

pointers

DEPARTMENT OF COMPUTER SCIENCE
GEORGIA STATE UNIVERSITY

FALL 2008

MESSAGE FROM THE CHAIR



Dr. Yi Pan

The Department of Computer Science was fortunate to acquire additional space during 2008 to house our growing program. We thank Dr. Lauren Adamson, the Dean of the College of Arts and Sciences, for her help. The dean's office

also provided much-needed funding to purchase workstations for our new network lab.

Another highlight of 2008 was the large number of visiting scholars and postdoctoral fellows that we hosted. The fact that our department is able to attract so many visitors is a sign of our growing research strength.

On a personal note, I was honored to be invited to join the editorial board of *IEEE/ACM Transactions on Computational Biology and Bioinformatics*. Since bioinformatics is a major focus of our department, serving as an editor of this important journal is particularly gratifying.

DEPARTMENT GAINS SPACE IN ONE PARK TOWER

During the summer, the Department of Computer Science acquired seven rooms on the 21st floor of the One Park Tower building at 34 Peachtree Street. (The main offices of the department are on the 14th floor.)

Three rooms serve as offices for the department's lecturers. Another three provide space for Ph.D. students studying with Dr. Xiaojun Cao, Dr. Sushil Prasad, and Dr. Yan-Qing Zhang. The largest room, which is approximately 500 square feet, is a laboratory used primarily for teaching computer networks. In the spring, Dr. Cao will use the lab for his CSc 8220 course (Advanced Computer Networks). The lab will also double as a tutoring center, which opens January 26.

The lab has 12 student workstations, purchased with funds from the Dean of Arts and Sciences. Each workstation has a Core 2 Quad CPU and 4 gigabytes of memory. Soft-



Dr. Xiaojun Cao with routers

ware installed on the workstations includes CPLEX (used for linear programming) and OPNET (for network simulation). The workstations have virtualization software that allows them to run either Windows or Linux. They also have pcAnywhere software to permit remote access by students.

The lab is equipped with nine industrial-strength Cisco routers, three Cisco switches, and a wireless access point. With the assistance of system administrator Shaochieh Ou, Dr. Cao and his students built a rack that holds the routers and associated patch panels.

PAN NAMED TO EDITORIAL BOARD OF *IEEE/ACM TCBB*

Dr. Yi Pan was recently chosen to serve as an associate editor of *IEEE/ACM Transactions on Computational Biology and Bioinformatics*. *IEEE/ACM TCBB* is a quarterly journal that publishes research related to algorithmic, mathematical, statistical, and computational methods in bioinformatics and computational biology; the development and testing of software for bioinformatics; the development and optimization of biological databases; and important biological results obtained by using these methods, software, and databases. *IEEE/ACM TCBB* began publication in 2004 with support from several IEEE societies and the Association for Computing Machinery; it is now regarded as one of the top journals in the field of bioinformatics.

DEPARTMENT WELCOMES A BUMPER CROP OF VISITORS

The Department of Computer Science hosted a record nine visiting scholars and postdoctoral fellows during the fall.

- **Julie He.** Dr. He is a professor in the School of Computer Science and Engineering at Southeast University in China. During her visit, which will last from February 2008 to June 2009, she is collaborating with Dr. Yi Pan on bioinformatics research.
- **Yeon-kwon Jeong.** Dr. Jeong, whose research area is wireless networks, is visiting from Information and Communications University in South Korea. During his visit, which will last from March 2007 to March 2009, he is collaborating with Dr. Yingshu Li on methodologies for seamless vertical handover in next-generation mobile communications, as well as modeling and performance analysis on fast handovers in wireless LANs. Dr. Jeong is supported by South Korea's Electronics and Telecommunications Research Institute.

