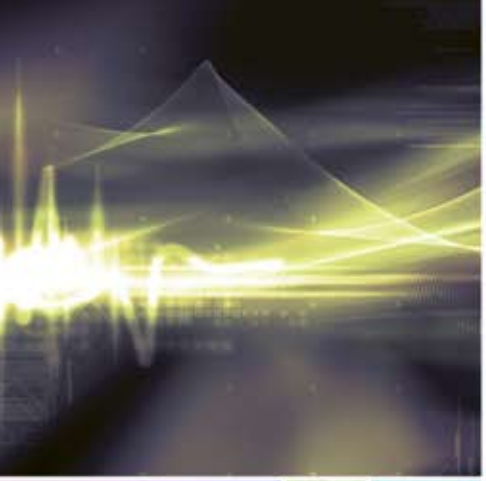

DEPARTMENT *of*

COMPUTER SCIENCE

2005-06

Annual Report

PURDUE
UNIVERSITY

The department moved into the Richard and Patricia Lawson Computer Science Building shortly before the start of fall classes. The building consolidates the department into two buildings from five and provides the research space necessary to maintain a competitive computer science program.

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The Year in Review

For Purdue Computer Science, 2005–06 was a year of celebrating changes and successes!

An event that impacted everyone in the department was our move into the new **Richard and Patricia Lawson Computer Science Building**. After a few delays, the move started in early August 2006, with most of the department operational in the Lawson Building in time for the first week of classes. Friday, September 15th marked the official opening and dedication of the Lawson Computer Science Building. Construction of the 100,000 square foot, $20 million building started in October 2004 and was funded through $13 million from the state of Indiana and $7 million raised from 289 private donors.

The Richard and Patricia Lawson Computer Science building consolidates the computer science department from five buildings into two. The building provides meeting rooms and office space for 45 faculty, 55 teaching assistants, 70 research assistants, and houses four classrooms, five instructional labs, and four research labs. The building offers state-of-the-art equipment in addition to its interaction areas. It is wired with special 10-gigabit high-speed cable, 10-100 times faster than standard twisted pair cable. The building also includes a 100-seat university meeting room designated for workshops, seminars, and other special events, and an adjacent commons that offers space for event registration, poster sessions, social interaction, and provisions for a tiled video wall.

New Appointments

In fall 2006, the department welcomed three new faculty members. **Jennifer Neville** joined as an assistant professor with a joint appointment in Computer Science and Statistics. She received her PhD in computer science from the University of Massachusetts Amherst in August 2006. **Luo Si** joined the department as an assistant professor of computer science. He received his PhD from the Language Technology Institute, School of Computer Science, Carnegie Mellon University in May 2006. **Xiangyu Zhang** joined the department as an assistant professor of computer science in October 2006. He received his PhD in computer science from the University of Arizona in the fall of 2006. Their biographies and research interests are described in this report.

Ahmed Elmagarmid, who has served as the interim director of Purdue's Discovery Park Cyber Center since its launch in August 2005, became its permanent director in August 2006. The center brings together the Purdue information technology network as well as the people and services needed to tackle large multidisciplinary problems that require the complex application of computational resources.

Retiree
John Rice

In September 2006, **Christoph Hoffmann** accepted the position of director of the Rosen Center for Advanced Computing (RCAC). The Rosen Center is a division of the Purdue central IT organization (ITaP) and provides advanced computing resources and services to support the computationally-intensive research of Purdue faculty and staff. RCAC also conducts its own research and development to enhance the capabilities of these resources. Given Chris' experience as director of CRI and his long history of successful interdisciplinary collaborations, this appointment is a great opportunity for Chris as well as our department.

May 2006 saw the retirements of **John Rice** and **Elias Houstis**. John joined the department in 1964 and, with more than 40 years of service, including 13 years as head, he has impacted the lives of many faculty, staff, and students. John is recognized as a pioneer in the field of mathematical software. He is the founder of the *ACM Transactions on Mathematical Software* journal, a Fellow of the ACM, and a member of the National Academy of Engineering. The retirement occasion was unusual in that Elias was John's student! Elias graduated from Purdue in 1974 and joined the computer science faculty 10 years later. During his 20 years with the department, Elias served as associate head, acting head on two occasions, and as director of the computational science and engineering program.

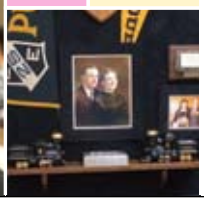
Honors and Promotions

Cristina Nita-Rotaru and **Dongyan Xu** received National Science Foundation CAREER awards. The CAREER program represents the foundation's most prestigious awards for junior faculty members. It recognizes and supports the early career development activities of those scholars who are most likely to become the academic leaders of the 21st century. Nita-Rotaru received her award for proposed research on "Scalable, Robust, and Secure Group-Oriented Services for Wireless Mesh Networks." Xu received his award for his research entitled "Towards Virtual Distributed Environments in a Shared Distributed Infrastructure."

In July 2006, three of our associate professors received promotions to full professor: **Walid Aref, Ananth Grama,** and **Zhiyuan Li.** These three outstanding faculty will provide senior leadership for the areas of databases, scientific computing, and higher performance computing and compilers.

Elisa Bertino was awarded the 2005 IEEE Kanai Award. The award, given annually for major contributions to state-of-the-art distributed computing systems, recognizes her pioneering and innovative research contributions to secure distributed systems.

Richard Lawson, a software industry executive who received his master's degree in computer science from Purdue in 1968, and his wife, Patricia, gave $4.7 million to the CS building fund, the largest single private contribution to the project. He credits Purdue with teaching him the know-how to think about computer science and to adjust to the many changes in technology over the years. Currently, Richard is the chairman of Lawson Software Inc., which he co-founded with his brother Bill and colleague John Cerullo in 1975. Lawson Software began as a consulting business, and in the past 30 years has flourished into a $364 million company providing business software to large and mid-sized organizations in healthcare, retail, professional services, the public sector, financial services, and other strategic markets.



Heddy Kurz is a long time supporter and friend of Purdue. Her late husband, Herman, earned his degree in electrical engineering from Purdue. The Herman and Heddy Kurz Lobby features a 10-foot-tall, stainless steel sculpture by Indiana artist John Mishler with touch screens to offer visitors directions and information. The lobby also houses a display case with Purdue memorabilia from Heddy Kurz's collection.

Year in Review (continued)

Walter Gautschi was recognized for 50 years of professional achievements in mathematics at the first Dolomites Workshop on Constructive Approximation and Applications. The conference, dedicated to Professor Gautschi, was held September 8–12, 2006, in Alba di Canazei, Trento, Italy. The workshop was attended by more than 100 participants from 30 different countries and six continents.

During the last year, **Gene Spafford** received two very distinguished awards. He was the recipient of the IEEE Computer Society 2005 Technical Achievement Award. The Technical Achievement Award goes to individuals whose work is outstanding and innovative in the fields of computer and information science and engineering within the past fifteen years. Gene Spafford received his Technical Achievement Award for "contributions to information security and digital forensics." He also received the 2006 ACM SIGSAC Outstanding Contributions Award. This award is given for significant contribution to the field of computer and communication security through fostering research and development activities, educating students, and providing professional services such as the running of professional societies and conferences.

Four of the ten 2006 College of Science Top Ten Teacher recognitions went to computer science professors: **Mike Atallah, Douglas Comer, Buster Dunsmore,** and **Gustavo Rodriguez-Rivera.** These four faculty are repeatedly among the best undergraduate teachers in the college. The quality of their teaching and their dedication to undergraduate education are known to students as well as alumni.

Student Accomplishments

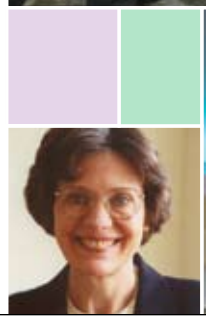
We congratulate all computer science students who completed a degree during the last year! This includes 17 graduate students who received the PhD degree, 29 students who completed an MS degree, and 96 students who completed a BS degree.

CS undergraduate **Alexei Czeskis** earned a scholarship from the Astronaut Scholarship Foundation (ASF). Alexei's initiative, creativity, and excellence in computer science prompted his nomination for this honor. Alexei was one of two students chosen by a university-wide Purdue committee from all the engineering and natural or applied science students nominated.

PhD student **Maleq Khan** received an award for the Best Student Paper at the 20th International Symposium on Distributed Computing (DISC 2006) held in Stockholm, Sweden, on September 18–20, 2006. He worked jointly with his advisor, Gopal Pandurangan. The award-winning paper is titled "A Fast Distributed Approximation Algorithm for Minimum Spanning Trees." The award is given annually to the best papers with at least one author as a full-time student.

The three-person Purdue programming team sponsored by the Purdue ACM chapter ranked in the top ten at the ACM Regional Programming Contest in Cincinnati, Ohio, on Saturday, November 5, 2005. **Ferry Unardi**, **Emil Stefanov**, and **Hong Chen**, coached by **Tomek Czajka**, had five hours to solve eight problems. They solved seven of the eight problems and finished seventh in a field of 113 teams.

Dorothy Denning (PhD '75) returned to our department to receive the 2006 Distinguished Science Alumni award. Denning is recognized as one of the world's leading experts in information security. Her research has laid the foundations in the areas of cryptography, information protection and warfare, and secure cyber infrastructures. She is currently a professor in the Department of Defense Analysis at the Naval Postgraduate School in Monterey, CA.



Alumnus and new building namesake, **Richard Lawson**, received an honorary doctorate in May 2006. Richard was recognized for his many contributions to the software industry.

Finally, the 2007 *U.S.News & World Report* ranking of graduate programs in business, education, engineering, law, and medicine was published in April 2006. Purdue's Computer Science Department was ranked 18th in this new ranking, up two positions from its previous ranking. The department shares the 18th rank with Columbia University, University of Pennsylvania, and Yale University. Jeffrey S. Vitter, Frederick L. Hovde Dean of the College of Science and professor of computer science, is very encouraged with the department's ranking. "We made very positive gains in computer science, rising two points, and we expect even more gains when our new Lawson Computer Science Building, with its state-of-the-art facilities, opens." he said.

I think that you will agree it was quite a year for Purdue Computer Science! The department made significant strides in many arenas — all geared towards our mission to advance the frontiers of computer science and apply computational principles to technical and societal problems. It is my personal pleasure and honor to lead this extraordinary department and also to interact with our world-class alumni and friends!

Susanne Hambrusch, *Professor and Head*

Faculty Honors

IEEE (Institute of Electrical and Electronics Engineers) Fellows: 7
ACM (Association for Computing Machinery) Fellows: 6
AAAS (American Association for the Advancement of Science) Fellows: 3
Member, National Academy of Engineering: 1
NSF Presidential Young Investigator Awards: 3
NSF CAREER Awards: 11
Journal Editors-in-Chief: 6

Departmental research areas and associated faculty

Bioinformatics and Computational Biology
Grama
Kihara
Pandurangan
Szpankowski
O. Vitek

Computational Science and Engineering
Grama
Hoffmann
Lucier
Sacks
Sameh
Skeel
Sun

Databases
Aref
Bertino
Bhargava
Clifton
Elmagarmid
Hambrusch
Neville
Prabhakar
Si
Vitter

Data Mining and Information Retrieval
Clifton
Neville
Si

Distributed Systems
Bhargava
Eugster
Grama
Hosking
Jagannathan
Nita-Rotaru
Pandurangan
Park
Xu
Yau

Graphics and Visualization
Aliaga
Hoffmann
Popescu
Sacks
Sun

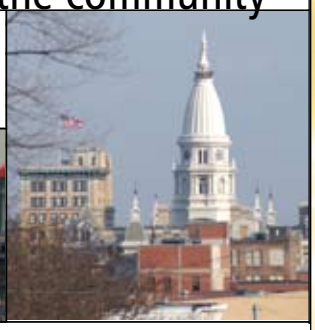
Information Security and Assurance
Atallah
Bertino
Bhargava
Clifton
Fahmy
N. Li
Nita-Rotaru
Park
Prabhakar
Spafford
J. Vitek
Wagstaff
Xu
Yau

Networking and Operating Systems
Comer
Fahmy
Nita-Rotaru
Park
Rego
Xu
Yau

Programming Languages and Compilers
Eugster
Hosking
Jagannathan
Z. Li
J. Vitek
Zhang

Software Engineering
Dunsmore
Eugster
Jagannathan
Mathur
Spafford
J. Vitek
Zhang

Theory of Computing and Algorithms
Atallah
Frederickson
Hambrusch
Pandurangan
Szpankowski
Vitter



Purdue University and the community

Purdue University

Founded in 1869 as Indiana's land-grant university, Purdue University is a public, doctoral-granting research university with nearly 39,000 students on its West Lafayette (main) campus, and serves over 68,000 students system-wide. Purdue is one of the nation's leading research institutions with a reputation for excellence and affordable education.

Recently ranked 22nd in the nation in the latest *U.S.News & World Report* top 50 public universities survey, the University offers more than 7,400 courses in over 500 fields of study. Ranked 59th in the world, 22nd among U.S. universities, and ninth among American public universities in a survey by *The Times of London*, Purdue students hail from all 50 states and 126 countries. Purdue enjoys the distinction of having more international students than any public university in the United States. Purdue's research and learning environment is an incubator of great ideas and stellar accomplishments; where faculty and students discover together, push the boundaries of knowledge, and make significant contributions to virtually every aspect of contemporary life. Extensive library, computing, and laboratory resources support a robust research and learning setting providing multiple opportunities to explore interests and develop skills. More than 325,000 living alumni are graduates of one of the University's highly regarded 10 colleges and schools — Science, Engineering, Management, Pharmacy, Nursing, Consumer and Family Sciences, Liberal Arts, Agriculture, Veterinary Medicine, and Technology — and are making a difference each day in myriad fields.

Purdue College of Science established the nation's first PhD-granting department of computer science in 1962. In over four decades, the department has awarded 307 PhDs to students in many areas of the field. For more information, visit: www.purdue.edu.

