

Computer & Information Science & Engineering

Professor awarded the coveted Alfred P. Sloan Research Fellowship



Chris Jermaine, an assistant professor in the CISE Department, has been awarded an Alfred P. Sloan Research Fellowship for 2008-2010.

This is the first time that a faculty member in UF's College of Engineering has received this award, which is the oldest and is widely considered the most prestigious of its kind.

The Sloan Research Fellowships were established in 1955 to provide support and recognition for the very best young faculty members in specified fields of science.

A total of 118 fellowships are awarded annually in seven fields: chemistry, computational and evolutionary molecular biology, computer science, economics, mathematics, neuroscience and physics. Thirty-five Sloan Fellows have won Nobel Prizes later in their careers, fourteen have won the Fields Medal in Mathematics, and hundreds have received other honors.

Faculty member wins prestigious NSF Career Award



Prabhat Mishra, an assistant professor in the CISE Department, received the prestigious NSF CAREER Award for his research project entitled, "New Directions in Functional Verification of Heterogeneous Multicore Architectures." He is the ninth CISE faculty member to receive the honor. The Faculty Early Career Development Program, sponsored by the National Science Foundation, is one of the most prestigious awards for new faculty. The NSF CAREER program recognizes and supports early career-development activities of teacher-scholars who are most-likely to become the academic leaders of the 21st century, according to the NSF Web site. The award provides more than \$400,000 during a five-year period.

New Directions in Functional Verification of Embedded Systems

Embedded systems are used everyday, everywhere, and are used in biomedical, military, geological and space equipment. The complexity of such systems is increasing at an exponential rate due to advances in technology and demand for realization of ever more complex applications in communications, multimedia, networking and entertainment. The complexity of designing and verifying such systems is also increasing. A recent study suggests almost half of the System-on-Chip (SOC) designs fail at the very first time. The total cost of each failure ranges from hundreds of thousands to several million dollars. These failures have tremendous impact on cost, time-to-market and quality of the final product.

Prabhat Mishra, an assistant professor in the CISE Department, is investigating the fundamental issues related to design automation of embedded systems. His research group focuses on developing tools, techniques and methodologies for code compression, test generation, simulation, architecture synthesis and functional verification of SOC architectures. Their work has identified three fundamental reasons for why there are so many functional errors, those being the lack of a golden reference model, lack of a comprehensive functional coverage metric and or automated techniques for directed test generation.

Manuel Bermudez, associate professor, received a \$15,000 IPPD grant from General Dynamics Corp. for a project entitled "Enabled Digital Manufacturing Toolset."

Timothy Davis, professor, was elected as a member of the Society for Industrial and Applied Mathematics Council. The organization "ensures the strongest interactions between mathematics and other scientific and technological communities through membership activities, publication of journals and books, and conferences."

Paul Fishwick, professor, received a \$128,284 grant from the U.S. Department of the Army (Medical Research Acquisition) for a project entitled "A Model Immersive Cultural Learning Environment." Fishwick served as Program co-chair of the 2007 International Workshop on Visual Languages and Computing held in San Francisco from September 6-8, 2007.

Sumi Helal, professor, was invited to serve as the program co-chair of the Sixth International Conference On Smart Homes and Health Telematics to be held at Iowa State University from June 28-July 2, 2008. He will also serve as the general co-chair of the Fourth IET International Conference on Intelligent Environments to be held at the University of Washington in July 2008.

Prabhat Mishra, assistant professor, received the International Educator of the Year Award for the College of Engineering in November 2007 in recognition of his outstanding international endeavors. In January 2008, he was awarded a \$400,000 CAREER Award from the National Science Foundation for his research project entitled "New Directions in Functional Verification of Heterogeneous Multicore Architectures."

Richard Newman, assistant professor, was recently appointed to the editorial advisory board of the Wiley publication International Journal of Network Management, a journal that allows researchers, developers and practitioners in network management to present their work to an international audience.

Jih-Kwon Peir, associate professor, received a \$6,029.96 grant from the U.S. Department of Veterans Affairs for a project entitled "Developing and Maintaining MS Access Modules and VA Database."

Sanjay Ranka, professor, received a contract for \$40,000 from the California Institute of Technology for a project entitled "PlaNetS: Physics Lambda Network System." He was also awarded \$71,167 from Florida International University for a research project entitled "An Inter-Regional Grid-Enabled Center for Research and Educational Outreach."

Gerhard X. Ritter, professor, has received an invitation to join the People to People Citizen Ambassador Programs' Optical Engineering Delegation to China in October 2008. As a member of the delegation, he will represent his profession while advancing the ideals of People to People International, a nonpolitical, private-sector organization dedicated to promoting international understanding.

Sartaj Sahni, distinguished professor and chair, was a keynote speaker at the International Conference on Information Systems, Technology, and Management, which was held in Dubai, United Arab Emirates, from March 6-8.

Mark Schmalz, associate scientist, was awarded a \$40,000 grant from Frontier Technology, Inc. for a project entitled "DASDAF - Dynamically Adaptive Sensor Data Fusion."

Meera Sitharam, associate professor, gave a two-hour short course on geometric constraint solving at the 10th Society for Industrial and Applied Mathematics biennial meeting on geometric design and computing in San Antonio, Texas, from November 4-8, 2007.

Baba Vemuri, professor, was invited to serve as program chair for the Indian Conference on Computer Vision Graphics and Image Processing to be held in Bhubaneswar, India, in December 2008.