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VISITORS

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- **Chaoyang Li.** Dr. Li is a faculty member in the School of Sciences at Beijing University of Posts and Telecommunications in China. His research area is optical networking. During his visit, which will last from November 2008 to November 2009, he is collaborating with Dr. Xiaojun Cao on research in optical networking. Dr. Li is supported by the China Scholarship Council.
- **Qiaoliang Li.** Dr. Li is a professor in the Department of Computer Science and Communication at Hunan University in China. His research areas are wireless sensor networks, graph theory, and coding theory. During his visit, which lasted from December 2007 to December 2008, he collaborated with Dr. Yi Pan on research in wireless sensor networks and coding theory. Dr. Li was supported by the China Scholarship Council.
- **Kim Seon-jong.** Dr. Seon-jong is an associate professor in the School of Biosystems Engineering at Pusan National University in South Korea. His research areas are image processing, computer vision, and pattern recognition. During his visit, which will last from August 2008 to July 2009, he is collaborating with Dr. Saeid Belkasim on research in partial image retrieval. Dr. Seon-jong is supported by Pusan National University.
- **Caifen Wang.** Dr. Wang is a vice dean and professor in the Computer Science department at Northwest Normal University in China. Her research area is network security. During her visit, which will last from May 2008 to May 2009, she is collaborating with Dr. Xiaojun Cao on research in wireless network security. Dr. Wang is supported by the China Scholarship Council.
- **Xiaoming Wang.** Dr. Wang is the associate dean for research in the School of Computer Science and Technology at Shaanxi Normal University in China. His research area is wireless security. During his visit, which lasted from October 2007 to September 2008, he collaborated with Dr. Yingshu Li on research in worm propagation in wireless sensor networks. Dr. Wang was supported by the China Scholarship Council.
- **Naixue Xiong.** Dr. Xiong is a postdoctoral fellow with a Ph.D. from the Japan Advanced Institute of Science and Technology. His research area is fault-tolerant communication networks. During his visit, which will last from March 2008 to March 2009 (and perhaps longer), he is

collaborating with Dr. Yingshu Li on research in quality of service in wireless sensor networks.

- **Xue Feng Yan.** Dr. Yan is an associate professor in the Computer Science department at Nanjing University of Aeronautics and Astronautics in China. His research areas are modeling and simulation as well as computer networking. During his visit, which will last from September 2008 to February 2009, he is collaborating with Dr. Xiaolin Hu on research in modeling and simulation. Dr. Yan is supported by the Nanjing University of Aeronautics and Astronautics.

PAN RECEIVES NSF GRANT

Dr. Yi Pan received a \$160,000 grant from the National Science Foundation for a project titled "(NECO) Collaborative Research: Reliability Modeling for Large-Scale Networking System (LSNS), and Self-Improvement in LSNS." The grant will run for three years, starting September 1, 2008.

Research to be performed under the grant involves building a holistic model of reliability and performance for large-scale networking systems (LSNS) and creating model-based self-improvement technology for high reliability, high performance, and smooth network communication in LSNS. The project will include developing a way to analytically evaluate the reliability and performance of LSNS and devising techniques to reduce network traffic jams. The research has applications in such areas as outer-space exploration, telemedicine, and grid computing.

OWEN HELPS LAUNCH SIGGRAPH ASIA 2008



Dr. G. Scott Owen

Professor Emeritus G. Scott Owen was recently quoted in *Variety*, the weekly entertainment trade newspaper, in an article about SIGGRAPH Asia 2008, which was held on December 10–13 in Singapore. In his capacity as the president of ACM SIGGRAPH, Dr. Owen was a key figure in the creation of the new conference, an Asia-based spin-off of the popular SIGGRAPH conference. The original SIGGRAPH, held annually in North America during the summer, is the largest conference sponsored by ACM, with between 20,000 and 30,000 attendees.