Greater Lafayette

The home of Purdue, Greater Lafayette is a welcoming and progressive community conveniently located on Interstate 65, approximately 150 miles southeast of Chicago and 65 miles northwest of Indianapolis. West Lafayette and Lafayette, situated along the scenic Wabash River in Tippecanoe County, are home to a total population of nearly 150,000 people who enjoy a strong and diverse economic base, historic architecture, excellent schools, well-maintained parks, biking, and hiking trails, and several outlets for fine dining. The local arts scene, including performances by international artists presented throughout the year at Purdue, is thriving and vibrant. Residents enjoy an average mean temperature of 23 degrees in January and 73 degrees in July. For more information, visit: www.lafayette-in.com

FACULTY

Daniel G. Aliaga

Assistant Professor of Computer Science (2003)

Education:
BS, Computer Science, Brown University (1991)
MS, Computer Science, University of North Carolina at Chapel Hill (1993)
PhD, Computer Science, University of North Carolina at Chapel Hill (1999)

Academic biography
Professor Aliaga's research activities are in the area of computer graphics, in particular capturing and rendering large complex environments. Applications for his research include telepresence, computer-aided design, and education. Aliaga's work into this general problem overlaps with several fields, including: computer graphics, computer vision, robotics, data compression, and system building. Aliaga has developed and published several new algorithms for interactively rendering massive geometrical models, recreating complex 3-D environments, visibility culling, reconstructing images, estimating camera pose, calibrating cameras, and compressing images. In addition, he has designed several complete experimental research systems, in collaboration with researchers at University of North Carolina at Chapel Hill, Princeton University, Johns Hopkins University, and Bell Laboratories.

Selected publications
Daniel Bekins and Daniel G. Aliaga, "Build-by-Number: Rearranging the Real World to Visualize Novel Architectural Spaces", *IEEE Visualization*, October 2005.

Daniel G. Aliaga and Ingrid Carlbom, "Build-by-Number: Finding Yourself: Fiducial Planning for Error-Bounded Pose Estimation of a Panoramic Camera in Large Environments", Special Issue of *IEEE Robotics and Automation Magazine: Panoramic Robotics*, December 2004.

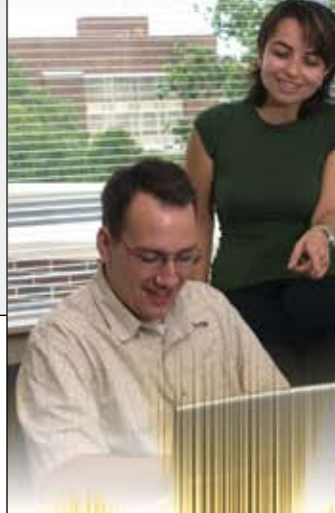
Daniel G. Aliaga and Ingrid Carlbom, "Plenoptic Stitching: A Scalable Method for Reconstructing 3D Interactive Walkthroughs", *Proceedings of the ACM SIGGRAPH*, pp. 443–450, 2001.

Walid G. Aref

Professor of Computer Science (1999)

Education:
BSc, Computer Science, Alexandria University, Egypt (1983)
MSc, Computer Science, Alexandria University, Egypt (1986)
PhD, Computer Science, University of Maryland at College Park (1993)

Academic biography
Professor Aref's research interests are in extending the functionality of database systems in support of emerging applications, e.g., spatial, spatio-temporal, multimedia, genomics, and sensor databases. He is also interested in indexing, data mining, and geographic information systems (GIS). Professor Aref's research has been supported by the National Science Foundation, the National Institute of Health, Purdue Research Foundation, CERIAS, Panasonic, and Microsoft Corp. In 2001, he received the CAREER Award from the National Science Foundation and in



2004, he received a Purdue University Faculty Scholar award. Professor Aref is a member of Purdue's Discovery Park Bindley Bioscience Center. He is on the editorial board of the VLDB Journal, a senior member of the IEEE, and a member of the ACM.

Selected publications

I. F. Ilyas, R. Shah, W. G. Aref, J. S. Vitter, A. K. Elmagarmid, "Rank-aware Query Optimization", ACM SIGMOD Conference, pp. 203–214, Paris, June 2004.

M. F. Mokbel, X. Xiong, W. G. Aref, "SINA: Scalable Incremental Processing of Continuous Queries in Spatio-temporal Databases", ACM SIGMOD Conference, pp. 623–634, Paris, June 2004.

X. Xiong, W. G. Aref, "R-trees with Update Memos", IEEE International Conference on Data Engineering, Atlanta, GA, April 2006.

Mikhail Atallah

Distinguished Professor of Computer Science (1982)
Professor of Electrical and Computer Engineering (courtesy)

Education:

BE, Electrical Engineering and Computer Science, American University in Beirut (1975)
MS, Electrical Engineering and Computer Science, The Johns Hopkins University (1980)
PhD, Electrical Engineering and Computer Science, The Johns Hopkins University (1982)

Academic biography

Professor Atallah's current research interests are in information security, and have in the past included algorithms, parallel computation, and computational geometry. He currently works on protocols for online collaborations between entities that do not completely trust each other, on key management issues in access control, and on watermarking digital objects (particularly non-media, such as relational data and natural language text). A Fellow of the IEEE, he has served on the editorial boards of top journals, and on the program committees of top conferences and workshops. He was keynote and invited speaker at many national and international meetings. He was selected in 1999 as one of the best teachers in the history of Purdue University and included in the Purdue Book of Great Teachers. He is a co-founder of Arxan Technologies, Inc.

Selected publications

Mikhail J. Atallah, Marina Blanton, Keith B. Frikken, and Jiangtao Li, "Efficient Correlated Action Selection", *Proc. 10th Financial Cryptography and Data Security Conference*, Anguilla, British West Indies, February 2006.

Keith B. Frikken, Jiangtao Li, Mikhail J. Atallah, "Trust Negotiation with Hidden Credentials, Hidden Policies, and Policy Cycles", *Proc. of the 13th Annual Network and Distributed System Security Symposium*, San Diego, California, February 2006, pp. 157–172.

Mikhail J. Atallah, Marina Blanton, Keith B. Frikken, "Key Management for Non-Tree Access Hierarchies", *Proc. 11th ACM Symposium on Access Control Models and Technologies*, Lake Tahoe, California, June 2006, pp. 11–18.

Elisa Bertino

Professor of Computer Science (2004)
Professor of Electrical and Computer Engineering
Research Director of CERIAS

Education:
PhD, Computer Science, University of Pisa (1980)

Academic biography

Professor Bertino's research interests cover many areas in the fields of information security and database systems. Her research combines both theoretical and practical aspects, addressing applications on a number of domains, such as medicine and humanities. Current research includes: access control systems, secure publishing techniques and secure broadcast for XML data; advanced RBAC models and foundations of access control models; trust negotiation languages and privacy; data mining and security; multi-strategy filtering systems for Web pages and sites; security for grid computing systems; integration of virtual reality techniques and databases; and geographical information systems and spatial databases.

Professor Bertino is a co-editor-in-chief of the *VLDB Journal* and she serves on the editorial boards of several journals, including the *ACM Transactions on Information and System Security*, the *IEEE Security & Privacy Magazine*, and the *International Journal of Information Security*. Professor Bertino is a Fellow of the IEEE and a Fellow of the ACM. She received the IEEE Computer Society Technical Achievement award in 2002 for outstanding contributions to database systems, database security, and advanced data management systems. In 2005, she received the Tsutomu Kanai Award by the IEEE Computer Society for pioneering innovative research contributions to secure distributed systems.

Selected publications

E. Bertino, L.R. Khan, R. Sandhu, B. Thuraisingham, "Secure Knowledge Management: Confidentiality, Trust, and Privacy", *IEEE Transactions on Systems, Man, and Cybernetics*, 36(3), pp. 429–438, May 2006.

R. Bhatti, E. Bertino, A. Ghafoor, "X-Federate: A Policy Engineering Framework for Federated Access Management", *IEEE Transactions on Software Engineering*, 32(5), pp. 330–346, May 2006.

E. Bertino, R. Sandhu, "Database Security — Concepts, Approaches, and Challenges", *IEEE Transactions on Dependable and Secure Computing*, 2(1), pp. 2–19, January–March 2005.

Bharat Bhargava

Professor of Computer Science (1984)
Professor of Electrical and Computer Engineering (courtesy)

Education:
BS, Mathematics (Honors), Punjab University (1966)
BE, Electrical and Computer Engineering, Indian Institute of Science (1969)
PhD, Electrical Engineering, Purdue University (1984)

Academic biography

Professor Bhargava conducts research in security and privacy issues in distributed systems. This involves host authentication and key management, secure routing and dealing with malicious hosts, adaptability to attacks, and experimental studies. Related research is in formalizing evidence, trust, and fraud. Based on his research in reliability, he is studying vulnerabilities in systems to assess threats to large organizations. His research has direct impact on nuclear waste transport, bio-security, disaster management, and homeland security.

Professor Bhargava is a Fellow of the IEEE and of the Institute of Electronics and Telecommunication Engineers. He has been awarded the charter Gold Core Member distinction by the IEEE Computer Society for his distinguished service. He received Outstanding Instructor Awards from the Purdue chapter of the ACM in 1996 and 1998. In 1999, he received the IEEE Technical Achievement Award for his contributions to foundations of adaptability in communication and distributed systems. In 2003, he was selected to appear in the Purdue Book of Great Teachers. He serves on five editorial boards and is the founder of the IEEE Symposium on Reliable and Distributed Systems, IEEE Conference on Digital Library, and the ACM Conference on Information and Knowledge Management.

Selected publications

M. Hefeeda, B. Bhargava, and D. Yau, "A hybrid architecture for cost-effective on-demand media streaming", *Computer Networks Journal*, Volume 44, pp. 353–382, 2004.

B. Bhargava, X. Wu, Y. Lu, and W. Wang, "Integrating Heterogeneous Wireless Technologies: A Cellular-assisted mobile ad hoc network", *Mobile Networks and Applications: Special Issue on Integration of Heterogeneous Wireless Technologies*, No. 9, pp. 393–408, 2004.

A. Habib, M. Khan, and B. Bhargava, "Edge-to-Edge Measurement-based Distributed Network Monitoring", *Computer Networks*, Volume 44, Issue 2, pp. 211–233, Feb 2004.

Christopher W. Clifton

Associate Professor of Computer Science (2001)

Education:

BS, Computer Science and Engineering, Massachusetts Institute of Technology (1986)
MS, Electrical Engineering and Computer Science, Massachusetts Institute of Technology (1986)
MA, Computer Science, Princeton University (1988)
PhD, Computer Science, Princeton University (1991)

Academic biography

Professor Clifton works on challenges posed by novel uses of data mining technology, including privacy-preserving data mining, data mining of text, and data mining techniques applied to interoperation of heterogeneous information sources. Fundamental data mining challenges posed by these applications include extracting knowledge from noisy data, identifying knowledge in highly skewed data (few examples of "interesting" behavior), and limits on learning. He also works on database support for widely distributed and autonomously controlled information, particularly information administration issues such as supporting fine-grained access control.

Before joining Purdue, Clifton was a principal scientist in the Information Technology Division at the MITRE Corporation. Before joining MITRE in 1995, he was on the faculty at Northwestern University.

Selected publications

Jaideep Vaidya and Chris Clifton, "Secure Set Intersection Cardinality with Application to Association Rule Mining", *Journal of Computer Security*, Volume 13, No. 4, pp. 593–622, IOS Press, November 2005.

Murat Kantarcioglu and Chris Clifton, "Privacy Preserving Data Mining of Association Rules on Horizontally Partitioned Data", *Transactions on Knowledge and Data Engineering*, Volume 16, No. 9, pp. 1026–1037, IEEE Computer Society Press, Los Alamitos, CA, September 2004.

Jaideep Vaidya, Chris Clifton, and Michael Zhu, "Privacy Preserving Data Mining", Volume 19 in *Advances in Information Security*, Springer, New York, 2006.

Douglas E. Comer

Distinguished Professor of Computer Science (1976)
Professor of Electrical and Computer Engineering (courtesy)

Education:

BS, Mathematics and Physics, Houghton College (1971)
PhD, Computer Science, The Pennsylvania State University (1976)

Academic biography

Professor Comer is an internationally recognized expert on computer networking and the TCP/IP protocols. He has been working in this area since the late 1970s, and was a principal investigator on several early Internet research projects. He served as chairman of the CSNET technical committee, chairman of the DARPA Distributed Systems Architecture Board, and was a member of the Internet Activities Board. Professor Comer is currently on leave from Purdue, serving as VP of Research for Cisco Systems.

Professor Comer has created courses on TCP/IP and networking technologies, and consults for private industry on the design of corporate networks. He is well known for his widely adopted series of groundbreaking textbooks on networking and operating systems. Comer's three-volume series *Internetworking with TCP/IP* is often cited as an authoritative reference for the Internet protocols. His texts have been used by fifteen of the top sixteen computer science departments listed in the *U.S.News & World Report* ranking. Comer's research is experimental. He and his students design and implement working prototypes of large, complex systems.
Professor Comer has served as editor-in-chief of *Software: Practice and Experience*. He is a Fellow of the ACM and the recipient of numerous teaching awards.

Selected publications

D. Comer, "Internetworking with TCP/IP Volume 1: Principles, Protocols, and Architecture", Prentice-Hall, Upper Saddle River, NJ, Fifth edition, 2005.

D. Comer, "Essentials Of Computer Architecture", Prentice-Hall, Upper Saddle River, NJ, 2005.

D. Comer, "Consequences Of IPv6 Addressing", *Journal of Internet Technology*, Vol 5:4 (2004), 305-309.

H. E. Dunsmore

Associate Professor of Computer Science (1978)

Education:

BS, Mathematics and Physics, University of Tennessee (1968)
PhD, Computer Science, University of Maryland (1978)

Academic biography

Professor Dunsmore's interests include the Internet, Web programming, software engineering, software metrics, object-oriented design and programming, and information systems. He is the Chair of the College of Science (CoS) Undergraduate Education Policy and Curriculum Committee. He is a member of the Executive Council of the Purdue Teaching Academy. Dunsmore was selected Outstanding Teacher in the College of Science at Purdue in 1980. He is a 1996 recipient of the Charles B. Murphy Outstanding Undergraduate Teacher Award. He is a Founding Fellow of the Purdue Teaching Academy and was selected in 1998 as a member of the Purdue chapter of Mortar Board. Dunsmore was selected as one of the Top Ten College of Science Teachers in 1994, 1995, and 2000. In 2001, he was selected as one of three Outstanding Indiana Information Technology Educators by the Indiana Information Technology Association (INITA). In 2005, he was voted by science alumni as their favorite CS professor. He is a Senior Faculty Mentor in the Purdue Teaching for Tomorrow Program. Dunsmore has extensive legal and industrial consulting experience. He is co-author of the books *Software Engineering Metrics and Models* (with Sam Conte and Vincent Shen) and *Internet Resources for Tourism and Leisure* (with William Theobald).