Joseph Wilson, assistant professor, was invited to chair two sessions at the International Geoscience and Remote Sensing Symposium 2008 on remote sensing for landmine and unexploded ordnance identification and removal, to be held in Boston from July 6-11, 2008.



Anna Hernandez
Office Assistant
Anna Hernandez joined CISE in January after graduating from UF with a bachelor's degree in economics and minor in business administration. As an office assistant, she is

responsible for handling graduate assistant appointments, payroll transactions, creating various budget reports and assists with the Department's newsletter. While pursuing her bachelor's degree, Anna interned at Valero Aruba Oil Refinery in the Economic Planning and Research Department. Anna says she enjoys reading fiction, watching movies, biking and tennis.

staff spotlight



David Castellanos
Office Assistant
David Castellanos has been working in the CISE Department since the fall of 2005. Castellanos serves as Departmental liaison with the College of Engineering and Central Personnel

Offices to ensure accurate appointment processing. Castellanos is the Department's go-to man for all issues regarding payroll, distributions, time reporting and new hires; and he ensures that all members of staff and faculty are paid correctly and from the correct source. He also makes recommendations for establishment and implementation of Departmental policies relating to personnel issues. A California native, Castellanos moved to Gainesville after completing his bachelor's degree in music at the University of California - Berkeley, where he focused on the history and structure of music. Before working in the CISE Department, Castellanos was an office assistant with the Romance Languages and Literature Department, and before that, he was in charge of mail distribution in the UF Registrar's office. Castellanos says that he still enjoys playing music, watching sports and barbecuing.

Chip multiprocessors (CMPs) have become an industry standard for achieving a higher chip-level IPC (Instruction-Per-Cycle). Recently, Intel's Tara-scale computing project pushes the number of on-die cores to unprecedented levels. Future CMPs will likely adopt the emerging 3-D stacking technology in handling off-chip memory accesses. By stacking DRAM die(s) on top of the logic die with fast vertical interconnect, the critical memory access latency and bandwidth can be improved significantly. The organization of the memory hierarchy must take advantage of the 3-D memory+logic stacking so that instructions and data can be supplied and routed to many cores quickly and efficiently.

We anticipate a class of CMP organization as shown in Figure 1, which consists of many cache modules, each local to a core. The cores and caches are interconnected through a 2-D-mesh network and form a tile-like structure. Block-interleaved memory modules are located directly above the associated core-cache pairs and can be accessed through the fast vertical interconnect. The cache modules can be organized as individual private caches to each core or they can be shared through block migration, collaborative caching or dynamic cache repartitioning.

In such an architecture with a large number of cores and cache modules, it becomes inherently difficult to locate a copy (or copies) of a requested block and keep them coherent. When a requested block is not located in the local cache module, one strategy is to search all other cache modules. This approach is only applicable to a small system using broadcast interconnect. To avoid broadcasting and searching all cache modules, directory-based cache-coherence schemes have been the choice for building scalable cache-coherent multiprocessors. A separate cache coherence directory can be established to record the state and locations of all the cached blocks. When a requested block is not present locally, a search through the coherence directory can locate the block in other cache modules.

One key difficulty in designing such a directory is handling the space explosion problem for recording the locations of shared blocks on CMP with large number of cores. Existing solutions try to save space by compromising certain precision and/or limiting the number of sharers. Imprecise coherence directory is not suitable on CMP due to frequent needs for cache-cache data transfer. Limiting the number of sharers increases remote cache accesses and degrades overall performance.

We investigate a space-efficient hybrid presence vector that can be transformed dynamically between two different formats: a full-presence vector for widely shared blocks, and a sparse presence vector for exclusive or narrowly shared blocks. Both types of blocks exist in multithreaded commer-

cial workloads. Performance evaluations show that given the directory entry that matches the total on-die cache frames, the hybrid presence vector can match the full-presence vector performance with 30 to 40 percent of the space overhead. On the other hand, when the directory size reduces, the hybrid presence vector outperforms the full-presence vector by 8 to 10 percent with the same space overhead.

Regardless of intelligent caching mechanisms, when the working set of applications is substantially bigger than what the on-die cache can retain, the requested data blocks often need to be fetched directly from memory, which incurs significant delays and degrades CMP performance. Therefore, the second research issue is to investigate an efficient and accurate data prefetching technique for bringing the blocks that the cores likely need in the near future. Our analysis of SPEC applications shows that adjacent traversals of various data structures, such as arrays, trees and graphs, often exhibit temporal repeated memory access patterns.

A unique feature of these nearby accesses is that they exhibit a long but equal reuse distance but are difficult to retain in caches. We define such a group of memory references as a Coterminous Group (CG) and the highly repeated access patterns among members in a CG as coterminous locality. The CG-prefetcher identifies and records highly repeated CGs in a small buffer for accurate and timely prefetches for members in a group. Performance evaluations show that the proposed prefetcher can accurately cover up to 40 to 50 percent of the total misses, and result in 50 to 60 percent of potential performance improvement for several selected workload mixes on CMPs.

Research in this article was conducted in collaboration with professor Ye Xia and with Jih-Kwon Peir's doctoral students, Xudong Shi, Zhuo Huang, Feiqi Su, Zhen Yang, and Gang Liu. The research project is supported in part by NSF and Intel.

