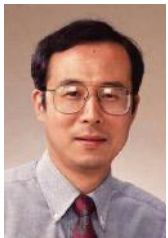


pointers

DEPARTMENT OF COMPUTER SCIENCE
GEORGIA STATE UNIVERSITY

FALL 2009

MESSAGE FROM THE CHAIR



Dr. Yi Pan

It is my great pleasure to announce in this issue that Dr. Raheem Beyah and Dr. Xiaolin Hu have won NSF CAREER awards. They join Dr. Xiaojun Cao and Dr. Yingshu Li, who received CAREER awards in previous years. All four

of our department's assistant professors now hold CAREER awards, an event that is unprecedented in the history of Georgia State University.

These awards reflect the talent and hard work of our younger faculty. I am very proud of these faculty members. I expect all of them to become leaders in their fields as they continue to build their careers.

BEYAH AND HU RECEIVE NSF CAREER AWARDS

Dr. Raheem Beyah and Dr. Xiaolin Hu have both received awards from the National Science Foundation's Faculty Early Career Development (CAREER) Program. The CAREER grant, which emphasizes high-quality research and novel education initiatives, is the most competitive and prestigious award from NSF to young faculty members in science and engineering fields. Dr. Beyah will receive

WE NEED YOUR HELP

These are exciting times in the Department of Computer Science. Our program is rapidly expanding. We are hiring nationally-recognized scholars who conduct state-of-the-art research, and we are attracting the best students from around the world. Your generous donation will help us continue to improve in the years ahead. For information about giving to the department, please visit cas.gsu.edu/giving.aspx. Your gifts are tax-deductible to the fullest extent allowed by law. To ensure that your donation reaches us, please designate that it go to "Computer Science."

\$400,000 over a five-year period; Dr. Hu will receive \$425,000.

Dr. Beyah's proposal was titled "A Networking Approach to Host-based Intrusion Detection." In it, he proposes to develop network-based defense systems for protecting cyber infrastructure from threats. His strategy avoids the weaknesses of the traditional approach, which attempts to secure a node by placing a defense mechanism (for example, an intrusion detection system) at the node. This approach may provide an additional avenue through which the host can be compromised.

Another goal of Dr. Beyah's proposal is to broaden the participation of groups traditionally underrepresented in science, technology, engineering, and mathematics. His proposal includes a summer academy at which he will actively engage underrepresented middle school students by using technology to convey computer architecture and computer networking concepts.

Dr. Beyah joined the Department of Computer Science in 2005 as an assistant professor. He received a B.S. in electrical engineering from North Carolina A&T State University in 1998. He earned M.S. and Ph.D. degrees in electrical and computer engineering from the Georgia Institute of Technology in 1999 and 2003. Dr. Beyah's research interests include network security, security visualization, and Internet traffic characterization.

Dr. Hu's proposal was titled "Large-Scale Spatial Temporal Data Driven Simulation with Sequential Monte Carlo Methods." Advances in sensor and network technologies have made it possible for simulations to incorporate real-time data, leading to a new paradigm of dynamic data-driven simulation. In such a sys-

tem, real-time data is continually fed into the simulation to improve its predictive abilities. Dr. Hu is planning to use Sequential Monte Carlo methods to incorporate probabilistic techniques into the dynamic data-driven simulation approach. His research may potentially benefit other fields in which sophisticated simulation models are used, such as manufacturing, transportation, geo-ecological science, and national security. Dr. Hu's work will build on his previous research into developing a software system to support real-time optimal decision-making for wildfire management.

Dr. Hu joined the Department of Computer Science in 2004 as an assistant professor. He received a B.S. from the Department of Automatic Control at Beijing Institute of Technology in 1996, an M.S. in computer engineering from the Institute of Automation at the Chinese Academy of Sciences in 1999, and a Ph.D. in electrical and computer engineering from the University of Arizona in 2004. Dr. Hu's research interests include modeling and simulation, autonomous agent and multi-agent systems, model-based development, and software engineering.