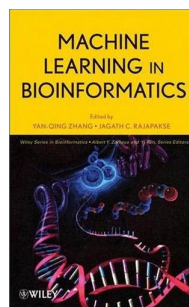
In the *Variety* article, Dr. Owen discusses

the difficulty that researchers from China and India encounter when they try to obtain visas to attend SIGGRAPH. He cites that factor, along with the rapid growth in computer research in Asia, as reasons for starting SIGGRAPH Asia. The article mentions the high cost of travel to North America as an additional factor. Although many Asian conferences already exist, SIGGRAPH is "unique," Owen is quoted as saying, because "it combines the highest-quality technical and creative (professionals)."

SIGGRAPH Asia resembles its parent conference in many ways: technical talks are augmented by an art gallery, computer animation festival, and exhibits. A job fair is an important part of the event, with major companies such as DreamWorks Animation, Industrial Light & Magic, Lucasfilm Animation, and Pixar looking to hire.

Although the inaugural SIGGRAPH Asia was held in Singapore, the event will rotate among several Asian countries. The conference will be in Yokohama in 2009 and in Seoul the following year.

ZHANG IS CO-EDITOR OF BIOINFORMATICS BOOK



Dr. Yan-Qing Zhang is a co-editor of the recently published book *Machine Learning in Bioinformatics* (ISBN 978-0-470-11662-3), along with Dr. Jagath C. Rajapakse, the director of the Bioinformatics Research Center at Singapore's Nanyang Technological University. The book, which was written by internationally recognized bioinformatics researchers, is part of the Wiley Series in Bioinformatics.

Machine-learning techniques such as Markov models, support vector machines, neural networks, and graphical models are useful for analyzing life-science data because of their ability to handle randomness, data uncertainties, and noise, as well as their ability to generalize. *Machine Learning in Bioinformatics* discusses recent machine-learning approaches and their applications to current bioinformatics problems. Topics include feature selection for genomic and proteomic data mining, comparing variable-selection methods in gene selection and classification of microarray data, fuzzy gene mining, sequence-based prediction of residue-level properties in proteins, and probabilistic methods for long-range features in biosequences.

Published by John Wiley & Sons, *Machine Learning in Bioinformatics* is a 456-page hardcover book. It is available at Amazon.com for \$99.95.

RECENT PH.D. GRADUATES

Bernard Chen. *Dissertation:* Discovery and Extraction of Protein Sequence Motif Information That Transcends Protein Family Boundaries. *Advisor:* Dr. Yi Pan. *Current position:* Assistant professor, Department of Computer Science, University of Central Arkansas. (August 2008)

ROBOTS INVADE INTRODUCTORY COMPUTER SCIENCE COURSE

Last fall, Dr. K. N. King taught an experimental section of CSc 2010 (Introduction to Computer Science) using robots. Each person in the class was loaned a small robot for the semester. Students learned how to control the robots by writing programs in the Python language.

In response to declining computer science enrollments, CS departments across the country are experimenting with innovative ways to teach the introductory course. The robot approach helps motivate students and allows them to work on projects that are fun and creative. The long-term goal is to attract and retain more students.

Ph.D. student Stefanie Markham, who assisted with last fall's class, is currently teaching a section of CSc 2010 using robots. The Department of Computer Science plans to offer at least one robot-based section of 2010 each semester for the next few years.

Students enrolled in the robot sections of 2010 use the Scribbler, an off-the-shelf robot equipped with three wheels, two motors, a variety



Scribbler robot
with Fluke card

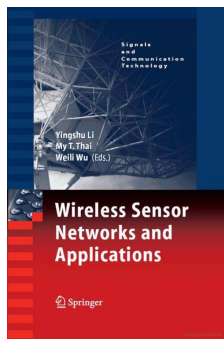
of sensors, and a speaker. An add-on circuit board created at Georgia Tech gives the robot Bluetooth capabilities, allowing it to be controlled wirelessly from a laptop. The circuit board, known as a Fluke, also includes a camera and additional sensors. The robots and Flukes are available from Georgia Robotics.

Stories about the robot project have appeared on the GSU web site and on the College of Arts and Sciences web site. A third story is scheduled to be published soon in *Georgia State Magazine*.