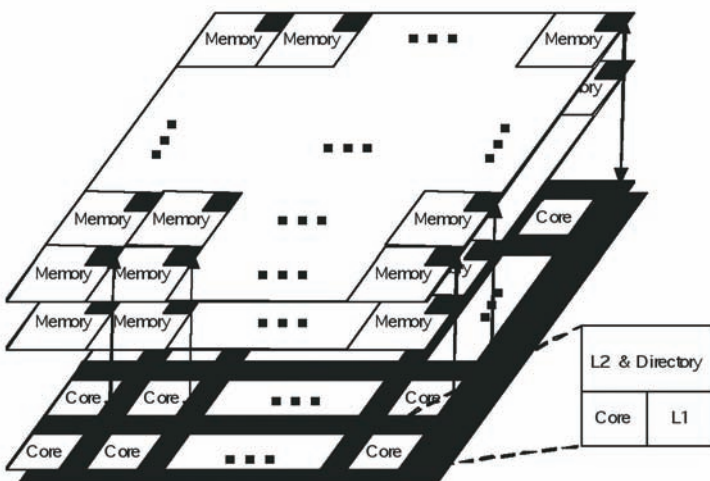
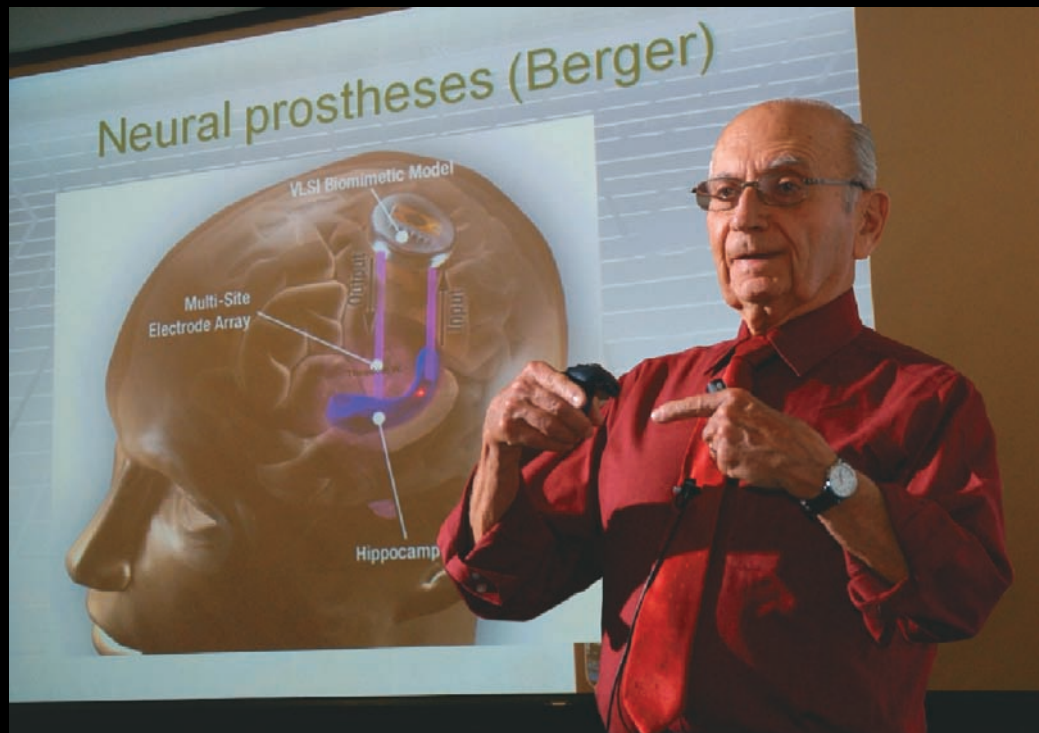


Figure 1. 3-D CMP architectures with many cores, caches, memory and coherence directory modules.

Renowned researchers invited to present in the Barr Systems Distinguished Lecture Series



Tony Barr, founder of Barr Systems Inc., attending the Barr Systems lecture.



George A. Bekey, presenting in the Barr Systems Lecture Series.

The

Barr Systems Distinguished Lecture Series attracts leaders in the field of computer science and engineering with common research interests as faculty in the CISE Department and the College of Engineering. Barr speakers are among a select group of scholars. Many have been elected as members of the National Academy of Engineering, and all are world-renowned researchers, with significant impact on their field of expertise. Most hold endowed professorships or are deans in top schools and are fellows of the professional institutes of their respective areas. Having speakers of such caliber at UF generates a lot of excitement among faculty and students and brings visibility to the research conducted by CISE researchers. It provides faculty and students with a unique opportunity for discussion and intellectual exchange with some of the best-established researchers in the field.

The Barr Systems series is funded by Tony Barr, founder of Barr Systems, Inc., which designs, manufactures, markets and

supports high-performance data communication and output management products. Barr Systems is headquartered in Gainesville.

The following distinguished speakers were invited to the CISE Department as part of this lecture series during the 2007-08 academic year:

- Demetri Terzopoulos**, chancellor's professor of computer science, University of California, Los Angeles.
- George A. Bekey**, professor emeritus of computer science and biomedical engineering, University of Southern California.
- Randal E. Bryant**, dean of the Carnegie Mellon University School of Computer Science, Carnegie Mellon University.
- P. R. Kumar**, Franklin W. Woeltge Professor of Electrical and Computer Engineering, University of Illinois, Urbana-Champaign.