Dr. Raheem Beyah



Dr. Xiaolin Hu

CONTENTS

- 1 Message from the Chair
- 1 Beyah and Hu Receive NSF CAREER Awards
- 2 ISBRA 2009 Held in Fort Lauderdale
- 2 Weeks Teaches iPhone Development
- 2 Department Acquires Cluster Server
- 2 Computer Science Tutoring Center Opens
- 3 Department Hosts Visiting Scholars
- 3 Computer Science "Major in a Minute" Video Released
- 3 Weeks Awarded STEM Faculty Fellowship
- 3 Faculty News
- 3 Alumni News
- 4 Dhawan Speaks at Brains & Behavior Retreat
- 4 Ph.D. Students Participate in MBD Research Day

ISBRA 2009 HELD IN FORT LAUDERDALE

In May, the Department of Computer Science helped organize the Fifth International Symposium on Bioinformatics Research and Applications (ISBRA 2009), which drew researchers, developers, and practitioners working on all aspects of bioinformatics and computational biology and their applications. Attendees came from 10 countries and 15 U.S. states. ISBRA was held at Georgia State in 2007 and 2008. This year, the conference moved to Nova Southeastern University in Fort Lauderdale, Florida.

The symposium featured 26 papers (selected by the program committee from 55 submissions) and 22 posters. Six distinguished scientists gave keynote talks: Dr. Nick Eriksson (23andMe, Inc.), Dr. Mikhail Gelfand (Russian Academy of Sciences), Dr. Itsik Pe'er (Columbia University), Dr. Shamil Sunyaev (Harvard Medical School), Dr. Nicholas Tsinoremas (University of Miami), and Dr. Esko Ukkonen (University of Helsinki).

The proceedings of ISBRA 2009 were published as volume 5542 of the Springer Lecture Notes in Bioinformatics series. Special issues of *IEEE/ACM Transactions on Computational Biology and Bioinformatics* and *Journal of Computer Science and Technology* will be devoted to expanded versions of the best symposium papers.

Four best poster awards were presented at the conference:

- Irina Astrovskaya and Alex Zelikovsky (Georgia State University), "Genotype Tagging with Limited Overfitting"
- Jen-hwa Chu, Scott T. Weiss, Vincent J. Carey, and Benjamin A. Raby (Brigham and Women's Hospital), "A Graphical Model Approach for Inferring Large-Scale Networks Integrating Gene Expression and Genetic Polymorphism"
- Jorge Duitama, Ion Mandoiu, and Pramod K. Srivastava (University of Connecticut), "Bioinformatics Pipeline for Detection of Immunogenic Cancer Mutations by High Throughput mRNA Sequencing"
- Michael Robinson (Florida International University), Camilo Silva (FIU), S. Masoud Sadjadi (FIU), Guangyuan Liu (Chinese Academy of Sciences), and Giri

Narasimhan (FIU), "Finding Repeats and Signatures in DNA Sequences Using MPI Clusters"

The general chairs of ISBRA 2009 were Dr. Matthew He (Nova Southeastern University) and Dr. Alex Zelikovsky. The program chairs were Dr. Ion Mandoiu (University of Connecticut), Dr. Giri Narasimhan (Florida International University), and Dr. Yan-Qing Zhang. Dr. Raj Sunderraman was the publicity chair, Dr. Anu Bourgeois was the finance chair, and Dr. Yufeng Wu (University of Connecticut) and Dr. Craig E. Nelson (University of Connecticut) were the poster chairs. Ph.D. student Zejin (Jason) Ding was the conference webmaster.

Financial support for ISBRA 2009 was provided by Georgia State's Molecular Basis of Disease Program.

WEEKS TEACHES IPHONE DEVELOPMENT

During the Spring Semester, Dr. Michael Weeks taught the rudiments of iPhone programming to students in his CSc 4110/6110 course.

The iPhone was introduced by Apple Inc. in 2007. In 2008, Apple began allowing developers to create iPhone applications ("apps") that would be sold through Apple's App Store. Apps have been very popular with iPhone users, with over 85,000 apps currently available and over two billion apps downloaded.

The popularity of the iPhone led Dr. Weeks to switch to that platform for the latest offering of CSc 4110/6110. He has taught the course, titled Introduction to Embedded Systems Laboratory, for the past six years.

To write their iPhone apps, students in the course used Xcode, Apple's development environment for Mac OS X, along with the iPhone SDK. Students had to learn the Objective-C language, an object-oriented version of C. They could either develop programs on their own Macintosh computers or use one of the Macs in Classroom South 400, a laboratory operated by the department. Each student could borrow an iPod touch for testing apps.