Funding for the robots was provided by the Institute for Personal Robots in Education (IPRE), a partnership between Georgia Tech's College of Computing, Bryn Mawr College, and Microsoft Research. Georgia State was one of 27 institutions to receive funding from IPRE last year.

LI IS CO-EDITOR OF WIRELESS SENSOR NETWORKS BOOK

Dr. Yingshu Li is a co-editor of the recently published book *Wireless Sensor Networks and Applications* (ISBN 978-0-387-49591-0), along with Dr. My T. Thai of the University of Florida and Dr. Weili Wu of the University of Texas at Dallas. The book, which is part of the Signals and Communication Technology series, consists of eighteen self-contained chapters written by experts in wireless



networking. These chapters are grouped into four sections: network design and modeling, network management, data management, and security. Each chapter covers the history of a particular topic, reviews the state of the art, and discusses unsolved problems. One of the chapters is co-authored by Dr. Raheem Beyah. Published by Springer, *Wireless Sensor Networks and Applications* is a 444-page hardcover book. It is available at Amazon.com for \$109.

FACULTY NEWS

Dr. Raheem Beyah will serve as a co-chair for the Computer and Network Security Symposium, one of eleven symposia to be conducted at the 5th International Wireless Communications and Mobile Computing Conference (IWCMC 2009). Under the theme of "Connecting the World Wirelessly," IWCMC 2009 will target a wide spectrum of state-of-the-art as well as emerging topics pertaining to wireless networks, wireless communications, and mobile computing. The conference will be held in Leipzig, Germany on June 21–24, 2009 in conjunction with the 2009 High Performance Computing & Simulation Conference (HPCS '09).

Dr. Raheem Beyah has been appointed an associate editor of the *Journal of Computer Systems, Networks, and Communications*. JCSNC is an open-access journal from Egypt-based Hindawi Publishing Corporation, which publishes more than 100 peer-reviewed journals. The publication is aimed at researchers, developers, practitioners, policymakers, professional trainers, educators, and other specialists in the areas of computer systems, networks, and communications.

Dr. Xiaolin Hu has been appointed an associate editor of *Simulation: Transactions of The Society for Modeling and Simulation International*. *Simulation* is a monthly refereed publication of The Society for Modeling and Simulation International, the leading society devoted to advancing the discipline and profession of modeling and simulation. Published in both print and electronic form, the journal consists of distinct sections: one devoted to theory, the other to applications. In addition to its archival mission, *Simulation* aims to help professionals and researchers,

particularly those involved in multidisciplinary projects, apply advances in modeling and simulation theory, methodology, and technology to their application areas.

Dr. Xiaolin Hu will serve as a program chair for the 2009 Summer Computer Simulation Conference (SCSC '09), which will be held in Istanbul on July 13–16, 2009. SCSC '09 is a premier international forum and annual conference that covers state-of-the-art developments in computer simulation methodologies and technologies, as well as scientific, industrial, and business applications. Papers and proposals for panels, tutorials, workshops, seminars, and exhibits are solicited. The deadline for submitting papers is February 25. Authors of accepted papers will be notified by April 21, with final versions due on May 15. SCSC '09 is sponsored by The Society for Modeling and Simulation International.

Dr. Yingshu Li was awarded a \$50,000 grant from the National Science Foundation for a project titled "SGER: A New Framework for Energy-Efficient and Realtime Data Delivery in Heterogeneous Wireless Sensor Networks." The grant, which runs for one year, will support research into emergency warning systems based on wireless sensor networks. Using wireless sensors is expected to provide an energy-efficient way of providing warnings in real time. Dr. Li hopes that the project's integration of research and education will attract both undergraduate and graduate students to the area of wireless sensor networks.