Alin Dobra

Summarizing data for fast query processing

Due to technological advances in the last two decades, the ability to produce and store information has increased tremendously. When we consider the amount of information transmitted through the Internet or even the amount of information stored on our personal computers, we realize that processing the information even in simple ways promises to be challenging. A careful look at the ability to process information reveals that the processing has not kept up with the speed of transmission and storage of information. Large databases are proof of this. It can take days or weeks to process some queries even though the information easily fits on a single hard drive.

Approximate query processing is a research subarea in database research that deals with the problem of significantly speeding up the processing of queries at the expense of introducing some errors. While errors in general are undesirable, they become acceptable as long as the errors are not too large and they are known. For example, it is desirable to know exactly how much money a company has but, with respect to taking decisions, it might be acceptable to know that it has \$10,532,000±\$1000. As long as the processing time can be significantly reduced, errors like this are justifiable.

Consider the situation in Figure 1, in which the network operation center has to monitor the activity in a number of routers. For exact processing, all the information the routers possess needs to be sent to the central location and processed. If the information is summarized first, the amount of information transmitted is substantially reduced, but also information can be processed more efficiently.

The challenge in approximate query processing is determining what types of

summaries to be used and how the approximate answer can be computed from the summaries efficiently. In order for the information to be useful to the user, a guarantee with respect to the error needs to be provided as well.

There are two major considerations when it comes to data processing. First, data might be created on the fly and never stored -- this is the case in networking. The data might be created at such a high speed or in such large quantity that it is impossible to store. This restriction on data processing is called the data-streaming restriction. Second, data resides or is created at multiple sites. Putting all the data together is inefficient. This restriction on data processing is called distributed processing restriction. These two data processing restrictions put two seemingly distinct constraints on query processing but they can be addressed using the same basic technique: summarize the data.

In order to satisfy the imposed requirements, the summarization techniques need to require only small amounts of memory so slow storage is not used, need to be computed efficiently so the summarization can keep up with the fast stream of data and needs to produce results that are small enough so that a small amount of information needs to be exchanged between parties when data is distributed. The hard part is designing summarization techniques with these characteristics that can produce reasonably accurate results and have provable accuracy guarantees.

Dobra's work is focused on designing summarization techniques suitable for data-streaming and distributed computation. One of the latest results is a summarization technique that consists of the combination of sampling and sketching. The computation of these types of summaries can keep up with very fast data streams like the ones produced by the Internet routers, can be used for distributed computation and are reasonably accurate. The most challenging part about researching these types of summaries is analyzing their properties so the accuracy can be guaranteed. The analysis of sampling type summaries and sketch type summaries had to be combined to analyze these new summaries successfully.

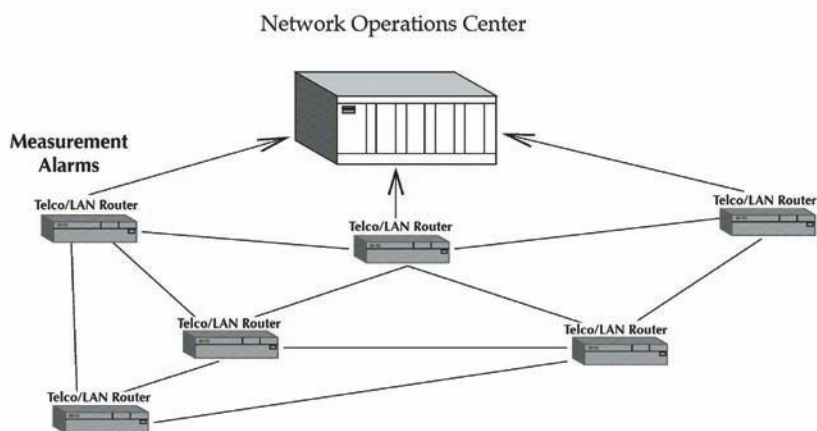


Figure 1. Processing network data

Udayan Kumar, a graduate student under the supervision of Ahmed Helmy, won the student research competition award at the ACM MobiCom conference and received a \$200 prize as well as an honorary plaque. His work, entitled "Gender-based Feature Analysis in Campus-wide WLANs," started as part of a project in Helmy's seminar course. He then continued with a summer-directed research study under Helmy's supervision. Although he is just starting his thesis, Kumar was competing with senior doctoral students from top universities in the U.S. and abroad. The competition consisted of a series of submissions: refereed extended abstract, refereed poster presentation and refereed full presentation, with five judges at MobiCom narrowing down from approximately 30 submissions to 16 posters and, finally, to four final presentations. As one of the top four finishers, Kumar will be invited to compete at the upcoming general ACM research competition (including all conferences).

Wei-Jen Hsu, another of Helmy's students, finished fifth in the ACM MobiCom SRC competition for his work "Profile-Cast: Behavior-Aware Mobile Networking," and received a \$500 travel grant for the conference. Hsu's work "Mining Behavioral Groups in Large Wireless LANs" ranked in the top 11 percent of 233 papers submitted to ACM MobiCom.

Both Kumar and Hsu were invited to submit their work to the ACM MobiCom associated archival journal called *Mobile Computer and Communications Review* for the Fall '07/Spring '08 issue.