Ahmed K. Elmagarmid

Professor of Computer Science (1988)
Director of the Purdue Cyber Center (2005)

Education:

BS, Computer Science, University of Dayton (1977)
MS, Computer and Information Science, The Ohio State University (1981)
PhD, Computer and Information Science, The Ohio State University (1985)

Academic biography

Professor Elmagarmid's research interests focus on applications of database technology to telemedicine, digital government, and electric power management. He has done work in video databases, data quality and confidentiality, and multidatabase systems. He is the director of the Indiana Center for Database Systems. He received a Presidential Young Investigator award from the National Science Foundation, and distinguished alumni awards from Ohio State University and the University of Dayton in 1993 and 1995, respectively. Professor Elmagarmid is the editor-in-chief of *Distributed and Parallel Databases: An International Journal*, editor of *IEEE Transactions on Knowledge and Data Engineering*, *Information Sciences Journal*, *Journal of Communication Systems*, and of the book series *Advances in Database Systems*. He has chaired and served on several program committees and served on several editorial boards.

Professor Elmagarmid serves as an industry consultant in the areas of database systems. He has consulted with Telcordia Technology, Bellcore, IBM, CSC, Harris, D. H. Brown and Associates, MCC, Bell Northern Research, Molecular Design Labs, and UniSql to name a few. He is the holder of a recent patent on workflow database technology. In 2006, Professor Elmagarmid became the first director of the newly created Purdue Cyber Center.

Selected publications

M. A. Hammad, M. J. Franklin, W. G. Aref, and A. K. Elmagarmid, "Scheduling for Shared Window Joins Over Data Streams", *Proceedings of the 29th International Conference on Very Large Data Bases (VLDB 2003)*, pp. 297–308, 2003.

I. F. Ilyas, W. G. Aref, and A. K. Elmagarmid, "Supporting Top-k Join Queries in Relational Databases", *Proceedings of the 29th International Conference on Very Large Databases (VLDB 2003)*, pp. 754–765, Berlin, Germany.

E. Bertino, T. Catarci, A. K. Elmagarmid, and M-S. Hacid, "Quality of Service Specification in Video Databases", *IEEE Multimedia*, Volume 10, No. 4, pp. 71–81, October/December 2003.

Patrick Eugster

Assistant Professor of Computer Science (2005)

Education:

MS, Computer Science, Swiss Federal Institute of Technology in Lausanne (1998)
PhD, Computer Science, Swiss Federal Institute of Technology in Lausanne (2001)

Academic biography

Professor Eugster's research aims at proposing adequate support for distributed programming. Particular topics of interest include (fault-tolerant) algorithms, (object-oriented) programming languages and abstractions, middleware, and software engineering — all specifically in the context of distributed settings. He was educated in Switzerland, and has worked for both Swiss Federal Institutes of Technology in Lausanne (EPFL) and in Zurich (ETHZ), as well as for Sun Microsystems. He has authored more than 30 articles.

Selected publications

P. Eugster, R. Guerraoui, A. M. Kermarrec, and L. Massoulie, "From Epidemics to Distributed Computing", *IEEE Computer*, 37(5), pages 60–67, May 2004.

P. Eugster and R. Guerraoui, "Distributed Programming with Typed Events", *IEEE Software*, 21(2), pages 56–64, March 2004.

P. Eugster, R. Guerraoui, S. B. Handurukande, A. M. Kermarrec, and P. Kouznetsov, "Lightweight Probabilistic Broadcast", *ACM Transactions on Computer Systems,* 21(4), pages 341–374, November 2003.

Sonia Fahmy

Associate Professor of Computer Science (1999)

Education:

BSc, Computer Science, The American University in Cairo, Egypt (1992)
MS, Computer and Information Science, The Ohio State University (1996)
PhD, Computer and Information Science, The Ohio State University (1999)

Academic biography

Professor Fahmy's research interests lie in the design and evaluation of network architectures and protocols. She is currently investigating Internet tomography, network security, and wireless sensor networks. Her work is published in over 60 refereed papers, including publications in IEEE/ACM Transactions on Networking, Computer Networks, IEEE INFOCOM, and IEEE ICNP. She received the National Science Foundation CAREER award in 2003 and Schlumberger foundation technical merit awards in 2000 and 2001. Results of her work were incorporated into the ATM Forum traffic management specifications 4.0 and 4.1, and a patent has been awarded for her work on the ERICA algorithm for network congestion control.

She is currently serving on the editorial boards of the *Journal of High Speed Networks*, and *Computer Communications*. She has served on the organizing or technical program committees of IEEE INFOCOM, ICNP, ICDCS, ICC, GLOBECOM, Hot Interconnects, WWIC, and IPCCC. She co-chaired the first SPIE Conference on Scalability and Traffic Control in IP Networks in 2001, and chaired the first Workshop on Secure Network Protocols (NPSec) in 2005. She is a member of the ACM, Phi Kappa Phi, Sigma Xi, and Upsilon Pi Epsilon, and a senior member of the IEEE.

Selected publications

S. Fahmy and M. Kwon, "Characterizing Overlay Multicast Networks and their Costs", *IEEE/ACM Transactions on Networking*, June 2007, A short version appeared in *Proceedings of the IEEE International Conference on Network Protocols (ICNP)*, pp. 61–70, November 2003.

O. Younis and S. Fahmy, "FlowMate: Scalable On-line Flow Clustering", *IEEE/ACM Transactions on Networking*, 13(2):288–301, April 2005.

O. Younis and S. Fahmy, "HEED: A Hybrid, Energy-Efficient, Distributed Clustering Approach for Ad-hoc Sensor Networks", *IEEE Transactions on Mobile Computing*, 3(4):366–379, Oct–Dec 2004.

Greg N. Frederickson

Professor of Computer Science (1982)

Education:

AB, Economics, Harvard University (1969)
MS, Computer Science, University of Maryland (1976)
PhD, Computer Science, University of Maryland (1977)

Academic biography

Professor Frederickson's areas of interest include the analysis of algorithms, with special emphasis on data structures, and graph and network algorithms. His recent work has focused on designing data structures to dynamically maintain information about graphs, designing optimal algorithms

for parametric search problems on trees, and discovering graph decompositions that facilitate fast algorithms for shortest path problems. Professor Frederickson has served on the editorial boards of *SIAM Journal on Computing*, *SIAM Journal on Discrete Mathematics*, and *IEEE Transactions on Computers*, and he currently serves on the editorial board of *Algorithmica*. He has published two books, *Dissections Plane & Fancy*, Cambridge University Press, 1997, and *Hinged Dissections: Swinging & Twisting*, Cambridge University Press, 2002. Professor Frederickson was recognized in 2003–04 as a Top Ten Outstanding Teacher in Science at Purdue, and won the 2004 George Pólya Award from the Mathematical Association of America.

Selected publications

Greg N. Frederickson, "Ambivalent data structures for dynamic 2-edge-connectivity and k smallest spanning trees", *SIAM Journal on Computing*, Volume 26, pp. 484–538, 1997.

Greg N. Frederickson, "A data structure for dynamically maintaining rooted trees", *Journal of Algorithms*, Volume 24, pp. 37–65, 1997.

Greg N. Frederickson and Roberto Solis-Oba, "Increasing the weight of minimum spanning trees", *Journal of Algorithms*, Volume 33, pp. 244–266, 1999.

Walter Gautschi

Professor Emeritus of Computer Science (1963)
Professor Emeritus of Mathematics

Education:

PhD, Computer Science, University of Basel (1953)

Academic biography

Before coming to Purdue, Professor Gautschi did postdoctoral work as a Janggen-Pöhn Research Fellow at the National Institute of Applied Mathematics in Rome and at the Harvard Computation Laboratory. He also held positions at the National Bureau of Standards, American University, Oak Ridge National Laboratory, and the University of Tennessee. Since coming to Purdue, he has been a Fulbright Scholar at the Technical University of Munich and has held visiting appointments at the University of Wisconsin, Argonne National Laboratory, the Wright-Patterson Air Force Base, ETH Zurich, the University of Padova, and the University of Basel. He has been a Fulbright Lecturer, an ACM National Lecturer, and a SIAM Visiting Lecturer. He is, or has been, on the editorial boards of *SIAM Journal on Mathematical Analysis*, *Numerische Mathematik, Calcolo,* and *Mathematics of Computation*, and has served as a special editor for *Linear Algebra and Its Applications*. From 1984 to 1995, he was the managing editor of *Mathematics of Computation* and, since 1991, an honorary editor of *Numerische Mathematik*. In 2001, Professor Gautschi was elected a Corresponding Member of the Bavarian Academy of Sciences and Humanities and, in the same year, a Foreign Member of the Academy of Sciences of Turin.

Selected publications

W. Gautschi, "Orthogonal Polynomials: Applications and Computations", *Acta Numerica*, (A. Iserles, Editor) Cambridge University Press, Cambridge, pp. 45-119, 1996.

W. Gautschi, "The Incomplete Gamma Functions Since Tricomi", *Tricomi's Ideas and Contemporary Applied Mathematics*, pp. 203-237, Atti dei Convegni Lincei, No. 147, Accademia Nazionale dei Lincei, Roma, 1998.

W. Gautschi, "Orthogonal Polynomials: Computation and Approximation", Oxford University Press, 2004.

Ananth Grama

Professor of Computer Science (1996)

Education:

BE, Computer Science and Technology, University of Roorkee (1989)
MS, Computer Engineering, Wayne State University (1990)
PhD, Computer Science, University of Minnesota (1996)

Academic biography

Professor Grama's research interests span the areas of parallel and distributed computing architectures, algorithms, and applications. His work on distributed infrastructure deals with development of software support for dynamic clustered and multiclustered environments. More recent work has focused on resource location and allocation mechanisms in peer-to-peer networks. His research on applications has focused on particle dynamics methods, their applications to dense linear system solvers, and fast algorithms for data compression and analysis. Professor Grama is the co-author of a well known text book, *Introduction to Parallel Computing: Design and Analysis of Algorithms*, with Vipin Kumar, Anshul Gupta, and George Karypis. He is a member of the American Association for Advancement of Sciences and Sigma Xi.

Selected publications

Ananth Grama, Anshul Gupta, George Karypis, and Vipin Kumar, "Introduction to Parallel Computing", Addison Wesley, 2003.

Sreekanth Sambavaram, Vivek Sarin, Ahmed Sameh, and Ananth Grama, "Multipole-Based Preconditioners for Large Sparse Linear Systems", *Parallel Computing*, Volume 29, No. 9, pp. 1261-1273, September 2003.

Mehmet Koyuturk and Ananth Grama, "Proximus: A Framework for Analyzing Very High Dimensional Discrete-Attributed Datasets", ACM SIGKDD, 2003.

Susanne E. Hambrusch

Department Head, Computer Science (2002)
Professor of Computer Science (1982)

Education:
MS, Computer Science, Technical University of Vienna (1977)
PhD, Computer Science, The Pennsylvania State University (1982)

Academic biography
Professor Hambrusch's research interests are in the area of parallel and distributed computation, data management and data dissemination in mobile environments, and analysis of algorithms. Her research contributions include communication and data dissemination routines for distributed applications, data management techniques for query processing in wireless, mobile environments, and parallel algorithms for image processing and graph problems. Professor Hambrusch's research has been supported by NSF, ONR, DARPA, DoE, AFOSR, and Microsoft Corp. Professor Hambrusch is a member of the editorial board for *Parallel Computing and Information Processing Letters*, and she also serves on the IEEE Technical Committee on Parallel Processing. Her recognitions include inaugural membership in the Purdue University Book of Great Teachers, a 2003 Outstanding Engineering Alumni Award from Pennsylvania State University, and the 2004 TechPoint Mira Education Award Winner.

Selected publications
Ashfaq A. Khokhar, Susanne Hambrusch, and Erturk Kocalar, "Termination Detection in Data-Driven Parallel Computations/Applications", Journal of Parallel and Distributed Computing, Volume 63, No. 3, pp. 312–326, 2003.

Mohamed Mokbel, Xiaopeng Xiong, Walid Aref, Susanne Hambrusch, Sunil Prabhakar, and Moustafa Hammad, "PLACE: A Query Processor for Handling Real-time Spatio-temporal Data Streams", Proceedings of the 13th International Conference on Very Large Data Bases (VLDB), pp. 1377–1380, 2004.

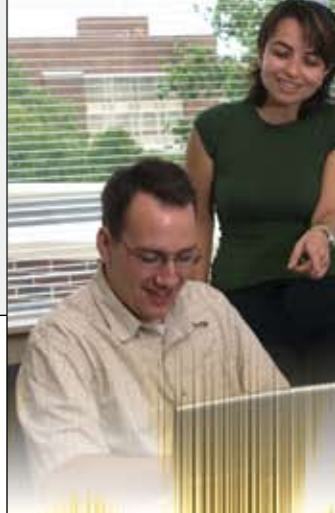
S. E. Hambrusch, C.-M. Liu, and S. Prabhakar, "Broadcasting and Querying Multi-dimensional Index Trees in a Multi-channel environment", Information Systems, Vol. 31, pp 870-886, 2006.

Christoph M. Hoffmann

Professor of Computer Science (1976)
Director of the Rosen Center for Advanced Computing
Co-director, Computing Research Institute
Co-director, PLM Center of Excellence

Education:
PhD, University of Wisconsin (1974)

Academic biography
Before joining the Purdue faculty, Professor Hoffmann taught at the University of Waterloo, Canada. He has also been a visiting professor at the Christian-Albrechts University in Kiel, West Germany (1980), and at Cornell University (1984–1986). His research focuses on geometric



and solid modeling, its applications to manufacturing and science, and the simulation of physical systems. The research includes, in particular, research on geometric constraint solving and the semantics of generative, feature-based design. Professor Hoffmann is the author of *Group-Theoretic Algorithms and Graph Isomorphism*, *Lecture Notes in Computer Science*, *136*, *Springer-Verlag and of Geometric and Solid Modeling: An Introduction*, published by Morgan Kaufmann Inc. Professor Hoffmann has received national media attention for his work simulating the 9/11 attacks on the Pentagon and the World Trade Center.

Selected publications

C. Hoffmann, "Solid Modeling", Chapter 47, *Handbook of Discrete and Computational Geometry*, J. Goodman and J. O'Rourke, eds, CRC Press 2004; second edition.

C. Hoffmann, V. Popescu, "Fidelity in Large-Scale Simulations", CAD 37, 2005, pp. 99–107.

C. Hoffmann and N. Stewart, "Accuracy and robustness in shape interrogation applications", Keynote address, Solid Modeling 2004, Given by N. Stewart in my place, joint paper to appear in *Geometric Models*.

Antony Hosking

Associate Professor of Computer Science (1995)

Education:

BSc, Mathematical Sciences, University of Adelaide (1985)
MSc, Computer Science, University of Waikato (1987)
PhD, Computer Science, University of Massachusetts (1995)

Academic biography

Hosking's research lies at the intersection between programming languages and database systems, focusing on the integration of language and database functionality for efficient data management. Particular topics of interest include interpretation, compilation, and optimization of object-oriented persistent/database programming languages, and empirical performance evaluation of experimental prototype systems. His current research explores language and compiler support for run-time object management (e.g., garbage collection, persistence, resilience, distribution and security) in the context of the Smalltalk, Modula-3, and Java programming languages.

