

# **COMPUTER AND INFORMATION SCIENCES**

**Hossein Hakimzadeh, Chair**

## **Chair's Remarks**

The year 2005 was a productive year for computer science and informatics at IU South Bend. Our faculty remained active in their research, teaching and service to our university. Dr. David Surma was granted tenure and promoted to the rank of associate professor. He was also nominated and accepted the responsibilities of the graduate director for our MS in Applied Mathematics and Computer Science program.

In pursuit of our goal to refine and expand our graduate and undergraduate programs in computer science and informatics, the department welcomed three new colleagues to join the faculty. Dr. Ligu Yu (Software Engineering, Vanderbilt University), Dr. Liqiang Zhang (Computer Networks, Wayne State University) and Dr. Murli Nair (University of Poona, Pune, India) joined the department in the Fall of 2005.

Our enrollment in computer science continues to be healthy. Currently, we have approximately 200 undergraduates in computer science and informatics and about 30 graduate students pursuing their MS degrees in Applied Mathematics and Computer Science. With the support of our college, the department was able to renew the equipment in our undergraduate laboratories, creating an up-to-date computing environment for our students.

During 2005, Dr. Mike Scheessele received a Faculty Research Grant, Dr. James Wolfer received an IT Equipment Grant, a UCET/FACET Faculty Development Award, and an Overseas Conference Grant, Dr. Dana Vrajitoru received a Faculty Fellowship Grant and the department also received a McGraw-Hill Equipment Grant. In addition, Dr. Wolfer and Dr. Vrajitoru submitted a grant proposal to the National Science Foundation. This grant is titled "A Multisensory Augmentation Studio for Computer Graphics and Human Interaction"

The department continues to be active in its outreach mission. Examples of such activity include faculty and student volunteer efforts to provide expertise to our local and regional non-profit organizations; increased interaction with local and regional educational institutions; internships and professional practice; increased course offerings for non-majors and community members; increased departmental sponsorship of public presentations; development of stronger relationships with our alumni; and the creation of endowments and scholarships in computer science.

## **SCHOLARSHIP**

Print or electronic *refereed* journal articles, book chapters, and creative works published

**David Surma.** Lab Activities Requiring Minimal Resources for Courses in Computer Networking *The Journal of Computing Sciences in Colleges*, Vol. 21(1), pp. 88-94, 2005 (October).

Papers appearing in *published* Proceedings of professional conferences

**Michael R. Scheessele**, & Perez, T. M. “‘Bottom-up’ cues aid perception of ambiguous, partially visible figures.” In *Proceedings of the 16<sup>th</sup> Midwest Artificial Intelligence and Cognitive Science Conference*, Vol. 16, (pp. 83-90), University of Dayton, Dayton, OH, 2005 (April).

**David R. Surma**. “Improving Performance in Mesh and Torus Networks by Reducing Communication Overhead.” In S. Q. Zheng (Ed.), *Proceedings of the 17<sup>th</sup> International Association of Science and Technology for Development (IASTED) International Conference on Parallel and Distributed Computing and Systems* (pp. 713-718), 2005. (November).

H. Rababaah, **James Wolfer**, and **Dana Vrajitoru**. (2005). “Pavement Crack Classification: a Comparison of GA, MLP, and SOM.” In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO'05 and SIGEVO 1)*, late breaking papers, electronic version only, 2005 (June 25-29).  
<http://www.cs.bham.ac.uk/~wbl/biblio/gecco20051bp/papers/78-rababaah.pdf>

**Dana Vrajitoru**, and J. DeBoni. “Hybrid Real-Coded Mutation for Genetic Algorithms Applied to Graph Layouts.” In *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO'05 and SIGEVO 1)* (pp. 1563-1564), 2005 (June 25-29).

\_\_\_\_\_. “Consistent Graph Layout for Weighted Graphs.” In *3rd ACS/IEEE International Conference on Computer Systems and Applications* (p. 13), electronic extended version, 2005 (January 3-5).

**Dana Vrajitoru**, and R. Mehler. “Multi-Agent Autonomous Pilot for Single-Track Vehicles.” In *Proceedings of the IASTED Conference on Modeling, Simulation, and Optimization* (pp. 85-90), 2005 (August 29-31).

**James Wolfer**. “A Neuro-Genetic Hybrid Motif Generator for Genetic Art.” In *Proceedings of the Eighth IASTED International Conference Computer Graphics and Imaging* (p. 31-36), 2005 (August).

**James Wolfer** and Haroun R. A. Rababaah. “Creating a Hands-On Robot Environment for Teaching Assembly Language Programming.” In *Global Congress on Engineering and Technology Education, IEEE/GCETE* (pp. 303-306), 2005 (March).