Heon-Mo Koo, a doctoral student under the supervision of Prabhat Mishra, received two awards. Koo received the University of Florida Korean Graduate Student Research Award in November 2006. This award is given to the top four Korean researchers at the University of Florida (<http://grove.ufl.edu/~ksa/KGSRA.htm>). He also received the KUSCO-KSEA Scholarship from the Korean-American Scientists and Engineers Association in May 2007. This award is given to the top 17 Korean Researchers in the U.S. in science and engineering. (<http://www.kseahq.org/scholarship/Scholarship4Graduates.aspx>).

Kyle Johnsen, a doctoral candidate, received the Howard Hughes Medical Institute Graduate Student Award (HHMI GSA) in the spring of 2007. The HHMI GSA is awarded to graduate students who participate in research and publication opportunities in the life sciences in collaboration with undergraduates. A CISE undergraduate student and University Scholars recipient, Robert Dickerson, started working with Kyle in Spring 2004 in the Virtual Experiences Research Group headed by Benjamin Lok. During that time, Johnsen and Dickerson worked together to build the InterPersonal Simulator (IPS), a virtual reality system for simulating interpersonal scenarios. The IPS is currently

being used in Lok's virtual patients project to teach medical students patient interviewing skills and to study human-virtual human interaction. Dickerson graduated in spring 2006 having co-authored nine peer-reviewed publications with Johnsen and is now pursuing his doctorate at the University of Virginia. For more information, see <http://www.cise.ufl.edu/research/vegroupp/vp/>.

Brianna Statinoff, an undergraduate student in the Department, has been invited to compete in the ACM International Collegiate Programming Contest, sponsored by IBM and hosted by the University of Alberta. The students will compete against the world's most gifted computer programmers at the 32nd Annual "Battle of the Brains." The ACM International Collegiate Programming Contest (ICPC) traces its roots to a competition held at Texas A&M in 1970 hosted by the Alpha Chapter of the UPE Computer Science Honor Society.

Angelos Barmpoutis, a doctoral student, received a \$5,000 graduate studies grant from Gerondelis Foundation Inc. He was also awarded a \$500 graduate student travel grant for IPMI'07 from the CISE Department. He was also given a bursary award from Oxford University for presenting paper in CIEGL'07.

Student Travel Awards 2007-2008:

- Song, Xiuyao: "Statistical Change Detection for Multi-Dimensional Data," ACM SIGKDD Conference, San Jose, Calif., Aug. 12-15, 2007.
- Boyaci, Cem: "Triangulations Loosing Bundles and Weight," The 19th Annual Canadian Conference on Computational Geometry, Ottawa, Canada, Aug. 20-22, 2007.
- McKenney, Mark: "PLR Partitions: A Conceptual Model of Maps," "Ensuring the Semantic Correctness of Complex Regions," and "Modeling Historical and Future Spatio-Temporal Relationships of Moving Objects in Databases," Workshop on Semantic and Conceptual Issues in Geographic Information Systems (SeCoGIS 2007) in conjunction with the International Conference on Conceptual Modeling (ER 2007), Auckland, New Zealand, Nov. 5-9, 2007.
- Myles, Ashish: "Extending Catmull-Clark Subdivision and PCCM with Polar Structures," Pacific Graphics 2007 in cooperation with ACM SIGGRAPH, Maui, Hawaii, Oct. 29 - Nov. 2, 2007.
- Xu, Fei: "Randomized Algorithms for Data Reconciliation in Wide Area Aggregate Query Processing," 33rd International Conference on Very Large Data Bases, Vienna, Austria, Sept. 23-27, 2007.
- Zhang, Xu(*): "Optimizing the alignment of many sequences," IEEE International Conference on Bioinformatics and BioEngineering, Boston, Mass., Oct. 14-17, 2007.

- Gummuluru, Vandana: "An Intelligent System for Searching Genomic Sequences," IEEE International Conference on BioInformatics and BioEngineering, Boston, Mass., Oct. 14-17, 2007.
 - Quarles, John*: "A Mixed Reality Approach to Merging Abstract and Concrete Knowledge" and "Tangible User Interfaces Compensate for Low Spatial Cognition," IEEE Virtual Reality 2008, 3D User Interfaces 2008 (concurrent), Reno, Nev., March 8-12, 2008. (<http://conferences.computer.org/vr/2008/prelim/>)
 - Harsh, Piyush: "An Overlay solution to IP-Multicast Address Collision Prevention," IASTED Conference on Internet and Multimedia Systems and Applications, Innsbruck, Austria, March 17-19, 2008.
- * Denotes College of Engineering Travel Award

Congratulations 2007-2008 Graduates

Doctor of Philosophy in Computer Engineering

Arturo Camacho, Ph D.

Dissertation title: SWIPE: A Sawtooth Waveform Inspired Pitch Estimator for Speech and Music
Adviser: J. Harris

Seema Degwekar, Ph D.

Dissertation Title: Etknet: A Distributed Event and Rule-Based System for Knowledge Sharing in a Collaborative Federation
Adviser: S. Su

Shantanu Sharad Joshi, Ph D.

Dissertation title: Sampling-Based Randomization Techniques for Approximate Query Processing
Adviser: C. Jermaine

Heon-Mo Koo, Ph D.

Dissertation title: Coverage-Drive Test Generation for Functional Validation of Pipelined Processes
Adviser: P. Mishra

Xuehui Li, Ph D.

Dissertation title: Identification and Application of Repetitive Biological Sequences
Adviser: T. Kahveci

Jun Liu, Ph D.

Dissertation title: Mining Comparative Genomic Hybridization Data
Adviser: S. Ranka

Nicholas Andrew Lord, Ph D.