Selected publications

Steve Blackburn and Antony Hosking, "Barriers: Friend or Foe?", In *Proceedings of the Third International Symposium on Memory Management* (Vancouver, Canada, October 2004), 143–151.

Chen-Yong Cher, Antony Hosking and T. N. Vijaykumar, "Software Prefetching for Mark-Sweep Garbage Collection: Hardware Analysis and Software Redesign", In *Proceedings of the Eleventh International Conference on Architectural Support for Programming Languages and Operating Systems* (Boston, Massachusetts, October 2004), 199–210.

Adam Welc, Suresh Jagannathan and Antony Hosking, "Transactional Monitors for Concurrent Objects", In *Proceedings of the European Conference on Object-Oriented Programming* (Oslo, Norway, June 2004), 519–542.

FACULTY

Elias N. Houstis

Professor Emeritus of Computer Science (1984)

Education:
BS, Mathematics, University of Athens (1969)
PhD, Mathematics, Purdue University (1974)

Academic biography
Professor Elias Houstis' research interests are in the areas of problem solving environments (PSEs), parallel computation, performance evaluation and modeling, computational intelligence, computational finance, and on-line learning. He is one of the principal designers of several domain specific PSEs (i.e., Parallel ELLPACK, PDELab) and numerous performance evaluation studies of PDE software and parallel architectures. Houstis has been involved in the design of a knowledge-based framework (known as PYTHIA) to support the selection of algorithm and machine pairs for a given class of PDE problems based on performance knowledge. He has published several books and over 120 technical articles. He has supervised 14 PhD students and several MS students. His research has been supported by the Air Force Office of Scientific Research, the Army Research Office, DARPA, DOE, ESPRIT, INTEL, IBM, AT&T, Kozo-Japan, Purdue University, the National Science Foundation, and the Greek Research Foundation.

Suresh Jagannathan

Associate Professor of Computer Science (2002)
Associate Professor of Electrical and Computer Engineering (courtesy)

Education:
BS, Computer Science, State University of New York at Stony Brook (1982)
MS, Electrical Engineering and Computer Science, Massachusetts Institute of Technology (1985)
PhD, Electrical Engineering and Computer Science, Massachusetts Institute of Technology (1989)

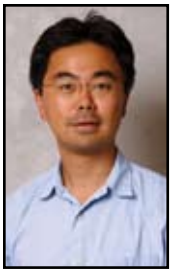
Academic biography
Professor Jagannathan is interested in the semantics and implementation of high-level programming languages. His work focuses on formal methods for describing and implementing such languages, e.g., type theory, program analysis, abstract interpretation, etc., as well as compiler and runtime techniques that leverage such analyses. He also has an active interest in the specification and implementation of concurrent and distributed systems. One aspect of this research studies the semantics and implementation of lightweight transactional abstractions as an alternative to lock-based synchronization for expressing scalable concurrent applications.
His current research explores new software engineering techniques to infer salient behavioral properties of programs, using a combination of both static and dynamic mining strategies. The applicability of this work lies in improved error detection, test case generation, code quality and maintenance, and security.

Selected publications

Adam Welc, Antony Hosking, and Suresh Jagannathan, "Transparently Reconciling Locks with Transactions for Java Synchronization", European Conference on Object-Oriented Programming (2006).

Lukasz Ziarek, Philip Schatz, and Suresh Jagannathan, "Stabilizers: A Modular Checkpointing Abstraction for Concurrent Functional Programs", ACM International Conference on Functional Programming (2006).

Muralikrishna Ramanathan, Ananth Grama, and Suresh Jagannathan, "Sieve: A Tool for Automatically Detecting Variations Across Program Versions", IEEE/ACM International Conference on Automated Software Engineering (2006).



Daisuke Kihara

Assistant Professor of Computer Science (2003)
Assistant Professor of Biological Sciences

Education:

BS, Biochemistry, University of Tokyo (1994)
MS, Bioinformatics, Kyoto University (1996)
PhD, Bioinformatics, Kyoto University (1999)

Academic biography

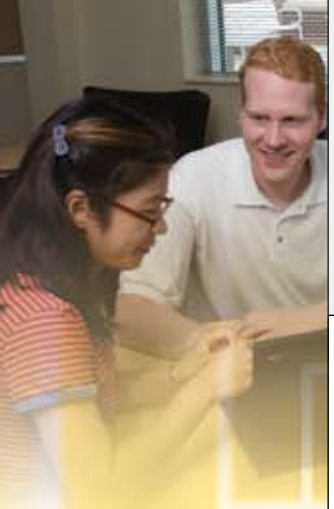
Kihara's research interest is in the area of bioinformatics. In the last decade, a large amount of biological data, such as genome/protein sequences, protein 3-D structures, and pathway data have become available. This data now enables us to employ comprehensive analysis of the relationship between protein sequence, structure and function, evolution of protein families, pathways, and organisms. Especially, he is focusing on developing computational methods to predict and analyze protein structure/function, pathway structure, and their applications in genome-scale or pathway/network scale. He has worked recently on protein structure prediction, protein global/local shape comparison, development of prediction method of transmembrane proteins, and its application to genome sequences.

Selected publications

Troy Hawkins, Stan Luban and Daisuke Kihara, "Enhanced automated function prediction using distantly related sequences and contextual association by PFP", *Protein Science*, Volume 15, 1550–1556, 2006.

Yen Hock Tan, He Huang, Daisuke Kihara, "Statistical potential-based amino acid similarity matrices for aligning distantly related protein sequences", *Proteins: Structure, Function, Bioinformatics*, Volume 64: pp. 587–600, 2006.

Daisuke Kihara, "On the effect of long-range interactions on the secondary structure formation of proteins", *Proteins Science*, Volume 14 pp. 1955–1963, 2005.



Ninghui Li

Assistant Professor of Computer Science (2003)

Education:

BS, Computer Science, University of Science and Technology of China (1993)
MS, Computer Science, New York University (1998)
PhD, Computer Science, New York University (2000)

Academic biography

Professor Ninghui Li's research interests are in computer security and applied cryptography. He has worked extensively on trust management and automated trust negotiation, which are approaches to access control in decentralized, open, and distributed systems. His research focuses on role-based access control, online privacy protection, access control policy specification and analysis, and operating system access control. He has graduated two PhD students and is currently supervising six PhD students. His research is currently supported by three NSF projects and a project funded by IBM. In 2005, he was awarded the NSF CAREER award.

Before joining Purdue, he was a research associate in the computer science department of Stanford University. He has served on the program committees of more than two dozen conferences and workshops in information security, including the IEEE Symposium on Security and Privacy, ACM Conference on Computer and Communications Security (CCS), ISOC Network and Distributed System Security Symposium (NDSS), International Conference on Data Engineering, ACM Symposium on Access Control Models and Technologies (SACMAT), and IEEE Computer Security Foundations Workshop (CSFW).

Selected publications

Ninghui Li, Ziad Bizri, and Mahesh V. Tripunitara, "On Mutually-Exclusive Roles and Separation of Duty", *Proceedings of the ACM Conference on Computer and Communications Security (CCS)*, October 2004.

Ninghui Li, John C. Mitchell, and William H. Winsborough, "Beyond Proof-of-compliance: Security Analysis in Trust Management", *Journal of the ACM*, 52(3):474–514, May 2005.

Ninghui Li, John C. Mitchell, and William H. Winsborough, "Design of A Role-based Trust-management Framework", *Proceedings of the 2002 IEEE Symposium on Security and Privacy*, May 2002.

Zhiyuan Li

Professor of Computer Science (1997)
Professor of Electrical and Computer Engineering (courtesy)

Education:

BS, Mathematics, Xiamen University (1982)
MS, Computer Sciences, University of Illinois at Urbana-Champaign (1985)
PhD, Computer Sciences, University of Illinois at Urbana-Champaign (1989)

Academic biography

Zhiyuan Li has led a group to design and implement an interprocedural parallelizing Fortran compiler, called Panorama, which performs highly efficient array data flow analysis to enable aggressive loop parallelization and locality-enhancement program transformations. His group also designs and implements compiler-based programming environments and run-time systems for mobile computing on handheld devices.

Li received a National Science Foundation Research Initiation Award and a National Science Foundation Career Award in 1992 and 1995, respectively. In 1998, he co-edited, with P. C. Yew, a special issue on compilers and languages for parallel and distributed computers for IEEE Transaction on Parallel and Distributed Systems and two special issues on compilers and languages for parallel computing for the *International Journal on Parallel Programming*. Li, with professor P. C. Yew, co-chaired the 10th International Workshop on Languages and Compilers for Parallel Computing in 1997. He has served as a program committee member for several international conferences, including IEEE International Parallel and Distributed Processing Symposium (IPDPS), ACM International Conference on Supercomputing, International Conference on Parallel Processing, and ACM SIGPLAN Symposium on Languages, Compilers, and Tools for Embedded Systems (LCTES).

Selected publications

Junjie Gu and Zhiyuan Li, "Efficient Interprocedural Array Data-flow Analysis for Automatic Program Parallelization", *IEEE Transactions on Software Engineering, Special Issue on Architecture-Independent Languages and Software Tools for Parallel Processing*, Volume 26, No. 3, pp. 244–26, March 2000.

Cheng Wang and Zhiyuan Li, "Parametric Analysis For Adaptive Computation Offloading", *Proceedings of the ACM SIGPLAN 2004 Conference on Programming Language Design and Implementation (PLDI)*, pp. 119–130, Washington, DC, June 9–11, 2004.

Cheng Wang and Zhiyuan Li, "A Compiler Scheme For Computation Offloading on Wireless-Networked Handheld Devices", *Journal of Parallel and Distributed Computing*, Volume 64, No. 6, pp. 740–746, June, 2004.

Bradley J. Lucier

Professor of Mathematics (1981)
Professor of Computer Science (1981)

Education:

BSc (Honours), Mathematics, University of Windsor (1976)
SM, Applied Mathematics, University of Chicago (1978)
PhD, Applied Mathematics, University of Chicago (1981)

Academic biography

Professor Lucier has worked for over fifteen years on wavelet and multi-resolution methods for image processing and other applications. He has a particular interest in applications in medical imaging (image compression for telemedicine, tomographic and MRI reconstruction, etc.).
The selected publications below indicate some of these interests. The first paper relates variational problems to wavelet shrinkage. The second paper introduces several results about wavelet methods for medical tomography, especially for Positron Emission Tomography (PET) imaging. The third paper is a study of radiologist performance in interpreting wavelet-compressed mammographic

images. The compression method was designed specifically to keep image features that are needed to interpret mammograms.

Selected publications

Antonin Chambolle, Ronald A. DeVore, Namyong Lee, and Bradley J. Lucier, "Nonlinear Wavelet Image Processing: Variational Problems, Compression, and Noise Removal through Wavelet Shrinkage", *IEEE Transactions on Image Processing: Special Issue on Partial Differential Equations and Geometry-Driven Diffusion in Image Processing and Analysis*, 7(3):319–335, 1998.

Namyong Lee and Bradley J. Lucier, "Wavelet Methods for Inverting the Radon Transform with Noisy Data", *IEEE Transactions on Image Processing*, 10(1):79–94, 2001.

Maria Kallergi, Bradley J. Lucier, Claudia G. Berman, Maria R. Hersh, J. Kim Jihai, Margaret S. Szabunio, and Robert A. Clark, "High-performance wavelet compression for mammography: localization response operating characteristic evaluation", *Radiology*, 238(1):62–73, 2006.

Robert E. Lynch

Professor Emeritus of Computer Science and Mathematics (1967)

Education:

BS, Engineering Physics, Cornell University (1954)
MA, Mathematics, Harvard University (1961)
PhD, Applied Mathematics, Harvard University (1963)

Academic biography

Professor Lynch has held positions at Brookhaven National Laboratory, Los Alamos Laboratories, Wright-Patterson Air Force Base, the University of Texas, and General Motors Research Laboratories. Areas of his research include differential equations, linear algebra, software for solving elliptic partial differential equations, and computational biology. He and G. Birkhoff have written the monograph *Numerical Solutions of Elliptic Problems*, SIAM Publications, 1985.

Aditya P. Mathur

Professor of Computer Science (1987)
Associate Dean, Graduate Education, College of Science

Education:

BE, Electrical Engineering, Birla Institute of Technology and Science (1970)
MS, Electrical Engineering, Birla Institute of Technology and Science (1972)
PhD, Computer Science, Birla Institute of Technology and Science (1977)

Academic biography

Professor Aditya Mathur conducts research in the areas of software testing, reliability, and formal approaches for software process control. Mathur has been a crusader for the use of code coverage criteria in the estimation of software reliability or as an orthogonal metric to assess confidence

in the reliability estimates. He has proposed the "Saturation Effect" as a motivating device for quantitative test assessment using an increasingly powerful suite of criteria. This device is often used by vendors to enhance marketing of their test tools. Mathur, in collaboration with Raymond DeCarlo, has pioneered research into the use of feedback control in software development.

Selected publications

Joao Cangussu, Raymond DeCarlo, and Aditya P. Mathur, "A Formal Model of the Software Test Process", *IEEE Transactions on Software Engineering*, Volume 28, No. 8, pp. 782–796, August 2002.

Aditya P. Mathur, Baskar Sridharan, and Steven G. Unger, "Digital Device Manuals for the Management of Connected Spaces", *IEEE Communications Magazine*, Volume 40, No. 8, pp. 78–85, August 2002.

Joao Cangussu, Raymond DeCarlo, and Aditya P. Mathur, "Using Sensitivity Analysis to validate a State Variable Model of the Software Test Process", *IEEE Transactions on Software Engineering*, Volume 29, No. 5, pp. 430–443, 2003.

Jennifer Neville

Assistant Professor of Computer Science (2006)
Assistant Professor of Statistics (2006)

Education:

BS, Computer Science, University of Massachusetts Amherst (2000)
MS, Computer Science, University of Massachusetts Amherst (2004)
PhD, Computer Science, University of Massachusetts Amherst (2006)

Academic biography

Professor Neville's research focuses on data mining and machine learning techniques for relational data. In relational domains such as bioinformatics, citation analysis, epidemiology, fraud detection, and web analytics, there is often limited information about any one entity in isolation, instead it is the connections among entities that are of crucial importance to pattern discovery. Relational data mining techniques move beyond the conventional analysis of entities in isolation to analyze networks of interconnected entities, exploiting the connections among entities to improve both descriptive and predictive models. Professor Neville's research interests lie in the development and analysis of relational learning algorithms and the application of those algorithms to real-world tasks.