(The iPod touch runs the same software as the iPhone.) Funding for the iPod touches used in the class was provided by student technology fees.

Nine students enrolled in the course, which Dr. Weeks hopes to offer again in the spring of 2010.

DEPARTMENT ACQUIRES CLUSTER SERVER

The Department of Computer Science recently acquired a cluster server, named Cheetah, which is now up and running. The new server, which was purchased at the request of Dr. Sushil Prasad, has a heterogeneous architecture that allows it to be used for shared-memory computing, distributed computing, and GPGPU programming.

Built by Advanced Clustering Technologies, Inc., Cheetah consists of nine computing nodes plus a head node. Four of the computing nodes have dual quad-core AMD Opteron CPUs, four have dual quad-core Intel Xeon CPUs plus NVIDIA GeForce GTX 280 GPUs, and one has four quad-core AMD Opteron CPUs. Including the head node, Cheetah has 88 CPU cores and 144GB of system memory. Nodes are connected through InfiniBand and gigabit Ethernet switches.

Cheetah runs the CentOS 5.2 operating system. Installed software includes GCC, Java, NVIDIA's CUDA 2.0 development tools, PGI Server, Open MPI, additional MPI libraries including MPICH2 and MVAPICH/MVAPICH2, Sun Grid Engine, Ganglia Monitoring System, and ns-2 network simulation software.

Cheetah, which was purchased with \$39,000 of student technology fee funds, will be used for both teaching and research. All graduate students may have a Cheetah account; undergraduate students doing research are also eligible. Students enrolled in certain courses, including CSc 4310/6310 (Parallel and Distributed Computing), will use Cheetah for homework and projects.

The department's first multiprocessor computer, Hydra, is still in use. Hydra is a shared-memory computer built by SGI. Originally an eight-processor machine when it was purchased in 2000, Hydra now has 24 CPUs and 4GB of shared memory.

COMPUTER SCIENCE TUTORING CENTER OPENS

In January, the Department of Computer Science began operating a tutoring center for students enrolled in several core undergraduate courses (CSc 2010, CSc 2310, CSc 2510, CSc 3210, CSc 3320, and CSc 3410). The center is located in Suite 2117 of the One Park Tower building at 34 Peachtree Street. Tutoring is free and available to all students enrolled in these courses.

RECENT PH.D. GRADUATES

Evelyn Brannock. *Dissertation:* Using the Discrete Wavelet Transform to Haar'd Code a Blind Digital Watermark. *Advisor:* Dr. Michael Weeks. *Current position:* Assistant professor, Department of Information Technology, Georgia Gwinnett College. (May 2009)

Kelly Westbrook. *Dissertation:* Biological Inference Using Flow Networks. *Advisor:* Dr. Alex Zelikovsky. *Current position:* Independent consultant. (May 2009)

Hong Yang. *Dissertation:* Modeling and Querying Graph Data. *Advisor:* Dr. Raj Sunderraman. *Current position:* Senior software engineer, Engineering Division, Web Security Research, McAfee, Inc. (May 2009)

DEPARTMENT HOSTS VISITING SCHOLARS

The department was honored to host two new visiting scholars during Spring Semester.

- **Yongqiang Chen.** Dr. Chen is an associate professor in the College of Computer Science at Wuhan University of Science and Engineering in China. His research areas include artificial Intelligence, neural networks, and pattern recognition. During his visit, which lasted from February 2009 to July 2009, he collaborated with Dr. Yan-Qing Zhang on research in neural networks. Dr. Chen was supported by Wuhan University of Science and Engineering.
- **Ruiying Du.** Dr. Du is an associate professor in the College of Computer Science at Wuhan University in China. Her research areas are networking and information security. During her visit, which will last from January 2009 to January 2010, she is collaborating with Dr. Yingshu Li on research in security issues in wireless sensor networks. Dr. Du is supported by the China Scholarship Council, a nonprofit institution affiliated with China's Ministry of Education.

COMPUTER SCIENCE "MAJOR IN A MINUTE" VIDEO RELEASED

The College of Arts and Sciences has released a short video to promote the computer science major and give students tips on how to make the most of it. The video is one of a series called "Major in a Minute" being created for the College's Major Matters program. The goal of the Major Matters program is to help undergraduate students choose the right major and chart a course toward finishing their degrees.