Dissertation title: Shape Analysis via Unified Segmentation, Smoothing, and Registration of Riemannian Structures
Adviser: B. Vemuri

Alexandra Martinez, Ph D.

Dissertation title: A Model for Data Quality Estimation and Management in Biological Databases
Adviser: J. Hammer

Alexandra McElroy, Ph D.

Dissertation title: Piecewise Linear Lattice Based Associative Memories
Adviser: P. Gader

Andres Mendez-Vasquez, Ph D.

Dissertation title: Information Fusion and Sparsity Promotion Using Choquet Integrals
Adviser: P. Gader

Abhijit Pol, Ph D.

Dissertation Title: Maintaining Very Large Samples Using the Geometric File
Adviser: C. Jermaine

Sukitti Punak, Ph D.

Dissertation title: Geometrically and Physically Based Modeling for Deformable Objects Simulating Soft Tissue Interactions in Surgery Environments
Adviser: J. Peters

Christian Roberson, Ph D.

Dissertation title: A Morphological Neural Network Model for Information Retrieval
Adviser: D. Dankel

Xudong Shi, Ph D.

Dissertation title: Geometrically and Physically Based Modeling for Deformable Objects Simulating Soft Tissue Interactions in Surgery Environments
Adviser: J. Peir

Jayendra Venkateswaran, Ph D.

Dissertation title: Indexing Techniques for Metric Databases with Costly searches
Adviser: T. Kahveci

Zhen Yang, Ph D.

Dissertation title: Improving Memory Hierarchy Performance with Addressless Preload, Order-Free Load-Store Queue, and Run ahead Scheduling
Adviser: J. Peir

Master of Engineering in Computer Engineering

Nathan John Bird
Kevin Allen Hann
Jason Blake Roncek
Amit Sardesai

Master of Science in Computer Engineering

Suranjit Adhikari
Gregory Robert Aicher
Phanindra Kum Anchuri
Raja Appuswamy
Pawan K. Aurora
Oliver John Barbara
Swapnil D. Belapurkar
Vishal Bhakta
Saurabh U. Bharambe
Zujian Cai
Seth Andrew Caplan
Sharat Channahalli
Shubhankar Chaudhuri
Yanqing Chen
Yingji Chen
Eshan Maa Chittimalla
Ketan Chand Deshpande
Shreyas Shridha Dixit
Yi Du
Shreyas S. Dube
Hale Erten*
Yexiong Feng
Chetan Gangwar
Francisco Garcia-Ascanio
Piyush Goswami
William Howard Grenzer
Janice Lynn Hill
Po Hu
Connie Huang
Joey Chaoyu Hwang
Mukund Namdeo Ingale
Vidyut Vishnu Jadhav
Sudarshan Jagannathan
Shalabh Jain
Hyun Ik Jang
Bing Jian
Surender Kumar Jindal
Namratha Kallapalli
Vasu Madhu Kallazhi
Vaishnav Ramu Kidambi
Hima Bindu Kodali
Kiran Kalyan Kulkarni
Eric C. Li
Amit Mahajan
Aranika Mahajan
Abhishek Mandhana
Ritu Manjunathan
Fan Mao
Daniel M. Messina
Anil Moola

Md Shahed Mosharrof
Zaki I. Mulla
Jayanth Natarajan
Dev Hardy William Oliver
Jarret Anthony O'Shea
Arun Kumar Palanisamy
Yi Pan
Sumeet M. Panchal
Subhash Parthibhan
Twisha R. Patel
Praveen Naga Ve Pathi
Honey Patodia
Kamini Dodhu Patole
Priyanka Purohit
Amarnath Raghunathan
Kannan Rajah
Manivannan Rajah
Seemi Sadaf
Krishnendu Sahoo
Pratapa Reddy Sanaga
Smita S. Singhaniya
Brandon Smock
Sameep Navin Solanki
Sharad S. Sonapeer
Praveen K. Subramanian
Jing Sun
Kristen J. Triplett
Chaitra Venus
Manas A. Wadke
Rebecca L. Wells
Mingxi Wu
Xiaochun Xu
Nikhil Yadav
Shiwei Zhang
Zhen Zhao

Master of Science in Computer Science

Hyung Jae Chang
Kashif Imran
Joseph Michael Keen
Max Mendenhall
Mohamad H. Tarifi

Master of Science in Digital Arts & Sciences

Howell B. Hollis
Siddharth Palaniappan
Jennifer Louise Rickerson

Bachelor of Science in Computer Engineering

Hector Alfaro Jr.*
Kate Marie Allinson
John W. Bassett*
Grant Latham Beaty
Andrea X. Belalcazar*
Nir Ben-Jacob
David Stephen Boerner
Erica Ashley Bolin**
Stephen Carlos Cano
Stephen C. Cimorelli**
Allison A. Corey***
Alicia Marie Cosenza*
Michael P. Costanza*
Kevin Stewart Dion***
Reed B. Divertie
Patrick Doran
Alexander Marie Figuly
Trevor A. Finn
Christopher Flanagan**
Brent Steward Ford
James Andrew Friedman
John Stanley Gause*
Gideon Selig Goldin**
Brandy Nicole Gonzales
Anna Granovskaya**
Brandon Edwin Grant
Christopher D. Hanlon
Steve Douglas Hintz
Mark Gregory Jacobson
Kevin Konkler
Cecilia Reyes Lajon
Sean E Larson***
Jose Angel Luna Jr.***
William R. Madison Jr.
Curtis McMillen
Sam Edwin Mendenhall**
Robert Dowler Meyers*
Brenton M. Moffit**
Jeffery J. Monson
Jacqueline J. Mullings***
David Allan Nash
Larry Eugene Neal Jr.
John R. Nichols
Christopher Michael Nielubowicz
Daniel Tran Nieman***
Santiago Obando
Elzbieta Ocipka**