Selected publications

Neville, J. and D. Jensen, "Relational Dependency Networks", *Journal of Machine Learning Research*, to appear 2006.

Neville, J. and D. Jensen, "Leveraging Relational Autocorrelation with Latent Group Models", *Proceedings of the Fifth IEEE International Conference on Data Mining* (2005), pp 322–329.

Neville, J., O. Simsek, D. Jensen, J. Komoroske, K. Palmer and H. Goldberg, "Using Relational Knowledge Discovery to Prevent Securities Fraud", *Proceedings of the 11th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining* (2005), pp 449–458.

Cristina Nita-Rotaru

Assistant Professor of Computer Science (2003)

Education:

BS, Computer Science, Politehnica University of Bucharest (1995)
MS, Computer Science, Politehnica University of Bucharest (1996)
MSE, Computer Science, The Johns Hopkins University (2000)
PhD, Computer Science, The Johns Hopkins University (2003)

Academic biography

Professor Cristina Nita-Rotaru joined Purdue in 2003, where she conducts her research within the Dependable and Secure Distributed Systems Laboratory (DS^2). Her research interests lie in designing distributed systems and network protocols and applications that are dependable and secure, while maintaining acceptable levels of performance. Her current research focuses on designing intrusion-tolerant architectures for distributed services that scale to wide-area networks, investigating survivable routing in wireless ad hoc networks, and providing access control mechanisms for secure group communication.

Her work is funded by the Center for Education and Research in Information Security and Assurance (CERIAS), the Defense Advanced Research Projects Agency (DARPA), and the National Science Foundation (NSF).

Selected publications

Yair Amir, Yongdae Kim, Cristina Nita-Rotaru, John Schultz, Jonathan Stanton, and Gene Tsudik, "Secure Group Communication Using Robust Contributory Key Agreement", *IEEE Transactions on Parallel and Distributed Systems* (TPDS), vol. 15, no. 5, pp. 468–480, May 2004.

Yair Amir, Yongdae Kim, Cristina Nita-Rotaru, and Gene Tsudik, "On the Performance of Group Key Agreement Protocols", *ACM Transactions on Information Systems Security (TISSEC)*, vol. 7, no. 3, August 2004.

Yair Amir, Cristina Nita-Rotaru, Jonathan Stanton and Gene Tzudik, "Secure Spread: An Integrated Architecture for Secure Group Communication", In *IEEE Transactions on Dependable and Secure Computing (TDSC)*, vol. 2, no. 3, 2005.

Gopal Pandurangan

Assistant Professor of Computer Science (2002)

Education:

BTech, Computer Science, Indian Institute of Technology at Madras (1994)
MS, Computer Science, State University of New York at Albany (1997)
PhD, Computer Science, Brown University (2002)

Academic biography

Professor Pandurangan's research interests are in theoretical computer science and design and analysis of algorithms. In particular, he is interested in randomized algorithms, probabilistic analysis of algorithms, dynamic computer processes, and theory and algorithms for real-world networks.

Professor Pandurangan is especially interested in algorithmic and modeling problems that arise in the following application areas: communication networks (especially ad hoc and sensor networks), computational biology and bioinformatics, and Web and Internet algorithms.

Selected publications

C. Bailey-Kellog, S. Chainraj, and G. Pandurangan, "A Random Graph Approach to NMR Sequential Assignment", *Journal of Computational Biology*, Volume 12, No. 6–7, pp. 569–583, 2005.

S. Muthukrishnan and G. Pandurangan, "The Bin-Covering Technique for Thresholding Random Geometric Graph Properties", *Proceedings of the ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2005.

G. Pandurangan, P. Raghavan, and E. Upfal, "Building Low-Diameter Peer-to-Peer Networks", *IEEE Journal on Selected Areas in Communications (JSAC)*, Volume 21, No. 6, pp. 995–1002, 2003.

Kihong Park

Associate Professor of Computer Science (1996)

Education:

BA, Management, Seoul National University (1988)
MS, Computer Science, University of South Carolina (1990)
PhD, Computer Science, Boston University (1996)

Academic biography

Professor Park's research centers on design and control issues in high-speed multimedia networks including deployable IP QoS, scalable network security, and robust distributed systems. He has published in major networking venues including ACM SIGCOMM, ACM SIGMETRICS, IEEE ICNP, and IEEE INFOCOM, and has edited two books *Self-Similar Network Traffic and Performance Evaluation* (Wiley-Interscience 2000) and *The Internet as a Large-Scale Complex System* (Oxford University Press 2005) with Walter Willinger at AT&T Research. His doctoral thesis, "Ergodicity and mixing rate of one-dimensional cellular automata" (advisor, Peter Gacs), was on a problem in probability theory going back to von Neumann, with applications to fault-tolerance in large-scale systems.

Professor Park was a Presidential University Fellow at Boston University, a recipient of the NSF CAREER Award, a Fellow-at-Large of the Santa Fe Institute, and has served on several international program committees and government panels. He was chair of the NSF/SFI Workshop, The Internet as a Large-Scale Complex System, held at the Santa Fe Institute in March 2001. He served on the editorial boards of *IEEE Communications Letters and Computer Networks*. His research has been supported by grants from government and industry including the Army, DARPA, ETRI, Intel, NSF, SFI, Sprint, and Xerox.

Selected publications

S. Choi, K. Park and C. Kim, "On the Performance Characteristics of WLANs: Revisited", Proceedings of the *ACM SIGMETRICS 2005*, pp. 97–108, 2005.

A. Lomonosov, M. Sitharam and K. Park, "Network QoS Games: Stability vs. Optimality Tradeoff", *Journal of Computer and System Sciences*, Volume 69, pp. 281–302, 2004.

K. Park and W. Willinger (eds.), "The Internet as a Large-Scale Complex System", *SFI Studies in the Sciences of Complexity*, Oxford University Press, 2005.

Voicu S. Popescu

Assistant Professor of Computer Science (2001)

Education:
BS, Computer Science, University of Cluj-Napoca, Romania (1995)
MS, Computer Science, University of North Carolina (1999)
PhD, Computer Science, University of North Carolina (2001)

Academic biography

Professor Popescu's research field is computer graphics, focusing on image-based modeling and rendering and on graphics architectures. He and his collaborators have built a low-cost, hand-held device for creating 3-D models of complex real-world scenes. The device consists of a video camera and 16 laser pointers that provide reference markings for the scene being scanned. The model is created dynamically during scanning, allowing the operator to control the model creation for greater accuracy and completeness.

Another project uses "reflection morphing" to render 3-D reflectors, such as spheres and cylinders, in real-time. The technique uses a pre-processing phase that ray-traces the reflectors from a sparse set of views, then interpolates the datastructure at runtime to generate intermediate views.

Selected publications

Voicu Popescu and Anselmo Lastra, "The Vacuum Buffer", *Proceedings of the 2001 ACM Symposium on Interactive 3D Graphics* (Chapel Hill, NC), 2001.

Voicu Popescu, John Eyles, Anselmo Lastra, Joshua Steinhurst, Nick England, and Lars Nyland, "The WarpEngine: An Architecture for the Post-Polygonal Age", *Proceedings of the SIGGRAPH 2000* (New Orleans, La), pp. 433–442, July 23–28, 2000.

Voicu S. Popescu, Anselmo A. Lastra, Daniel G. Aliaga, and Manuel de Oliveira Neto, "Efficient Warping for Architectural Walkthroughs using Layered Depth Images", *Proceedings of the IEEE Visualization 1998*, pp. 211–215, Oct 18–23, 1998.

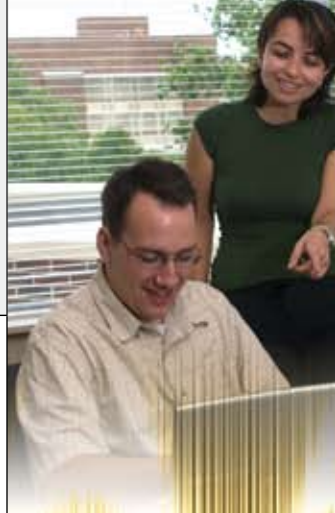
Sunil Prabhakar

Associate Professor of Computer Science (1998)

Education:
BTech, Electrical Engineering, Indian Institute of Technology (1990)
MS, Computer Science, University of California (1998)
PhD, Computer Science, University of California (1998)

Academic biography

Professor Prabhakar's research focuses on performance and privacy issues in large-scale, modern database applications such as multimedia, moving-object, and sensor databases. The efficient execution of I/O is a critical problem for these applications. The scope of this research ranges from main memory to disks and tertiary storage devices. Sensor and moving object applications are also faced with the need to process large volumes of data in an online manner. The current research effort addresses efficient continuous query evaluation and novel techniques for managing



the inherent lack of accuracy for these applications. Prabhakar's interest also lies in the design and development of private databases and digital watermarking techniques for structured (e.g. relational databases) and semi-structured (e.g., XML) data. He is also working on developing advanced databases for biological data. His current focus is on developing a transparent and reliable protein function database. Before joining Purdue, Prabhakar held a position with Tata Unisys Ltd. from 1990 to 1994.

Selected publications

Yicheng Tu Song Liu, Sunil Prabhakar, Bin Yao, "Load Shedding in Stream Databases: A Control-Based Approach", *Proceedings of the International Conference on Very Large Databases (VLDB)*, September 2006, Seoul, Korea.

R. Sion, M. J. Atallah, and Sunil Prabhakar, "Rights Protection for Discrete Numeric Streams", *IEEE Transactions on Knowledge and Data Engineering*, Vol. 18, No. 5, May 2006.

Reynold Cheng Ben Kao, Sunil Prabhakar Alan Kwan, Yicheng Tu, "Adaptive Stream Filters for Entity-based Queries with Non-Value Tolerance", *Proceedings of the International Conference on Very Large Databases* (VLDB), September 2005, Trondheim, Norway. pp. 37–48.

Vernon J. Rego

Professor of Computer Science (1985)

Education:

MSc, Mathematics, Birla Institute of Technology and Science (1979)
MS, Computer Science, Michigan State University (1982)
PhD, Computer Science, Michigan State University (1985)

Academic biography

Professor Vernon Rego directs research in the Parallel Computation and Simulation Laboratory (PacsLab) in Purdue's computer science department. His research interests include software systems for high-performance distributed computation, network protocols, threads systems, parallel stochastic simulation, computational probability and performance, and software engineering. His current projects include the ACES software architecture for multi-threaded distributed computing and parallel simulation, including the EcliPSe replicated simulation system (for which he was awarded an IEEE/Gordon Bell Prize), the ParaSol process-oriented distributed simulation system, the Ariadne threads system, and the CLAM protocol suite. He was also awarded a German Research Council Award for Computer Networking Research. He has been an invited researcher at the Oak Ridge National Laboratories and an ACM National Lecturer. He is an editor of the *IEEE Transactions on Computers* and an advisory board member of The DoD Advanced Distributed Simulation Research Consortium.

John R. Rice

W. Brooks Fortune Distinguished Professor Emeritus of Computer Science (1964)
Professor of Mathematics (courtesy)

Education:
BS, Mathematics, Oklahoma State University (1954)
MS, Mathematics, Oklahoma State University (1956)
PhD, Mathematics, California Institute of Technology (1959)

Academic biography
Professor Rice is founder of the ACM Transactions on Mathematical Software, he is the past chair of the CRA, a fellow of AAAS and ACM, and a member of the National Academy of Engineering. For the past 25 years, Professor Rice has been analyzing numerical methods and problem solving environments for scientific computing. He has created a general methodology for performance evaluation of mathematical software and developed the ELLPACK system for elliptic problems. It is now being extended to Parallel ELLPACK and PDELab. Professor Rice has published 21 books. Among recent ones are *Solving Elliptic Problems with ELLPACK* (Springer-Verlag, 1985), *Mathematical Aspects of Scientific Software* (Springer-Verlag, 1988), *Expert Systems for Scientific Computing* (North Holland, 1992), and *Enabling Technologies for Computational Science* (Kluwer, 2000). He also has published about 300 scientific articles. Professor Rice also has extensive funding from Wright Patterson Air Force Base, the SBIR Program, and the State of Indiana.

Elisha Sacks

Professor of Computer Science (1994)

Education:
BS, Computer Science, Carnegie-Mellon University (1982)
SM, Computer Science, Massachusetts Institute of Technology (1985)
PhD, Computer Science, Massachusetts Institute of Technology (1988)

Academic biography
Professor Sacks' research area is geometric reasoning in science and engineering. His current projects are robust computational geometry, model acquisition for computer graphics, generalized camera models, and robot path planning. He has also researched mechanical design algorithms using configuration spaces. The research led to practical design software for kinematic analysis, simulation, tolerancing, and parametric design of mechanical systems with higher pairs and changing contact topologies. The software has been used at Ford Motors for transmission design and at Sandia National Laboratory for micro-mechanism design.

Selected publications
Victor Milenkovic and Elisha Sacks, "An Approximate Arrangement Algorithm for Semi-Algebraic Curves", *International Journal of Computational Geometry and Applications*, 2006, In press.

Min-Ho Kyung and Elisha Sacks, "Robust Parameter Synthesis for Planar Higher Pair Mechanical Systems", *Computer-Aided Design* 38(5), 2006.

Chunhui Mei, Voicu Popescu, and Elisha Sacks, "The Occlusion Camera", *Computer Graphics Forum* 24(3), 2005.

Ahmed Sameh

Samuel D. Conte Professor of Computer Science (1997)

Education:
PhD, University of Illinois at Urbana-Champaign (1968)

Academic biography

Ahmed Sameh is the Samuel D. Conte Professor of Computer Science. His current research interests include numerical linear algebra and the design and performance analysis of parallel numerical algorithms needed in various science and engineering applications. He has served on the editorial boards of: *IEEE Transactions on Computers*, *Computing*, *SIAM Journal on Scientific and Statistical Computing*, *Parallel Computing*, *Journal of Parallel and Distributed Computing*, *Computer Physics Communications*, *International Journal of High Speed Computing*, *Numerical Linear Algebra with Applications*, *IEEE Computing in Science and Engineering*, and *International Journal of Parallel Programming*.

He joined Purdue in 1997 as head of the Department of Computer Science, after being head of computer science at the University of Minnesota, Minneapolis, and the holder of the William Norris Chair for Large-Scale Computing. He was also a faculty member in the Department of Computer Science at the University of Illinois at Urbana-Champaign. While at Illinois, he served as an associate director and director of the Center for Supercomputing Research and Development (CSRD).
He is a Fellow of ACM, IEEE, and AAAS, and a member of SIAM. He received the IEEE 1999 Harry Goode Award for "seminal and influential work in parallel numerical algorithms."