Dr. Anu Bourgeois, the department's Director of Undergraduate Studies, is featured in the video; a number of CS majors also appear in it. The video is available at the College of Arts and Sciences web site, YouTube (youtube.com/watch?v=_sPL4XXJPK), and iTunes U (look under Georgia State University/Life at Georgia State/College of Arts and Sciences). The video was created by Alex Kreuter, a media specialist who works for the Dean of Arts and Sciences.

WEEKS AWARDED STEM FACULTY FELLOWSHIP

Dr. Michael Weeks has been named a STEM Faculty Fellow by Dr. Cheryl Lynn Morrow, the director of Georgia State's STEM Initiative. Fellowships were awarded to twelve faculty members to promote innovative teaching in STEM (Science, Technology, Engineering, and Mathematics) disciplines.

One goal of the STEM Fellowship is to encourage collaborations with social science faculty and faculty in the College of Educa-

tion. Dr. Weeks will collaborate with Dr. Brendan Calandra, an associate professor of learning technologies in the Department of Middle-Secondary Education and Instructional Technology. Both Dr. Weeks and Dr. Calandra will receive \$6,800. Their team was one of eight selected to receive a grant from among 14 submissions.

The project proposed by Dr. Weeks and Dr. Calandra is titled "Creating Educational Simulations for STEM Teachers' Professional Development." The first stage of the project involves creating video recordings of preservice science teachers in actual classrooms. Participants will then select one exemplary teaching incident and one in need of improvement. Exemplary teaching incidents will be shared within the group via Georgia State's iTunes U portal. Incidents that need improvement will be used in stage two of the project.

The second stage focuses on providing simulated teaching experiences in Second Life, a popular 3-D virtual world. Dr. Weeks is planning to develop a virtual version of a science classroom and populate it with avatars of virtual schoolchildren and a virtual teacher. Preservice teachers will reenact their "needs improvement" incidents within this environment. Some of the virtual children will be controlled by other teachers in the group, but other children will be "bots" that simply follow artificial intelligence rules.

STEM Faculty Fellowships are administered by Georgia State's STEM Initiative, the Center for Teaching and Learning, and the Office of the Provost.

FACULTY NEWS

Dr. Raheem Beyah has been elevated to Senior Member grade in the Institute of Electrical and Electronics Engineers. Senior Member is the highest grade for which IEEE members can apply. Dr. Beyah joins Dr. Anu Bourgeois, Dr. Yi Pan, and Dr. Michael Weeks, who are also IEEE Senior Members.

Dr. Raheem Beyah and **Dr. Anu Bourgeois** were commended by Kevin F. Gaw, the director of University Career Services, for "supporting the career development process of Georgia State University students." In his letter of commendation, Dr. Gaw said that each of these faculty members "has been a true advocate for students seeking career assistance."

Faculty and staff selected for this honor were chosen from a pool nominated by University Career Services staff.

Dr. Xiaojun Cao has been chosen to serve as an associate editor of *IEEE Communications Letters*, a monthly journal of the IEEE Communications Society. Unlike other journals, *IEEE Communications Letters* offers researchers a quick way to share their latest results, with publication occurring within four months of submission.

In March, **Dr. Xiaolin Hu** gave a talk entitled "Towards Dynamic Data Driven Simulation for Wildfire Management" at Columbus State University as part of the Computer Science Colloquium Series.

Dr. Yingshu Li has joined the editorial board of *International Journal of Wireless and Mobile Computing*, a quarterly journal published by Inderscience Publishers. *IJWMC* publishes both theoretical and practical contributions on all aspects of wireless communications and mobile computing.

Dr. Yingshu Li served as a program chair for the Second ACM International Workshop on Foundations of Wireless Ad Hoc and Sensor Networking and Computing (FOWANC 2009). The workshop was held in New Orleans on May 18 in conjunction with MobiHoc 2009. FOWANC 2009 was sponsored by ACM SIGMOBILE.

ALUMNI NEWS



Dr. Bryson Payne, Chief Information Officer at North Georgia College & State University in Dahlonega, has been named Chair-Elect of the Board of Regents' Administrative Committee on Information Technology, the professional advisory group of all 35 University System of Georgia CIOs and IT directors. Dr. Payne has served as CIO at North Georgia since 2006; prior to that, he was an assistant professor of computer science and information systems at North Georgia and at Georgia College & State University in Milledgeville. He was one of two recipients of the Ph.D. from our department when the degree was first awarded in 2004. Bryson and his wife Beverly live in Dahlonega with their one-year-old son Alex.