Mckenzie Petion
Daniel Nicholas Pham
Stephen James Pilon
Zachary Scott Pulkin
Taeber James Rapczak*
Adnan Rashid
Christopher M. Rock*
Josue D. Rodriguez
Jeffrey P. Ross**
Krzysztof Sadowski
Brianna R. Satinoff***
Karl Christophe Scott
Bruce Jackson Shaw
Eric Michael Sheely
Rene Adwin Kayode Simon
Christopher P. Spence
Nicholas G. Stamas***
Oliver Stamkov**
Kalin Richar Stanojev*
Mark Vincent Sullivan
Brett M. Swanson
Peter J. Tebow
Daniel Joseph Trast
Abhilash Trehan
Frederick Tyndall Jr.**
Luis A. Vega***
Pablo E. Velasco*
Trevor Elliot Ward
Keith Michael Wilson***
Kenneth John Wilson
Johnathan B. Wolverton*

*Cum Laude

** Magna Cum Laude

***Summa Cum Laude

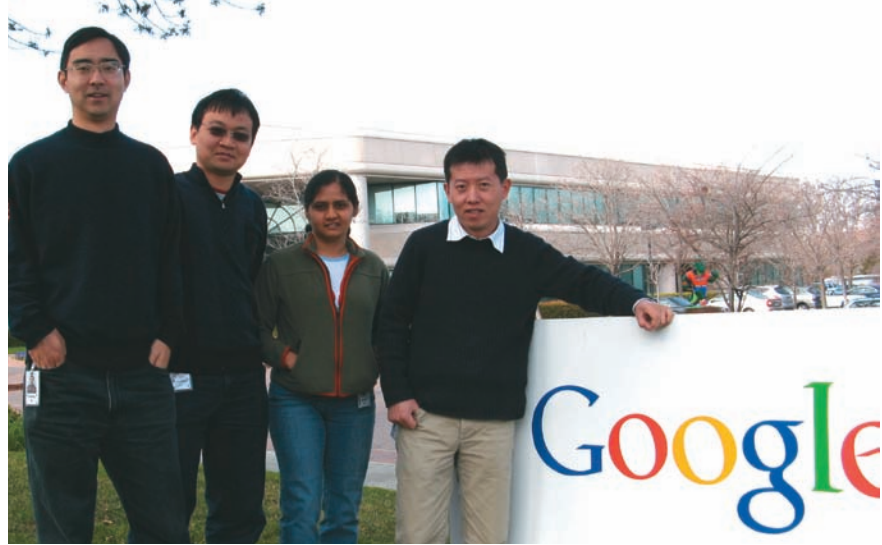
Faculty wins continued from page 1

There are multiple specification models above the RTL level, such as functional, timing and verification models. It is difficult to maintain consistency between the reference models due to the lack of a golden reference model. The design verification problem is further aggravated due to the lack of a functional coverage metric that can be used to determine the coverage of the microarchitectural features in addition to the quality of functional validation. Several coverage measures are commonly used during design validation, such as code and toggle coverage. Unfortunately, these measures do not have any direct relationship to the functionality of the design. In the case of a pipelined processor, for example, none of these measures determine if all possible interactions of hazards, stalls and exceptions are verified. Moreover, simulation is the most widely used form of SOC verification one that uses billions of random and pseudo-random tests in traditional design flow. Directed tests are very promising in reducing the overall validation effort, since a drastically small number of directed tests are required compared to random tests to obtain the same coverage goal. Due to lack of fully automated techniques for directed test generation, however, it isn't feasible to generate all directed tests to achieve a comprehensive coverage goal.

Gators at Google



Gators at Google: Amrita Nayal (M.E., ECE, '07), Jun Liu (Ph.D., CISE, '07), Wencheng Lu (Ph.D., CISE, '07), and Xudong Shi (Ph.D., CISE, '07).



Google is an Internet search engine company. “Googol” is the mathematical term for a 1 followed by 100 zeros. The term was coined by Milton Sirota, nephew of American mathematician Edward Kasner, and was popularized in the book, “Mathematics and the Imagination” by Kasner and James Newman. Google’s play on the term reflects the company’s mission to organize the immense amount of information available on the web.

As a first step to fulfilling that mission, Google’s founders Larry Page and Sergey Brin developed a new approach to online search that took root in a Stanford University dorm room and quickly spread to information seekers around the globe. Google is now widely recognized as the world’s largest search engine – an easy-to-use free service that usually returns relevant results in a fraction of a second. Google’s utility and ease of use have made it one of the world’s best known brands almost entirely through word of mouth from satisfied users.

As a business, Google generates revenue by providing advertisers with the opportunity to deliver measurable, cost-effective online advertising that is relevant to the information displayed on any given page. Google has been identified multiple times as Fortune Magazine’s No. 1 Best Place to Work.