Dr. Yi Pan delivered an invited talk in plenary session at the 2008 Artificial Neural Networks in Engineering conference (ANNIE 2008), which was held in St. Louis on November 9–12. The title of his talk was "Clustering Support Vector Machines with Application to Prediction of Protein Local Tertiary Structures." The focus of ANNIE 2008 was building "smart" components that can interact with their environment and adapt to changes in it. The conference was organized by the Missouri University of Science and Technology.

Dr. Yi Pan gave a keynote talk entitled "Protein Structure Prediction and Its Understanding Based on Machine Learning Methods" at the 9th International Conference for Young Computer Scientists (ICYCS 2008). The conference was held in Zhang Jia Jie, Hunan, China on November 18–21. It was organized by Central South University and sponsored by the China Computer Federation.

RECENT DEPARTMENTAL COLLOQUIA

September 11. "Bioinformatic Approaches for Studying Diseases," *Dr. Dong Xu*, University of Missouri-Columbia (Molecular Basis of Disease Distinguished Lecture Series)

GRADUATE FELLOWSHIP WINNERS ANNOUNCED

The winners of Molecular Basis of Disease (MBD) and Brains & Behavior (B&B) fellowships were recently announced. New MBD fellowships were awarded to the following computer science graduate students:

- Nael Abu-Halaweh
- Yan Chen
- Wooyoung Kim
- Xue Wang

The following students hold MBD fellowships that were awarded in prior years:

- Irina Astrovskaia
- Xiong Cheng
- Zejin Ding
- Stefan Gremalschi
- Stephen Pellicer
- Anjum Reyaz-Ahmed
- Kelly Westbrook

A new B&B fellowship was awarded to the following student:

- Rasanjalee Dissanayake

The following students hold B&B fellowships from prior years:

- Rizi Aznita
- Akshaye Dhawan

- Stefanie Markham
- James Reid
- Xiaoyuan Suo

Each fellowship provides a stipend of \$22,000 per year. Fellowships last for one year but can be renewed for up to three years.

Molecular Basis of Disease is a program in computational biomedicine that includes faculty in six departments engaged in interdisciplinary research: Biology, Chemistry, Computer Science, Physics and Astronomy, Mathematics and Statistics, and Computer Information Systems. The program provides both graduate and undergraduate fellowships as well as support for state-of-the-art facilities in these departments.

Brains & Behavior is a Georgia State initiative that unites a wide variety of researchers who bring unique perspectives about how nervous systems produce behavior. B&B research groups foster collaboration among faculty from Biology, Chemistry, Computer Information Systems, Computer Science, Mathematics and Statistics, Philosophy, Physics and Astronomy, and Psychology.

DHAWAN WINS AWARD AT HIPC

Ph.D. student Akshaye Dhawan won a Best Poster Presentation Award for a short paper, "On Distributed Algorithms for Maximizing

the Network Lifetime in Wireless Sensor Networks," that he presented at a Student Research Symposium held in conjunction with the 15th Annual IEEE International Conference on High Performance Computing (HiPC 2008). He received a cash prize of \$250. Mr. Dhawan was also the author of a full paper presented at HiPC 2008. The paper, titled "Energy Efficient Distributed Algorithms for Sensor Target Coverage Based on Properties of an Optimal Schedule," was co-authored by his Ph.D. advisor, Dr. Sushil Prasad. The conference was held in Bangalore, India, on December 17–20.

DING RECEIVES TRAVEL GRANT

Ph.D. student Zejin (Jason) Ding was awarded a \$400 travel grant from the 2008 IEEE Symposium on Computational Intelligence in Bioinformatics and Computational Biology (CIBCB 2008). Grants were awarded to four students who presented papers at the conference; Mr. Ding was the only student at a U.S. college to win one. CIBCB 2008 focused on computational-intelligence-based methods for bioinformatics, computational biology, and bioengineering problems. The conference was held at the Sun Valley Resort in Sun Valley, Idaho, on September 15–17. Mr. Ding's Ph.D. advisor is Dr. Yan-Qing Zhang.

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*published by the
Department of Computer Science
Georgia State University*

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Have something to say?

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