\_\_\_\_\_. “An Integrated Khepera and Sumo-Bot Development Environment for Assembly Language Programming.” In *International Conference on Engineering and Computer Education, IEEE/ICECE 2005 Proceedings and Book of Abstracts*, (pp. 29) Madrid, Spain, 2005 (November).

**James Wolfer** and Jacob Ratkiewicz. "Texture Descriptor Visualization Through Self-Organizing Maps: A Case Study in Undergraduate Education." In *Global Congress on Engineering and Technology Education, IEEE/GCETE* (pp. 358-362), 2005 (March).

**James Wolfer, Ruth Schwartz, and Hossein Hakimzadeh**. "Informatics and the Diversification of the Computing Curriculum." In International Conference on Engineering and Computer Education, IEEE/ICECE, *ICECE 2005 Proceedings and Book of Abstracts*, Electronic media (pp. 43 proceeding), Madrid, Spain, 2005 (November).

**Liguo Yu, Stephen R. Schach, and Kai Chen**. "Measuring the Maintainability of Open-Source Software." In *Proceedings of the 4th International Symposium on Empirical Software Engineering* (pp. 287-293), Noosa Heads, Queensland, Australia, 2005 (November).

\_\_\_\_\_. "Reusability before and after Reuse: A Darwin Case Study," In *Proceedings of the 4th International Symposium on Empirical Software Engineering* (pp. 355-362), Noosa Heads, Queensland, Australia, 2005 (November).

\_\_\_\_\_. "Maintaining Linux: The Role of current." In *Proceedings of the 4th International Symposium on Empirical Software Engineering* (pp. 43-51), Noosa Heads, Queensland, Australia, 2005 (November).

**Liguo Yu** and Xubin He. "An Information Flow Based Security Model for Linux Clusters." In *Proceedings of the 2005 High Availability and Performance Computing Workshop*, CD format, Santa Fe, New Mexico, 2005 (October). ([http://xcr.cenit.latech.edu/hapcw2005/program/papers/Yu\\_He.pdf](http://xcr.cenit.latech.edu/hapcw2005/program/papers/Yu_He.pdf))

**Liguo Yu** and Srinivas Ramaswamy. "Categorization of Common Coupling in Kernel-Based Software." In *Proceedings of the 43rd ACM Southeast Conference, Vol. 2*, (pp. 207-210), Kennesaw, GA, 2005 (March).

**Liqiang Zhang, Q. Cheng, Y. Wang, and S. Zeadally**. "Landscape: A High Performance Distributed Positioning Scheme for Outdoor Sensor Networks." In *Proceedings of IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob'05), Vol. 3* (pp. 430-437), Montreal, Canada, 2005.

Formal presentations made at state, regional, national, and international professional meetings

**Michael R. Scheessele**, and Perez, T.M. "'Bottom-up' Cues Aid Perception of Ambiguous, Partially Visible Figures." Presented at the 16<sup>th</sup> Midwest Artificial Intelligence and Cognitive Science Conference, University of Dayton, Dayton OH, April 17.

**Michael R. Scheessele**, Guthrie, D. T., and Gottschalk, D. R. "Role of non-targets in detection of a target in visual search;" Presented at the 5<sup>th</sup> Annual Meeting of the Vision Sciences Society, Sarasota FL, May 7.

**Ruth Schwartz.** “Bringing IT Professionals and Graduate Students Together: A Capstone Course in an IT Program.” Presented at the 2005 Annual Meeting of the Midwest Business Administration Association. Chicago. March.

**David Surma.** “Lab Activities Requiring Minimal Resources for Courses in Computer Networking.” Presented at the Consortium for Computing Sciences in Colleges (CCSC) Midwest Conference, Millikin University, Decatur, IL, September 24.

\_\_\_\_\_. “Improving Performance in Mesh and Torus Networks by Reducing Communication Overhead.” Presented at the 17<sup>th</sup> International Association of Science and Technology for Development (IASTED) International Conference on Parallel and Distributed Computing and Systems, Phoenix, AZ, November 14-16.

**Dana Vrajitoru.** “Hybrid Real-Coded Mutation for Genetic Algorithms Applied to Graph Layouts.” Presented at the Genetic and Evolutionary Computation Conference (GECCO'05 and SIGEVO 1), Washington, DC, June 25-29.

**Dana Vrajitoru.** “Pavement Crack Classification: a Comparison of GA, MLP, and SOM.” Presented at the Genetic and Evolutionary Computation Conference (GECCO'05 and SIGEVO 1), Washington, DC, June 25-29.