RECENT DEPARTMENTAL COLLOQUIA

March 13. "Identification of Molecular Biomarkers by Analyzing 'Omics' Data Using Integrative Systems Biology Strategy," *Dr. Youping Deng*, SpecPro, Inc.

March 24. "The Giants of Wireless," *Dr. Bert Lundy*, Naval Postgraduate School

April 10. "Is Computer Science Really a Science?" *Dr. Ross Gagliano*, RosarioPub.com

June 18. "Neurodynamic Optimization and Its Applications for Winners-Take-All," *Dr. Jun Wang*, The Chinese University of Hong Kong

DHAWAN SPEAKS AT BRAINS & BEHAVIOR RETREAT

Ph.D. student Akshaye Dhawan gave a presentation titled “NeuronBank: A Computer Science Perspective” at the Brains & Behavior 2009 Spring Retreat. Five GSU students holding Brains & Behavior Fellowships were invited to speak; Mr. Dhawan was the only one from Computer Science. The retreat was held at the Loudermilk Center near campus on May 13. Mr. Dhawan’s advisor is Dr. Sushil Prasad.

PH.D. STUDENTS PARTICIPATE IN MBD RESEARCH DAY

A number of computer science Ph.D. students participated in this year’s Molecular Basis of Disease Research Day, which was held on May 22 in the Student Center Ballroom. Kelly Westbrook, who received his Ph.D. in May, gave a talk on “HCV Quasispecies Assembly Using Flow Networks.” His co-authors included fellow Ph.D. student Irina Astrovskaya and his advisor, Dr. Alex Zelikovsky. In addition, many of the presentations during the poster session involved current and former Ph.D. students and their advisors:

- Na’el Abu-Halaweh and Dr. Robert Harrison, “Prediction of MicroRNA Precursors Using Fuzzy Decision Trees”

- Irina Astrovskaya and Dr. Alex Zelikovsky, “Genotype Tagging with EM”
- Yan Chen and Dr. Yan-Qing Zhang, “Selective Neural Network Ensemble for Protein Secondary Structure Prediction”
- Qiong Cheng, Dr. Robert Harrison, and Dr. Alex Zelikovsky, “MetNetAligner: A Web Service Tool for Metabolic Network Alignments”
- Zejin Jason Ding, Nan Xie, Dr. Yan-Qing Zhang, and Yujun George Zheng, “Identifying New Methylated Arginines via Granular Decision Fusion with SVM Modeling”
- Wooyoung Kim, Bernard Chen, Jingu Kim, Haesun Park, and Dr. Yi Pan, “Sparse Nonnegative Matrix Factorization for Protein Sequence Motifs Information Discovery”
- Stefan Gremalschi, Gulsah Altun, Irina Astrovskaya, and Dr. Alex Zelikovsky, “Mean Square Residue Biclustering with Missing Data and Row Inversions”
- Stephen Pellicer and Dr. Yi Pan, “High Performance Peer-to-Peer Gene Sequence Alignment Visualization”
- Anjum Reyaz-Ahmed, Dr. Robert Harrison, and Dr. Yan-Qing Zhang, “Assessment of Protein Structures Using Machine Learning Technique”
- Xue Wang, Kun Zhao, Michael Kirberger, Dr. Guantao Chen, and Jenny Yang, “Predicting Protein Calcium-Binding”
- Kun Zhao, Xue Wang, Michael Kirberger, Dr. Guantao Chen, and Jenny Yang, “Prediction and Structural Analysis of Calcium-Binding Proteins”

STUDENTS RECEIVE AWARDS AT HONORS NIGHT

Four computer science students received departmental awards at the annual Arts and Sciences Honors Night ceremony:

Outstanding Senior Award: Eric Topasna

Outstanding Graduate Research Award: Fasheng Qiu

Outstanding Teaching by a Graduate Student Award: Irina Astrovskaya

Outstanding Graduate Student Award: Navin Viswanath

The event was held on April 6 in the Student Center Ballroom.

pointers

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

**P.O. BOX 3994
ATLANTA, GA 30302-3994**

Have something to say?

Mail suggestions and alumni news to
webmaster@cs.gsu.edu.