Engineering and Computer Sciences at the University of Michigan. Her expertise is in database and information systems. She leads projects on data warehousing over distributed information sources, web-based database tools, object-oriented databases and visual data exploration. She received a PhD in 1992 in Computer Science from the University of California, an MS degree in Computer Science from Florida State University, and an MS in Business Administration and a BS in Computer Science from Johann Wolfgang Goethe University in Germany.

## DOCTORS

*Balazs & Grecu*

The CS Department recently awarded its eighth PhD degree to Dr. Marton E. Balazs. The advisor was David Brown. On Dec. 15th, 1999, Marton successfully defended his thesis in public before the PhD committee. His thesis, "Design Simplification by Analogical Reasoning", addressed the issue of reducing the complexity of an object or artifact by using analogies with previous object simplifications.

Marton began his academic journey in CS at WPI in the fall of 1994, having already received his PhD in mathemat-

ics. The joke in the AI Research Group, of which he was a member, is that he's now called "Doctor Doctor Balazs"!

Since October 1999 he's been employed as a Research Associate in the Engineering Design Center at the University of Cambridge in England.

In addition, the CS Department recently awarded its ninth PhD degree to Dan L. Grecu. Again, the advisor was David Brown. On April 19th, 2000, Dan successfully defended his thesis "Flexible Learning in Multi-Agent Systems", which describes the role of expectations in multi-agent design systems, and how expectations can be acquired, validated and used.

Dan began his studies in Computer Science at WPI in the fall of 1993, having come to the US from Romania on a Fulbright scholarship.

## NEW CENTER

*Electronic Commerce Technology*

Profs. David Finkel, Bob Kinicki and Craig Wills are preparing to open the Center for Research in Electronic Commerce Technology (CRECT) by January 2001.

CRECT is an industry-university consortium to advance software and hardware technologies that support electronic commerce. It will conduct research to improve the delivery of information through the Internet and to investigate the development and integration of new software/hardware technologies in support of electronic commerce.

The mission of the center is to conduct research activity in collaboration with its industrial partners. CRECT will focus on investigative and experimental activities that yield new knowledge about computer systems, computer network architecture, and applications software that advance the use of the World Wide Web for electronic commerce. Research projects will be chosen annually in collaboration with its industrial members.

The collaboration of CRECT with its member companies will include: sponsored research projects, workshops, presentations and publications.

Starting from the expertise of its researchers in performance evaluation of computer systems, computer networks, and Web sites, CRECT brings a fundamental understanding of the underlying computational processes for communication of information over the Internet, for providing reliable, scalable and secure Web sites, and for measurement of complex computer systems to the challenge of discovering new technologies for electronic commerce.

CRECT is currently seeking industrial members that can provide expertise and experience in leading-edge technologies for electronic commerce. Alumni working for companies that might be excellent candidates for membership should email Prof. Kinicki (rek@cs.wpi.edu). CRECT web pages can be found via: <http://www.cs.wpi.edu/~rek/>

## AWARDS

*From Sigma Xi & IBM*

Two CS graduate students were honored for their MS and PhD theses at WPI's Faculty Honors Convocation, April 25.

Daniel Bailey of Worcester, Mass., received the Sigma Xi Graduate Research Award for his master's thesis, "Computation in Optimal Extension Fields".

"Dan's work is in the area of public key cryptography," reads the citation accompanying the award. "While cryptography is not new, it becomes of increasing importance as the Internet and e-business grow. The problem with the majority of current public-key schemes is that they are relatively slow. Dan has proposed an entirely new approach to realizing fast arithmetics for certain public-key algorithms." Dan has implemented this theory to produce the fastest reported implementations in the open literature.

Bailey's work has already led to a number of peer-reviewed papers and conference proceedings. His thesis advisor is Christof Paar, assistant professor of electrical and computer engineering, who has a collaborative appointment with the CS department.

Dan Grecu of Newton, Mass., received a Sigma Xi Graduate Research Award for



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his PhD thesis titled "Flexible Learning in Multi-Agent Design". The advisor was David Brown.

"Dan's research is in the general area of artificial intelligence in design," reads the citation for his award. "For the first time, Dan has developed an approach to machine learning that allows the system to decide what to learn and when to learn it. This flexible learning approach can efficiently respond as design requirements are changed."

The department is also pleased to announce that PhD student Lily (Li) Chen has been selected to receive a 2000-2001 IBM Corporate Fellowship. These awards are very competitive and are given country-wide by IBM to the best graduate schools and students.

Lily Chen is supported for her research with Prof. Elke Rundensteiner on XML/WEB database tools and data warehousing technology in the context of the EVE/OOSE projects in the DKBRG Lab. (see <http://davis.wpi.edu/dsrg>).

### SILICON VALLEY

*David Finkel*

This spring CS students helped launch a new MQP center in California's Silicon Valley that will expose students to cutting-edge technology while providing valuable research for sponsoring companies.

Led by Prof. David Finkel, each student team worked full-time on sponsored research at their MQP sponsor's site for

about 9 weeks, completing their projects in March of 2000.

"Customer Migration Tools Utilizing Java and XML for Kana Communications Inc." was completed by CS seniors Glenn Barnett and Christine Lawrence, and Frederick Tan, a junior biotechnology major.

To increase the likelihood of signing on customers, Kana needed to ease the migration of external data into the Kana Response system. XML, an emerging format for defining and creating standardized, portable documents, was identified as an appropriate technology.

The students "designed different testing scenarios to fully test all the aspects of functionality, including data validation, import conflict-handling options and export parameters".

Another project, "Filtering Greeting Cards at Sparks.com," was completed by three CS seniors: Sharad Bhojnagarwala, Michael Sao Pedro, and Zachary Zebrowski. They sought to determine if filtering technology could be used to suggest paper greeting cards appealing to particular buyers at Sparks.com, a startup San Francisco-based Internet company.

"Filtering is the technique of comparing incoming information to the profile of the user's interest and displaying relevant information to the user based on that profile". The students decided to use collaborative filtering, which uses similarities and differences among users to determine relevant information.

Their system makes recommendations based upon the opinions of other users who have purchased similar cards. Because Sparks.com has such a vast inventory, users may not otherwise be able to find the perfect card they want. Sparks.com may also benefit from this from a competitive standpoint because today none of the other online paper greeting card sites use filtering for recommendations.

### 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 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.

### CONTACTS

*How to reach us...*

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