**Dana Vrajitoru.** “Multi-Agent Autonomous Pilot for Single-Track Vehicles.” Presented at the IASTED Conference on Modeling, Simulation, and Optimization, Oranjestad, Aruba, August 29-31.

**Dana Vrajitoru.** “Motorcycle Simulation and Automatic Piloting.” Presented at the Biomorph Computing & the Mutable Body, November 8, IUSB.

Scholarly work not appearing elsewhere

**Dana Vrajitoru.** “Simulating Gender Separation and Mating Constraints for Genetic Algorithms.” Indiana University South Bend, Computer and Information Sciences Department, Technical Report, TR-20050520-1, 2005 (May 20).

### ***OTHER: GRANT ACTIVITIES***

New external grants, contracts, and scholarly fellowships awarded

**Hossein Hakimzadeh.** McGraw Hill Grant to support technology needs in the department of Computer and Information Sciences (\$3,700). Lilly Foundation Grant, summer and fall efforts (Approximately \$9,000).

New internal grants, contracts, and scholarly fellowships awarded

**Hossein Hakimzadeh and Ruth Schwartz.** “Developing an Assessment Plan for Informatics,” IUSB Assessment Grant (\$2,000).

\_\_\_\_\_. “A Web Based Tool for Conducting Alumni surveys for IUSB Departments and Academic Units,” IUSB Assessment Grant (\$2,937).

**Michael Scheessele.** “Role of non-targets in perception of a target in visual search,” IUSB Faculty Research Grant (\$3505).

**Ruth Schwartz.** One month faculty exchange in Strasbourg, France, Indiana University and Robert Shuman University.

**James Wolfer.** Overseas Conference Grant (\$600).

\_\_\_\_\_. OIT IT Equipment Grant for High End Stereographic Workstations (\$6200).

New external and internal grants, contracts, and scholarly fellowship proposals submitted

**James Wolfer and Dana Vrajitoru.** National Science Foundation, “A Multisensory Augmentation Studio for Computer Graphics and Human Interaction” (\$149,571).

Continuing external and internal grants, contracts, and scholarly fellowships

**David Surma.** National Science Foundation Grant (\$100,000) “RUI: Using Communication Reduction Techniques to Improve Throughput in High-Performance Networks.” Grant obtained in 2003 for a two-year period, subsequently granted an extension and now set to expire in August 2006.

### ***SERVICE-Campus***

Campus service activities

**Hossein Hakimzadeh.** Chair, Search and Screen Committee for the UCET Instructional Technology Specialist; Search and Screen Committee for the Dean of the School of Business and Economics; Senate IT committee.

**William Knight.** Chair (Spring), CLAS Curriculum Committee; ad hoc Task Force on Clerical Work (Spring); Academic Senate Faculty Board of Review (Spring).

**Michael Scheessele.** IRB Member; Chair (Spring), CLAS Cognitive Science Committee; Faculty Advisor for student chapter of the Association for Computing Machinery (ACM).

**David Surma.** Senate Library Affairs Committee.

**Dana Vrajitoru.** Math Search Committee for assistant professor in Mathematics; Cognitive Science Committee; CLAS Promotion and Tenure for Lecturers Committee; CLAS Graduate Liberal Studies Committee; IUSB SMART Grant Committee.

**James Wolfer.** Cognitive Science Committee; CLAS Dean Search Committee; Co-organizer of campus theme event: “Biomorphic Computing and the Mutable Body;” Student Mentor/Faculty showcase at OIT “Making IT Happen” event.

### ***SERVICE-University***

University service activities (IU system)

**Ruth Schwartz.** Advisor to IU Kokomo on development of their Informatics program (October-December).

**James Wolfer.** Grant reviewer for SBC Fellows applicants.

### ***SERVICE-Community***

Local community service activities

**Ruth Schwartz.** Women’s Initiative; St. Joseph Regional Medical Center Innovation Group.

**David Surma.** Psi Iota Xi Service Sorority; St. John’s Lutheran Church - La Porte, IN. Served as the technical advisor and system administrator. Helped install the file server, and the web server.

Extension and outreach activities (other than formal presentations)

**Hossein Hakimzadeh.** Riley High School Technology and Engineering Magnet School Advisory Council.

Invited Formal Presentations made in the local community as workshops, seminars, or meetings

**Ruth Schwartz.** “A Forty Year Journey in the Information Technology field.” Presented at the WOST Public Forum, October 7, IU South Bend.

### ***SERVICE-National/International***

National or international service activities (other than review activities)

**David Surma.** Session chair - 17<sup>th</sup> IASTED (The International Association of Science and Technology for Development) International Conference on Parallel and Distributed Computing and Systems. Conference held November 14-16 in Phoenix, Arizona. Session 18: Routing and Switching.