Four Gator graduates who recently joined Google as software engineers are Amrita Nayal (M.E., ECE, '07), Jun Liu (Ph.D., CISE, '07), Wencheng Lu (Ph.D., CISE, '07), and Xudong Shi (Ph.D., CISE, '07). While gaining experience at the company as Nooglers (Google’s term for new Googlers), they are passionate for delivering significant achievements in the near future and making a strong impression and recognition of Gators at Google.

Amrita, Wencheng, and Xudong are all from Google Platforms focusing on building and operating a large-scale computing infrastructure to improve the performance of applications that run on it. Jun works with Google AdSense team on delivering ads relevant to the content on websites, improving their ability to generate revenue and enhancing the experience for their users.

Wencheng is a big Gator football fan. He is still watching Gator games and rooting for them.

“I am so proud of being a Gator and excited for Tim Tebow winning Heisman Trophy last football season,” Lu says.

Xudong adds, “I really appreciate everything I have learned at UF, which will surely enlighten me through my current and future career. Once a Gator, always a Gator”

Beyond the Classroom – CISE Students Benefit from Internships and Co-Ops in Industry

By Ross Vanover, CISE Undergraduate Adviser

Getting the most out of any college experience often requires going beyond the classroom, and for many CISE students, that means taking part in internships and co-ops. Whether it’s a summer on the campus of Microsoft, alternating semesters of co-op work for ExxonMobil, or finding time amidst attending classes to intern locally in Gainesville, many students within CISE have had some of their most valuable college experiences working in industry.

“The experience was extremely beneficial for me as I left with increased technical knowledge and a network of contacts within one of the largest software companies in the world,” CISE junior Matthew Carroll said recalling his time interning with Symantec Corp.

While CISE programs stress practical knowledge and application within the curriculum, the actual experience of day-to-day, hands-on experience for students who take part in internships and co-ops offers opportunities for practical learning that cannot be simulated in the classroom.

Working with the Cerner Corp., one of the leading U.S. suppliers of healthcare information technology solutions, CISE senior Joseph Akoni came away with the conviction necessary for every student who has an interest in software engineering to find an internship to learn what only hands-on experience can teach.

Career Development Workshop

Akoni felt the most important lessons he learned were provided by the opportunity to experience the software engineering process from start to finish, as well as being apart of the real-world team dynamics that are often necessary to successfully complete the development process. The opportunity of working within a team in industry also allows students to build lasting professional relationships that can aid in securing future employment.

Of course, the benefits of many internships and co-ops are not limited to the serious aspects of the work-a-day world. Many companies provide students with a variety of special events, socializing activities and opportunities to experience local amenities.

"It wasn't all work. In the summer of 2006, Microsoft had over 1,000 interns," said Warren Moore, a CISE senior. "This gave me plenty of chances to meet people with passion and creativity equal to my own and in several cases to establish friendships that are still strong. From evening movie outings, to talks given by industry pioneers like Ivar Jacobsen, Michael Howard, and Miguel de Icaza, to hiking Mount Ranier. Every day was an opportunity to learn and experience something new. I wish I could do it all over again."

Students who participate in internships and co-ops can also gain course credit for the successful completion of their industry work. CIS 4940, Practical Work (i.e., internships) and CIS 4949, co-op, are each one credit courses that may be applied toward the technical electives requirement for CISE undergraduate degree programs. Students may register for each course a maximum of three times and the credits may only be taken S/U (Satisfactory/Unsatisfactory).

Registration for the course is handled through CISE Student Services. Co-op students are additionally asked to meet with an adviser at the Career Resource Center before the co-op begins. The CRC keeps track of all University co-op experiences and provides counseling for all students taking part in the co-op process.

To successfully complete the internship or co-op courses with a grade of satisfactory, a 2-4 page post-internship report written by the student and a formal evaluation letter written by the student's supervisor must be on file in CISE student services within one week of the last day of classes for the semester in which the student is enrolled. The evaluation letter must include a review of the student's work during the internship, an evaluation by the student's supervisor indicating whether or not the student has satisfactorily completed the internship, and detailed contact information of the person or persons who have supervised and evaluated the student's performance.

For more information on internships and co-ops, or if you are interested in publicizing internship and co-op opportunities, please contact CISE student services at 352-392-1090 or email us at ugadvisors@cise.ufl.edu.

The Department's Second Semi-Annual Career Development Workshop was held on January 28 in the Touchdown Terrace located inside Ben Hill Griffin Stadium. The event was sponsored by CISE, ASCIE (Association of Graduate Students) and ACM (Association of Computing Machinery, UF chapter).

More than 450 students eagerly attended the catered event to speak with 11 represented companies: Sage Software, Harris Corp., Lockheed Martin, VMware, Inc., Morgan Stanley, McKesson, FL Interactive Entertainment Academy, Walt Disney World, Ignition Entertainment, Ultimate Software and Raytheon all set up interactive booths to entice and inform perspective job seekers.

Many attendees expressed gratitude for the opportunity to engage in personal contact with company representatives who specifically targeted computer science and engineering students. During the evening, attendees participated in a lottery for prize, such as computer games, software and equipment. Free T-shirts were also given away at the door.

Responses from the attending companies were overwhelmingly positive, and prospects for future expansion of the event are bright.

ACM and ASCIE plan to host the CISE Career Workshop again in the Fall 2008 semester. More information can be found at the event Web site at: <http://www.cise.ufl.edu/careerworkshop/>.





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University of Florida Foundation
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Acknowledgements

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