Selected publications

S. Kilic, F. Saied, and A. Sameh, "Efficient iterative solvers for structural dynamics problems", *Computers & Structures*, Volume 82, No. 28, pp. 2363–2375, 2004.

A. Baggag and A. Sameh, "A nested iterative scheme for indefinite linear systems in particulate flows", *Computer Methods in Applied Mechanics and Engineering*, Vol 193, pp. 1923–1957, 2004.

S. Sambavaram, V. Sarin, A. Sameh, and A. Grama, "Multipole-Based Preconditioners for Large Sparse Linear Systems", *Parallel Computing*, Volume 29, No. 9, pp. 1261–1273, September 2003.

Luo Si

Assistant Professor of Computer Science (2006)

Education:
PhD, Language and Information Technologies, Carnegie Mellon University (2006)
MS, Computer Science and Technology, Tsinghua University (2000)
BS, Computer Science and Technology, Tsinghua University (1998)

Academic biography

Professor Si's research spans a range of topics in information retrieval, machine learning, text mining, speech and multimedia processing, and data mining. His recent research focuses on

federated search (distributed information retrieval), probabilistic models for information filtering, and text/data mining for life science. Professor Si has designed systems with his colleagues and acquired good results in evaluation campaigns such as TREC (Text Retrieval Conference) and CLEF (Cross-Lingual Evaluations Forum). He has published more than 35 conference, journal, and workshop papers.

Selected publications

Luo Si and Jamie Callan, "Modeling Search Engine Effectiveness for Federated Search", In *Proceedings of the Twenty-Seventh Annual International ACM SIGIR Conference on Research and Development in Information Retrieval*, 2005, ACM.

Rong Jin, Luo Si, Cheng Xiang Zhai, "A Study of Mixture Models for Collaborative Filtering", *Journal of Information Retrieval*, 2006.

Luo Si and Jamie Callan, "A Semi-Supervised Learning Method to Merge Search Engine Results", In *ACM Transactions on Information Systems*, 24(4), 2003 ACM.

Robert D. Skeel

Professor of Computer Science (2004)
Professor of Mathematics (courtesy)

Education:

BSc, (Honours) Applied Mathematics, University of Alberta (1969)
MS, Mathematics, University of Toronto (1970)
PhD, Computing Science, University of Alberta (1974)

Academic biography

Professor Skeel's research interest is in computational methods for biomolecular simulation, which seeks to aid in the discovery of the structures and mechanisms that are basic to life. Such simulations are very demanding computationally, running for days, weeks, and even months on parallel computers. Current research of Professor Skeel embraces three challenges: (1) the N-body problem for calculating nonbonded interactions as well as dense matrix "inversion" for dipole moments and implicit solvent, (2) the problem of doing dynamics simulations on biological time scales, and (3) the problem of calculating of free energy differences and transition paths in very high dimensional configuration space. Professor Skeel has previously taught full time at the University of Illinois where he initiated the development of the scalable parallel molecular dynamics program NAMD. Professor Skeel has, with Jerry Keiper, co-authored a textbook *Elementary Numerical Computing with Mathematica*.

Selected publications

G. Zou and R.D. Skeel, "Robust biased Brownian dynamics for rate constant calculation", *Biophys. J.* 85, pp. 2147–2157, 2003.

W. Wang and R. D. Skeel, "Fast Evaluation of Polarizable Forces", *J. Chem. Phys.*, 123, 164107 (12 pages), 2005.

J.C. Phillips, R. Braun, W. Wang, J. Gumbart, E. Tajkhorshid, E. Villa, C. Chipot, R.D. Skeel, L. Kale, and K. Schulten, "Scalable molecular dynamics with NAMD", *J. Comput. Chem* 26, 2005, 1781–1802.

Eugene H. Spafford

Professor of Computer Science (1987)
Professor of Electrical and Computer Engineering
Professor of Communication (courtesy)
Professor of Philosophy (courtesy)
Executive Director, Purdue CERIAS

Education:

BA, Mathematics and Computer Science, State University of New York at Brockport (1979)
MS, Information and Computer Science, Georgia Institute of Technology (1981)
PhD, Information and Computer Science, Georgia Institute of Technology (1986)
DSc (honorary), State University of NY (SUNY) (2005)

Academic biography

Professor Spafford's research interests are focused on issues of computer and network security, cybercrime and ethics, the social impact of computing, and public policy. He is the founder and executive director of the Center for Education and Research in Information Assurance and Security (CERIAS). This university-wide institute addresses the broader issues in information security and information assurance, and draws on expertise from all of the academic disciplines at Purdue. Professor Spafford has received recognition and many honors for his research, including being named as a Fellow of the ACM, of the AAAS, and of the IEEE. He has received almost every major award in the field of information security for his accomplishments as a researcher and technical leader. Additionally, Professor Spafford has been honored for his education efforts, including receiving all three of Purdue's highest honors for teaching. He has also received major awards from organizations including the NCISSE and the IEEE for his leadership infosec education.

Among many professional activities, Spafford is a member of the Computing Research Association's Board of Directors and chair of ACM's U.S. Public Policy Committee. He is the academic editor of the journal *Computers & Security*.

Selected publications

Rajeev Gopalakrishna, Eugene H. Spafford, and Jan Vitek, "Efficient Intrusion Detection Using Automaton Inlining", *Proceedings of the IEEE Symposium on Security & Privacy*, Oakland, CA; pp. 18–31; May 2005.

Paul D. Williams and Eugene H. Spafford, "CuPIDS Enhances StUPIDS: Exploring a Coprocessing Paradigm Shift in Information System Security", *Proceedings of the IEEE Workshop on Information Assurance and Security*, West Point, NY; June 2005.

X. Jiang, A. Walters, F. Buchholz, D. Xu, Y. Wang, and E. H. Spafford, "Provenance-Aware Tracing of Worm Break-ins and Contaminations: A Process Coloring Approach", *Proceedings of the IEEE International Conference on Distributed Computing Systems* (ICDCS 2006), Lisbon, Portugal, July 2006.

John M. Steele

Associate Professor Emeritus of Computer Science (1963)

Academic biography

John Steele's research interests are in the areas of computer data communications and computer circuits and systems.

Yinlong Sun

Assistant Professor of Computer Science (2001)

Education:

BS, Physics, Beijing University (1985)
PhD, Physics, Simon Fraser University (1996)
PhD, Computer Science, Simon Fraser University (2000)

Academic biography

Professor Yinlong Sun's research interests lie in computer graphics, scientific visualization, biomedical imaging, computational neuroscience, and cross-disciplinary topics. The research projects include spectral modeling, simulation of iridescences, physical-based illumination, BRDF representation, vector visualization, cellular visualization, cortical surface analysis, and neuroimaging. A particular focus is on combining analytical, numerical, and experimental techniques to solve complex, cross-disciplinary problems. He has established a Computational Imaging Research Lab (CIRL) with principal missions to bridge computational sciences and physical sciences and engineering and to develop effective imaging and visualization tools to assist scientific research and discoveries. He is also associated with the Computer Graphics and Visualization Lab. He is a member of ACM, IEEE, and IS&T.

Selected publications

Yinlong Sun, Bartek Rajwa, and J. Paul Robinson, "Adaptive Image-Processing Technique and Effective Visualization of Confocal Microscopy Images", *Microscopy Research and Techniques*, Volume 64, pp. 156–163, 2004.

Yinlong Sun, "Self Shadowing and Local Illumination of Randomly Rough Surfaces", *Proceedings of the Computer Vision and Pattern Recognition* (CVPR), pp. 158–165, 2004.

Yinlong Sun, F. David Fracchia, Mark S. Drew, and Thomas W. Calvert, "A Spectrally Based Framework for Realistic Image Synthesis", *The Visual Computer* Volume 17, No. 7, pp. 429–444, 2001.

Wojciech Szpankowski

Professor of Computer Science (1985)
Professor of Electrical and Computer Engineering (courtesy)

Education:

MS, Electrical Engineering and Computer Science, Technical University of Gdansk (1970)
PhD, Electrical Engineering and Computer Science, Technical University of Gdansk (1980)

Academic biography

Before coming to Purdue, Wojciech Szpankowski was assistant professor at the Technical University of Gdansk, and in 1984 he was assistant professor at the McGill University, Montreal. During 1992–93, he was professeur invité at INRIA, Rocquencourt, France. His research interests cover analysis of algorithms, data compression, information theory, analytic combinatorics, random structures, networking, stability problems in distributed systems, modeling of computer systems and computer communication networks, queueing theory, and operations research. His

recent work is devoted to the probabilistic analysis of algorithms on words, analytic information theory, and designing efficient multimedia data compression schemes based on approximate pattern matching.

He is a recipient of the Humboldt Fellowship. He has been a guest editor for special issues in *IEEE Transactions* on Automatic Control, Theoretical Computer Science, Random Structures & Algorithms, and Algorithmica. Currently, he is editing a special issue on "Analysis of Algorithms" in *Algorithmica*. He serves on the editorial boards of *Theoretical Computer Science*, *Discrete Mathematics and Theoretical Computer Science*, and the book series *Advances in the Theory of Computation and Computational Mathematics*.

Selected publications

P. Jacquet and W. Szpankowski, "A Combinatorial Problem Arising in Information Theory: Precise Minimax Redundancy for Markov Sources", *Proceedings of the 2nd Colloquium on Mathematics and Computer Science: Algorithms, Trees, Combinatorics and Probabilities*, pp. 311–328, Birkhauser, 2002.

P. Flajolet and W. Szpankowski, "Analytic Variations on Redundancy Rates of Renewal Processes", *IEEE Transactions on Information Theory*, Volume 48, pp. 2911–2921, 2002.

C. Knessl and W. Szpankowski, "Height of a Binary Search Tree: The Limiting Distribution Perspective", *Theoretical Computer Science*, Volume 289, pp. 649–703, 2002.

Jan Vitek

Associate Professor of Computer Science (1999)

Education:

BS, Computer Science, University of Geneva (1989)
MS, Computer Science, University of Victoria (1995)
PhD, Computer Science, University of Geneva (1999)

Academic biography

Professor Vitek works in foundations and implementation of programming languages and has an interest in program analysis, real time systems, object-oriented software engineering, and information security. He is leading the Open Virtual Machines project to develop a framework for configurable and secure virtual machines for object-oriented languages. This research is being conducted in the Secure Software Systems (S3) Lab founded in early 2000 by Professors Vitek, Hosking, and Palsberg. Vitek was born in Czechoslovakia and educated in Switzerland. He has authored more than 30 papers and edited books on mobile objects and secure Internet programming. He served on program committees for international conferences such as PLDI, OOPSLA, ECOOP, POPL, ESOP, ICALP, and SACMAT.

Selected publications

T. Zhao, J. Palsberg, J. Vitek, "Type-based Confinement", *Journal of Functional Programming*, 2006.

A. Armbuster, J. Baker, A. Cunei, C. Flack, D.Holmes, F.Pizlo, E. Pla, M. Prochazka, J. Vitek, "A Real-Time Java Virtual Machine with Applications in Avionics", *ACM Transactions on Embedded Systems*, 2006.

C. Andrea, Y. Coady, C. Gibbs, J. Noble, J. Vitek, T. Zhao, "Scoped Types and Aspects for Real-Time Systems", *Proceedings of the European Conference on Object Oriented Programming (ECOOP)*, 2006.

Olga Vitek

Assistant Professor of Computer Science (2006)
Assistant Professor of Statistics

Education:
BSc, Econometrics and Statistics, University of Geneva (1995)
MSc, Econometrics and Statistics, University of Geneva (1997)
MSc, Mathematical Statistics, Purdue University (2001)
PhD, Statistics, Purdue University (2005)

Academic biography
Olga Vitek's research interests are in statistical and computational methods for high-dimensional molecular biology, in particular for mass spectrometry-based proteomics. Methodological aspects of her work include Bayesian modeling, statistical computing, and experimental design. Before joining the Purdue faculty, she was a post-doctoral fellow in the Aebersold Lab at the Institute for Systems Biology in Seattle.

Jeffrey S. Vitter

Frederick L. Hovde Dean of the College of Science (2002)
Professor of Computer Science (2002)

Education:
BS with highest honors, Mathematics, University of Notre Dame (1977)
PhD, Computer Science, Stanford University (1980)
MBA, Duke University (2002)

Academic biography
Professor Vitter's research investigates how to manage and process very large amounts of data. He helped pioneer the field of external memory algorithms. His work melds theory and practice to span a number of application areas, including geographic information systems (GIS), databases, computational geometry, data mining, and text indexing. Another aspect of Vitter's work involves novel prediction mechanisms based upon principles of data compression and locality; examples include algorithms for caching, prefetching, data streaming, database query optimization, data mining, and resource management in mobile computers. His interest in prediction comes from ongoing work in data compression and machine learning. Professor Vitter is currently working on compressed indexes for long sequences of symbols, such as text. A recent theoretical breakthrough he worked on showed how to fully compress text and make it self-indexing at the same time. Honors & Awards: Fellow, John Simon Guggenheim Foundation, 1986; Fellow, IEEE, 1993; Fellow, ACM, 1996; National Science Foundation Presidential Young Investigator Award 1985; Fulbright Scholar, 1998; Recognition of Service Award, ACM, 1998 and 2001.

Selected publications
J. S. Vitter, "External Memory Algorithms and Data Structures: Dealing with Massive Data", *ACM Computing Surveys*, 33(2), June 2001, 209–271.

D. T. Hoang and J. S. Vitter, *Efficient Algorithms for MPEG Video Compression*, John Wiley & Sons, New York, NY, 2002.

R. Grossi, A. Gupta, and J. S. Vitter, "High-Order Entropy-Compressed Text Indexes", *Proceedings of the 14th Annual SIAM/ACM Symposium on Discrete Algorithms (SODA 2003)*, Baltimore, MD, Jan. 2003.

Samuel S. Wagstaff Jr.

Professor of Computer Science (1983)
Professor of Mathematics (courtesy)

Education:
BS, Massachusetts Institute of Technology (1966)
PhD, Cornell University (1970)

Academic biography
Before coming to Purdue, Professor Wagstaff taught at the Universities of Rochester, Illinois, and Georgia. He spent a year at the Institute for Advanced Study in Princeton. His research interests are in the areas of cryptography, parallel computation, and analysis of algorithms, especially number theoretic algorithms. He and J. W. Smith of the University of Georgia have built a special processor with parallel capability for factoring large integers. He is the author of *Factorizations of bn 1 1, b = 2, 3, 5, 6, 7, 10, 11, 12 up to high powers*, *Contemporary Mathematics series*, v. 22, Third edition, American Mathematical Society, 2002 (with John Brillhart, D. H. Lehmer, J. L. Selfridge and Bryant Tuckerman), and *Cryptanalysis of Number Theoretic Ciphers*, CRC Press, 2002.