**Dana Vrajitoru.** Session co-chair for Modeling, Simulation, and Optimization in Engineering at the conference IASTED Modeling and Simulation. Oranjestad, Aruba, August 29-31, 2005

**James Wolfer.** Session Chair, IASTED Computer Graphics and Imaging; Session Chair, Global Congress on Engineering and Technology Education; Session Chair, two sessions, International Conference on Engineering and Computer Education. Honolulu, Aug. 2005

\_\_\_\_\_ Session Chair, Global Congress on Engineering and Technology Education; Bertioga, Brazil, March 2005

\_\_\_\_\_ Session Chair, two sessions, International Conference on Engineering and Computer Education. Madrid, Spain, November 2005

Service on doctoral or master's degree committees off the IUSB campus

**William Knight.** 1 Master's thesis in mathematics, University of Northern British Columbia.

Active tenure cases where served as an external reviewer

**James Wolfer.** 1 Tenure review, Colorado State University, Software Engineering.

Professional publication manuscript review activities

**David Surma.** *Simulation Modeling Practice and Theory* (1); 2 manuscripts for the 2005 Consortium for Computing Sciences in Colleges, 12<sup>th</sup> Annual Midwest Conference; 1 manuscript for the 35<sup>th</sup> ASEE/IEEE Frontiers in Education Conference; 1 paper for the 2005 Consortium for Computing Sciences in Colleges, Rocky Mountain Conference.

**Dana Vrajitoru.** *Iranian Journal of Science.* (reviewed one manuscript)

**Liqiang Zhang.** *Wireless Communications and Mobile Computing* (1); *Journal of Supercomputing* (1); *International Journal of Pervasive Computing and Communications* (1); *IEEE Network Magazine* (1).

## **ADVISING**

Committee service related to advising

**Ruth Schwartz.** CLAS Academic Advising Committee.

Advising sessions for new students

**William Knight.** Jan. 5, May 21, July 22, Aug. 19, and Dec. 16.

**Michael Scheessele.** August 19 and December 16.

**Dana Vrajitoru.** 2 sessions, Fall. 7-22-05 and 8-24-05

## **MENTORING**

Active thesis/dissertation committees where served as first reader or chair

**Michael Scheessele.** Chair, 2 thesis committees, 1 for AMCS program, 1 for MLS program.

**James Wolfer.** Chair, 1 AMCS Thesis.

Active thesis/dissertation committees where served in a non-chair role

**Dana Vrajitoru.** 2 AMCS Thesis Committee.

**James Wolfer.** 1 AMCS Thesis Committee.

Mentored students who have co-authored a journal article or book chapter

**Michael R. Scheessele & Perez, Thomas. M.** ‘Bottom-up’ cues aid perception of ambiguous, partially visible figures. *Proceedings of the sixteenth Midwest Artificial Intelligence and Cognitive Science conference, University of Dayton, Dayton, OH, Vol. 16, pp. 83-90, 2005.*

*Poornima Konnanur.* The student’s thesis resulted in a co-authored paper submitted to a journal. Genetic Algorithms for a Single-Track Vehicle Autonomous Pilot. Accepted with modifications by the journal *Control and Intelligent Systems*. To be published in 2006.  
[Mentored by **Dana Vrajitoru**]

Mentored students who have co-presented a paper at a professional meeting

**Michael R. Scheessele** and *Perez, Thomas M.* “Bottom-up’ Cues Aid Perception of Ambiguous, Partially Visible Figures.” Presented at the 16<sup>th</sup> Midwest Artificial Intelligence and Cognitive Science Conference, University of Dayton, Dayton OH, April 17.

**Michael R. Scheessele**, *Guthrie, David T.*, and *Gottschalk, Dean R.* “Role of non-targets in detection of a target in visual search,” Presented at the 5<sup>th</sup> Annual Meeting of the Vision Sciences Society, Sarasota FL, May 7.

**James Wolfer**, and *Haroun R.A. Rababaah.* “An Integrated Khepera and Sumo-Bot Development Environment for Assembly Language Programming,” Presented at the International Conference on Engineering and Computer Education. Madrid, Nov. 14-16, 2005

\_\_\_\_\_. “Creating a Hands-On Robot Environment for Teaching Assembly Language Programming,” Presented at the Global Congress on Engineering and Technology Education. Bertioga, March 13-16 2005

\_\_\_\_\_. “Asphalt Pavement Crack Classification: A Comparison of GA, MLP, and SOM,” Presented at the Genetic and Evolutionary Computing Conference, Late-breaking paper. Washington, D.C., June 25-29, 2005