Selected publications
Samuel S. Wagstaff, "Prime numbers with a fixed number of one bits or zero bits in their binary representation", *Experimental Mathematics*, Volume 10 (2001), pp. 267-273.

Samuel S. Wagstaff, "Prime divisors of the Bernoulli and Euler numbers", *Proceedings of the Millennial Conference on Number Theory*, Urbana, Illinois, May 21–26, 2000, M. A. Bennett, B. C. Berndt, N. Boston, H. G. Diamond, A. J. Hildebrand, W. Philipp, eds.

B. Dodson, A. K. Lenstra, P. Leyland, A. Muffett, and Samuel S. Wagstaff, "MPQS with three large primes", *Proceedings of the Algorithmic Number Theory Symposium 2002*, Volume 2369 of Springer-Verlag Lecture Notes in Computer Science, pp. 448–462, 2002.

Dongyan Xu

Assistant Professor of Computer Science (2001)
Assistant Professor of Electrical and Computer Engineering (courtesy)

Education:
BS, Computer Science, Zhongshan University (1994)
PhD, Computer Science, University of Illinois at Urbana-Champaign (2001)

Academic biography
Professor Xu's research is on protection, management, and quality of service of next generation distributed systems. He leads the Lab for Research in Emerging Network and Distributed Services (FRIENDS). He has conducted projects in overlay and peer-to-peer networks, autonomic Grid computing middleware, and mobile pervasive applications and services.

Especially, his group has been investigating runtime environment virtualization models and technologies for shared distributed infrastructures. The goal is to protect a shared infrastructure from un-trusted applications running on top of it and vice versa. Their research results have also

been effectively applied to the containment, emulation, and analysis of network attacks launched by humans or malware.

Dongyan Xu is the 2000 recipient of C. L. and Jane W-S. Liu Award in the Department of Computer Science at UIUC. He is a member of ACM, USENIX, IEEE, and IEEE Communications Society. He is affiliated with the Center for Education and Research in Information Assurance and Security (CERIAS) and e-Enterprise Center. His research is supported by the National Science Foundation (NSF), Microsoft Research, and Purdue Research Foundation.

Selected publications

X. Jiang and D. Xu, "Collapsar: A VM-Based Architecture for Network Attack Detention Center", *Proceedings of the 13th USENIX Security Symposium* (Security 2004), San Diego, CA, August 2004.

P. Ruth, X. Jiang, D. Xu, and S. Goasguen, "Towards Virtual Distributed Environments in a Shared Infrastructure", *IEEE Computer*, Special Issue on Virtualization Technologies, May 2005.

M. Hefeeda, A. Habib, D. Xu, B. Bhargava, and B. Botev, "CollectCast: A Peer-to-Peer Service for Media Streaming", *ACM/Springer Multimedia Systems Journal*, October 2005.

David K. Y. Yau

Associate Professor of Computer Science (1997)
Associate Professor of Electrical and Computer Engineering (courtesy)

Education:

BS, Computer Science, Chinese University of Hong Kong (1989)
MS, Computer Science, University of Texas at Austin (1992)
PhD, Computer Science, University of Texas at Austin (1997)

Academic biography

Professor David Yau's research interests are in network and operating system quality of service, network security, incentive protocols, value-added services routers, and mobile wireless networks. A major goal is to improve the performance and robustness of complex large-scale networks for heterogeneous applications. He has been invited to serve as panelist and reviewer by the National Science Foundation (NSF), the Research Grants Council of Hong Kong, and the Research Council of Norway. His research has been funded by various government and industrial organizations including the NSF. He is a member of the ACM and IEEE. He serves on the editorial board of the journal *IEEE/ACM Transactions on Networking*, and has served on the organizing and technical program committees of many ACM and IEEE conferences.

David Yau received a CAREER award from the NSF. He was the recipient of a Hong Kong Government Scholarship, a Swire Scholarship, a Microelectronics and Computer Development Fellowship (UT Austin), and an IBM Fellowship. Before academia, he was employed as Management Associate and then Assistant Manager at Citibank, NA.

Selected publications

David K. Y. Yau, John C. S. Lui, Feng Liang, and Yeung Yam, "Defending Against Distributed Denial-of-Service Attacks with Max-min Fair Server-centric Router Throttles.", *IEEE/ACM Transactions on Networking*, 13(1), February 2005.

Richard T. B. Ma, Sam C. M. Lee, John C. S. Lui, and David K. Y. Yau, "A Game Theoretic Approach to Provide Incentive and Service Differentiation in P2P Networks.", In *Proc. ACM SIGMETRICS*, New York, NY, June 2004.

Simon S. Lam, Simon Chow, and David K. Y. Yau, "A Lossless Smoothing Algorithm for Compressed Video", *IEEE/ACM Transactions on Networking*, 4(5), October 1996.

Xiangyu Zhang

Assistant Professor of Computer Science (2006)

Education:

PhD, Computer Science, University of Arizona (2006)
MS, Computer Science, University of Sci. & Tech. of China (2000)
BS, Computer Science, University of Sci. & Tech. of China (1998)

Academic biography

Professor Zhang's research is on automatic debugging, software reliability, computer security, and program profiling. In particular, he has designed efficient and effective dynamic slicing techniques, which have a lot of applications in debugging runtime errors, intrusion detection, and preventing software piracy. He has designed architectural support for protecting sensitive data in symmetric shared memory processors. He has also conducted research on program tracing and profiling, which includes novel representations and creative compression techniques. Zhang is interested in program analysis, both dynamic and static, and their applications in software engineering and security related issues. Zhang is a member of ACM and IEEE.

Selected publications

X. Zhang, N. Gupta, and R. Gupta, "Pruning Dynamic Slices With Confidence", *ACM SIGPLAN Conference on Programming Language Design and Implementation*, 2006.

X. Zhang and R. Gupta, "Whole Execution Traces and their Applications", *ACM Transactions on Architecture and Code Optimization*, 2005.

X. Zhang and R. Gupta, "Matching Execution Histories of Program Versions", *Conference and 13th ACM SIGSOFT Symposium on the Foundations of Software Engineering*, 2005.

Courtesy Faculty in Computer Science

Name	Title	Main Department	Research Area
Shreeram Abhyankar	Professor	Mathematics	Computational and algebraic geometry
David Anderson	Professor	Mechanical Engineering	Computer-aided design
Saurabh Bagchi	Assistant Professor	Electrical and Computer Engineering	Distributed and secure systems
Alok Chaturvedi	Associate Professor	School of Management	Information technology strategies
William Cleveland	Professor	Statistics	Data mining and visualization
Melissa Dark	Associate Professor	College of Technology	Security awareness and education
David Ebert	Associate Professor	Electrical and Computer Engineering	Visualization and computer graphics
Michael Gribskov	Professor	Biological Sciences	Bioinformatics
Y. Charlie Hu	Assistant Professor	Electrical and Computer Engineering	Distributed systems and wireless networking
Sabre Kais	Professor	Chemistry	Quantum computation
Guy Lebanon	Assistant Professor	Statistics	Machine learning, statistical analysis of massive data sets
Yung-Hsiang Lu	Assistant Professor	Electrical and Computer Engineering	Energy-efficient computing systems
Ness Shroff	Professor	Electrical and Computer Engineering	Communication networks
T. N. Vijaykumar	Associate Professor	Electrical and Computer Engineering	Computer architecture

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Pascal Meunier and Jan Vitek. *Develpoment of a Safe, Virtual Imaging Instrument for Logically Destructive Experiments*. National Science Foundation. 2004–2009, $800,000.

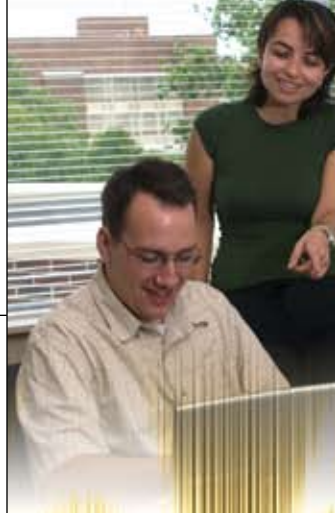
Suresh Jagannathan and Jan Vitek. *Fault Determination and Recovery in Cycle-Sharing Infrastructures*. National Science Foundation. 2005–2007, $350,000.

Jan Vitek. *Aspectual Configuration of Real-Time Embedded Middleware*. National Science Foundation. 2005–2008, $240,000.

Suresh Jagannathan, Jan Vitek, Tony Hosking, and Ananth Y. Grama. *CRI: A Computational Infrastructure for Experimentation on Relaxed Concurrency Abstractions and their Applications*. National Science Foundation. 2006–2008, $99,979.

Jan Vitek. *Collaborative Research: Secure Distributed Programming*. National Science Foundation. 2002–2006, $240,000.

Jan Vitek. *High Productivity Computing Systems*. IBM. 2003–2006, $361,986.



Vitter, Jeffrey

Jeffrey Vitter. *Entropy-Compressed Data Structures*. National Science Foundation. 2004–2006, $165,000.

Jeffrey Vitter. *Industrial Support*. IBM. 2002, $40,000.

Xu, Dongyan

Daniel Aliaga and Dongyan Xu. *Microsoft Research Learning Science*. Microsoft Corporation. 2003, $90,000.

Dongyan Xu, Sebastien Goasguen, and Gerhard Klimeck. *NMI Deployment (ENG): Nanohub*. National Science Foundation. 2004–2007, $2,967,804.

Dongyan Xu. *NMI Collaborative Research: Development Self-Management of Distributed Virtual Environments*. National Science Foundation. 2005–2006, $45,000.

Dongyan Xu. *Malware Research*. Microsoft Corporation. 2005, $5,000.

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Dongyan Xu. *CAREER: Towards Virtual Distributed Environments in a shared Distributed Infrastructure*. National Science Foundation. 2006–2011, $400,000.

Yau, David

David Yau. *Collaborative Research: A Component-based Software Environment for Simulation, Emulation, and Synthesis of Network Protocols in Next Generation Networks*. National Science Foundation. 2004–2007, $187,000.

David Yau. *Northwest Indiana Computational Grid: A Joint Project of the University of Notre Dame, Purdue University-West Lafayette, and Purdue University-Calumet*. Department of Energy. 2005–2007, $15,569.

David Yau. *Collaborative Interdomain Networking Research with Tsinghua University*. Asian Initiative Research. 2005–2007, $8,000.

David Yau. *IBM PhD Fellowship - Yu Dong*. IBM. 2005–2006, $38,263

EDUCATION

Graduate Teaching Assistants

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EDUCATION

Course Offerings

110 Introduction to Computers
158 C Programming
177 Programming with Multimedia Objects
180 Programming I
182 Foundations of Computer Science
192 Freshman Resources Seminar
197 Freshman Honors Seminar
235 Introduction to Organizational Computing
240 Programming in C
250 Computer Architecture
251 Data Structures
290E Freshman and Sophomore EPICS Projects
307 Software Engineering I
314 Numerical Methods
334 Fundamentals of Computer Graphics
348 Information Systems
352 Compilers: Principles and Practice
354 Operating Systems
355 Introduction to Cryptography
381 Introduction to the Analysis of Algorithms
390S Secure Programming
397 Honors Seminar
422 Computer Networks
426 Computer Security
434 Advanced Computer Graphics
448 Introduction to Relational Database Systems
456 Programming Languages
471 Introduction to Artificial Intelligence
490B Introduction to Bioinformatics
490C Senior EPICS Design Project
490E Junior and Senior EPICS Projects
490S Secure Network Programming
490T Advanced Tablet Platform Applications
497 Honors Research Project
501 Introduction to Computational Science
502 Compiling and Programming Systems
503 Operating Systems
514 Numerical Analysis
515 Numerical Linear Algebra
525 Parallel Computing
526 Information Security
530 Introduction to Scientific Visualization
531 Computational Geometry
535 Interactive Computer Graphics
536 Data Communication and Computer Networks
541 Database Systems
542 Distributed Database Systems
543 Introduction to Simulation and Modeling of Computer Systems
555 Cryptography
565 Programming Languages
569 Introduction to Robotic Systems
580 Algorithm Design, Analysis, and Implementation
590A Trends in Database Research
590B Protein Bioinformatics
590C Recent Topics in Database Systems Research
590D Data Mining
590E Distributed Programming Seminar
590M Models and Algorithms in Life Sciences
590R Randomized Algorithms and Probabilistic Techniques in Computer Science
590S Parallel Numerical Algorithms
590T Model-based Software Testing
590U Access Control: Theory and Practice
590V Visualization and Numerical Methods in Life Sciences
591C Research Seminar for First-Year Graduate Students
591S Information Security and Cybercrime Seminar
603 Advanced Topics in Distributed Systems
614 Numerical Solution of Ordinary Differential Equations
626 Advanced Information Assurance
655 Advanced Cryptology
662 Pattern Recognition and Decision-Making Processes
690C Principles of Network Management Systems
690S Examining Privacy in an On-line World

PhD Graduates

December 2005

Robert Gwadera
Reliable Identification of Significant Sets of Episodes in Event Sequences
Advisors: W. Szpankowski and M. J. Atallah
Employer: University of Helsinki; Helsinki, Finland

Mahesh Veeraragh Tripunitara
A Theory Based on Security Analysis for Comparing the Expressive Power of Access Control Models
Advisor: N. Li
Employer: Motorola Labs; Schaumburg, Illinois

May 2006

Brian David Carrier
A Hypothesis-based Approach to Digital Forensic Investigations
Advisor: E. H. Spafford
Employer: Basis Technology; Cambridge, Massachusetts

Rajeev Gopalakrishna
Improving Software Assurance Using Lightweight Static Analysis
Advisor: E. H. Spafford and J. Vitek
Employer: Intel Laboratories; Hillsboro, Oregon

Jiangtao Li
Privacy Enhanced Automated Trust Negotiation
Advisor: M. J. Atallah and N. Li
Employer: Intel Laboratories; Hillsboro, Oregon

Gahyun Park
Profile of Tries
Advisor: W. Szpankowski
Employer: University of Wisconsin-Whitewater; Whitewater, Wisconsin

Adam Welc
Concurrenty Abstractions for Programming Languages Using Optimistic Protocols
Advisor: A. L. Hosking and S. Jagannathan
Employer: Intel; Santa Clara, California

August 2006

Xuxian Jiang
Enabling Internet Worms and Malware Investigation and Defense Using Virtualization
Advisor: D. Xu
Employer: George Mason University; Fairfax, Virginia

Tiberiu Vasile Stef-Praun
Ownership and Decentralization in Distributed Systems Allocation Mechanisms
Advisor: V. J. Rego
Employer: Argonne National Laboratories / University of Chicago Computation Institute; Illinois

GUEST SPEAKERS

Fall 2005

DATE	SPEAKER	AFFILIATION	TALK TITLE
8/26/2005	Evimaria Terzi	University of Helsinki in Finland	Models and Algorithms for Network Immunization
9/8/2005	George Cox, PhD	Intel Corporation	Trustworthy Platforms: Problems, Promises, Concepts, Practical Realities, and Research Opportunities
9/26/2005	Srikanth Thirumalai, PhD	Amazon.com	The Online Product Catalog Management Problem at Amazon.com
9/26/2005	Niels Provos, PhD	Google	Honeyd Virtual Honeypots and their Applications
10/6/2005	Jaikumar Radhakrishnan, PhD	Toyota Technological Institute at Chicago and Tata Institute of Fundamental Research, Mumbai	Privacy Versus Communication in Quantum Communication Protocols
10/13/2005	AnHai Doan, PhD	University of Illinois at Urbana-Champaign	Toward Fast, Collaborative, and Best-Effort Data Integration
10/18/2005	Jim Mapel	Guidant Corporation	Applying Computer Models to the Development of Implantable Cardiac Rhythm Management Devices
10/19/2005	Prof. Azer Bestavros	Boston University	Exploiting the Transients of Adaptation for RoQ Attacks on Internet Resources
10/20/2005	Prof. Pam Samuelson	University of California at Berkeley	Should Technologists Have a Responsibility to Design Products To Minimize Misuses?
10/31/2005	Prof. Greg Morrisett	Council for the Central Laboratory of the Research Councils	Type-Safe C
10/31/2005	Keith G. Jeffery, PhD	Harvard University	CRIS + Open Access = The Route to Research Knowledge on the GRID
11/3/2005	Massimo Mecella, PhD	Dipartimento Informatica e Sistemistica, Univ. Roma LA SAPIENZA, Italy	Web Service Composition
11/10/2005	Ralph Kling, PhD	Intel Corporation	Intel Motes & Sensor Networks
11/15/2005	Monica Scannapieco, PhD	Dipartimento Informatica e Sistemistica, Univ. Roma LA SAPIENZA, Italy	Dealing with Data Quality in Distributed and Heterogeneous Information Systems
11/21/2005	Paul Larson, PhD	Microsoft Research	View Matching for Outer-Join Views
11/28/2005	Prof. Karthik Ramani	Purdue School of Mechanical Engineering and director, PRECISE	Shape-Lab: A Unified Framework for 2-D and 3-D Shape "Search" in Large Repositories
11/29/2005	Danfeng Yao	Brown University	Trust Management and Private Communication in Role-Based Systems
12/2/2005	Prof. John Hatcliff	Kansas State University	Experience and Future Directions in Model-Driven Development for Component-Based Product-Line Architectures
12/5/2005	Prof. Ron Rivest	Massachusetts Institute of Technology	Security of Voting Systems
12/6/2005	Christoph Kirsch, PhD	University of Salzburg, Austria	High-Level Programming of Real-Time and Concurrent Software Systems

Spring 2006

1/13/2006	Prof. Ian Parberry	University of North Texas	Three Research Topics in Entertainment Computing
2/6/2006	Prof. Paul Saylor	Louisiana State University	Two Questions about Enforcing Constraints and Three Answers
2/9/2006	Prof. Dave Patterson	University of California, Berkeley	How to Hurt Scientific Productivity
2/14/2006	Prof. Avigdor Gal	Faculty of Industrial Engineering & Management at the Technion	Agent Oriented Data Integration or The Three Laws of Integrobotics

DATE	SPEAKER	AFFILIATION	TALK TITLE
2/20/2006	Jeffrey Nichols	Carnegie Mellon University	Automatically Generating High-Quality User Interfaces for Appliances
2/23/2006	Xiangyu Zhang	University of Arizona	Efficient and Effective Dynamic Slicing
2/27/2006	Pin Zhou	University of Illinois at Urbana-Champaign	Improving Software Dependability with Hardware Support
3/1/2006	Susan Hohenberger	Massachusetts Institute of Technology	Compact E-Cash
3/2/2006	Janise McNair, PhD	University of Florida	Location Verification in Wireless Sensor Networks
3/2/2006	Xifeng Yan	University of Illinois at Urbana-Champaign	Mining and Searching Massive Graph Databases
3/7/2006	Samuel King	University of Michigan	Analyzing Intrusions Using Operating System Level Information Flow
3/9/2006	Jennifer Neville	University of Massachusetts Amherst	From Nodes to Networks: Exploiting Autocorrelation to Improve Statistical Models of Relational Data
3/20/2006	Prof. Bruce Gooch	Northwestern University	Optimizing the Communication Content of Computer-Generated Imagery
3/22/2006	Koushik Sen	University of Illinois at Urbana-Champaign	Scalable Automated Methods for Software Reliability
3/23/2006	Benjamin Raphael, PhD	University of California, San Diego	Rearrangements and Duplications in Tumor Genomes: Towards a Cancer Genome Project
3/24/2006	Marek E. Rusinkiewicz, PhD	Telcordia Technologies	Computer and Information Science Research at Telcordia Applied Research Laboratories
3/27/2006	Brad Malin	Carnegie Mellon	Provable Privacy in DNA Database Sharing
3/29/2006	Amy Gooch	Northwestern University	Preserving Perceptual Differences for Image Creation and Manipulation
3/30/2006	Luo Si	Carnegie Mellon	Federated Search of Text Search Engines
4/4/2006	Lilia Krivodonova, PhD	New York University	High-Order Discontinuous Galerkin Methods for Nonlinear Hyperbolic Conservation Laws
4/5/2006	Pradeep Sen	Stanford University	Dual Photography
4/6/2006	Prof. Dorothy Denning	Naval Postgraduate School	Tracks, Trackers, and Tracking
4/7/2006	Prof. Peter Denning	Naval Postgraduate School	Great Principles of Computing
4/10/2006	Colin Dewey	University of California, Berkeley	Whole-Genome Alignments and Polytopes for Comparative Genomics
4/10/2006	Mukesh Mohania, PhD	IBM India Research Lab	Context Oriented Information Integration Using SCORE
4/12/2006	James Fogarty	Carnegie Mellon	Constructing and Evaluating Sensor-Based Statistical Models of Human Interruptibility
4/13/2006	Bin He	University of Illinois at Urbana-Champaign	MetaQuerier: Toward Large-Scale Integration for the Deep Web
4/17/2006	Prof. Yuanshun Dai	Indiana University-Purdue University Indianapolis	Model-Driven Autonomic Computing for NASA's ANTS Projects
4/17/2006	David Bindel	University of Maryland	Computer Aided Design of Micro-Electro-Mechanical Systems: Eigenvalues, Energy Losses, and Dick Tracy Watches
4/20/2006	Suresh Venkatasubramanian, PhD	AT&T Labs	Finding Bumps in Space and Time
5/22/2006	Erez Petrank, PhD	Technion– Israel Institute of Technology	Resurrecting Reference Counting

DEVELOPMENT HIGHLIGHTS

Richard and Patricia Lawson Computer Science Building

The move into the new Lawson Building has provided a number of developmental growth opportunities for Computer Science. The department leadership working in conjunction with the director of development has seen additional funds raised from new naming opportunities. Key strategic rooms/facilities are still available for naming ($10K–$300K range) by individual or corporate donors. Please contact Tony Vidmar, director of development, for more information (tvidmar@purdue.edu).

The building dedication provided excellent stewardship activities and interaction with our most major donors. Additionally, all donors to this campaign were recognized, regardless of the size of their gift, on the donor recognition wall in the Kurz Lobby.

The Campaign for Purdue nearing Completion…Computer Science Goals Still to Reach!

The University-wide, seven year, $1.5 billion Campaign for Purdue will officially end June 30, 2007. This date will also mark the official retirement date of the 10th president of Purdue University, Martin C. Jischke.

With the Lawson Building dedicated, planned efforts are refocusing on raising unrestricted gifts for the department, funding for startup packages of new hires, and funding of student activities and scholarships. Now that the department clearly has one of the best facilities in the country, a key component in our pursuit of excellence will be to raise additional major gifts for faculty, student, and program support. The department has significant needs to reach its goals and finish the campaign well. For example, our department—the nation's first computer science department—still does not have a fully endowed professorship.

To find out more about how you can make a strategic gift to the department, please contact Tony Vidmar, development director.

Computer Science Excellence Fund: An Excellent Gift Opportunity at Any Level

An unrestricted gift to the Computer Science Excellence Fund — at any level — represents one of the most strategic funding sources for the department. First, the gift can be allocated to the most pressing needs facing the department at any given time. Second, the percentage of alumni who give to a department is a metric often requested when seeking foundation and/or corporate gifts.
The department has seen a growth in giving to this fund and is seeking even more alumni and friends who will invest in this manner.

To donate to the Computer Science Excellence Fund, please see the reply envelope inserted in this report. You may also give online at the link:

http://www.purdue.edu/udo/giving/give_online.shtml.

K–12 Outreach

The main purpose of the Department of Computer Science K–12 Outreach Program is to promote scientific literacy and stimulate interest in computer science among students in the K–12 school systems. Visits to K–12 schools include presentations, workshops, and teacher consultations. Students participate in hands-on learning experiences, for example, by disassembling and reassembling a computer.

A secondary goal of our program is to inspire educators by equipping them with the confidence they need so they may incorporate the use of technology and computer science concepts into their classrooms. This goal is achieved through professional development seminars, statewide conference presentations, and personal contacts. We encourage educators to integrate these concepts into their curriculum rather than making the use of technology a special event.

A mainstay of the Computer Science outreach program is the annual summer camps for middle school students. We run both beginner and advanced level camps. Additionally, former campers are invited to participate in a junior counselor program.

A new summer program is the workshop for mathematics teachers called "Linking Mathematics and Computer Science". The goal is to show these teachers how topics in the mathematics curriculum relate naturally to many concepts in computer science.

Thus far in 2006, more than 2,700 students and 550 teachers participated in departmental K–12 outreach events.

Corporate Partners

The Corporate Partners Program (CPP) fosters close communication between the Department of Computer Science and private industry in the context of a mutually beneficial relationship. The department enjoys the benefit of financial contributions, nurturing experiences for our students and faculty research collaboration with industry leaders. At the same time, members of our CPP reap the benefits of increased visibility, priority access to top students who may become future employees, as well as priority access to faculty who are experts in relevant technical fields. True to any real partnership, both sides benefit significantly.

Companies participate through strategic, unrestricted donations at tier levels and are involved in many core activities of the department. Company representatives take advantage of opportunities to speak in classes, sponsor student projects, and make significant contact with CS students and faculty. Members of the CPP include giants of the information technology industry, as well as smaller, specialized companies. Partner members represent Indiana-based companies and other outstanding firms nationwide. This diverse and dynamic membership provides CS students with exposure to a myriad of career opportunities across the United States.

The corporate partners meet twice each year to provide input and feedback to departmental and college leadership. Recent contributions of the council include assistance in revising the undergraduate and graduate curricula; suggestions regarding recruiting, retention, and enrollment issues; collaborative efforts with faculty and student research; as well as alerting the department to industry areas of concern, such as global outsourcing.

Premier Corporate Partners

Boston Scientific Corporation	IBM	Motorola
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DEVELOPMENT HIGHLIGHTS

Development of Private Support

With support from its alumni and friends, Purdue Computer Science competes for the best faculty, recruits top students, provides scholarships, supports research, and funds new program initiatives. The department is deeply grateful to these donors who made contributions and pledges in the 2005–06 academic year.

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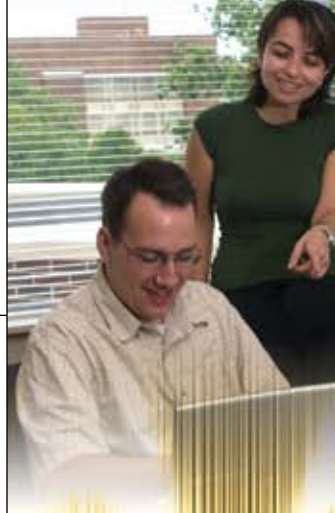

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Flexware Innovation
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McGraw-Hill Company
National Christian Charitable Foundation
NCR Foundation
Purdue University Student Organizations
S. C. Johnson Fund/MG
Shell Oil Company Foundation
Southern Company Services Inc.
Sun Microsystems
3M Corporation

CS FACILITIES — GENERAL OVERVIEW

The department provides high-quality computing facilities for use by computer science faculty, students, and administrative personnel. The facilities are operated by an outstanding technical staff who handle all aspects of installation, maintenance, and user assistance for a wide variety of hardware and software platforms. The staff includes a director, facilities manager, administrative assistant, network engineer, hardware engineer, six system administrators, and several student assistants.

General Facilities

General computing facilities are available for both administrative activities (such as the preparation of research reports and technical publications) and research needs that are not supported by other dedicated equipment. The main server systems are multiprocessors with large main memories and a total of over 60 TB of disk storage. Personal workstations and laptops from a variety of vendors are used by faculty, staff, and students throughout the department.

Educational Facilities

The department operates eight instructional laboratories in two buildings and include about 200 Intel- and Sun SPARC-based workstations. Supported operating systems include Windows XP, Linux, Solaris x86, and Solaris SPARC. A later section lists equipment owned and maintained by ITaP but used by computer science students.

I/O Equipment

The department operates both special-purpose output devices as well as general output equipment, including more than 75 laser printers, color printers, color scanners, copiers, video projectors, digital video editing capabilities, and phone and video conferencing equipment.

Networking Services

The department is strongly committed to state-of-the-art networking technology to provide access to and communication among its systems, as well as to those elsewhere on campus and throughout the world. Our departmental infrastructure supports gigabit per second data rates to the desktop throughout our two buildings using over 65 Ethernet VLAN-capable switches from Force10 and Cisco Systems. Wiring in the new Lawson Computer Science Building is based on Panduit augmented CAT6 data cable and patch panels, capable of 10 gigabit per second speeds. This network infrastructure is bi-connected to the campus backbone by two 1 gigabit per second redundant fiber links. The campus is connected to multiple high speed Internet backbones, including Abilene/ Internet2 and I-Light. DSL, cable, and cellular data services are widely used for remote access.

Information Technology at Purdue (ITaP)

In addition to the facilities described above, students and faculty have access to computing systems owned and operated by ITaP. General instructional facilities operated by ITaP include large Sun SPARC servers and several Sun and Intel workstation laboratories. Departmental research projects make use of other facilities provided by ITaP, including a large IBM SP cluster and the Envision Center for Data Perceptualization.

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Linda Byfield, Account Clerk
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Kip Granson, Windows Software
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