COMPUTER & INFORMATION SCIENCE & ENGINEERING

CISE NEWS

SUMMER 2009

WWW.CISE.UFL.EDU

CISE FACULTY WIN ESTEEMED NSF CAREER AWARDS

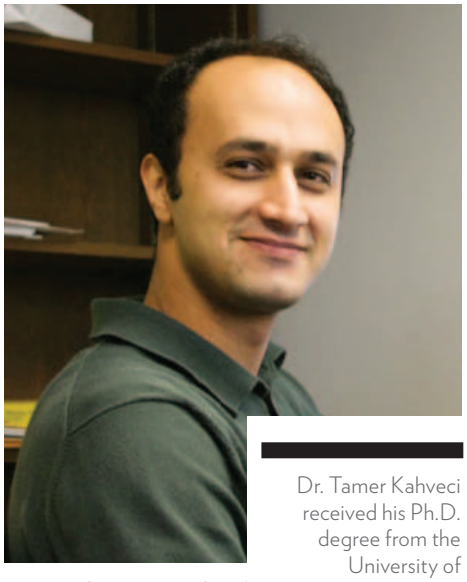
PROFESSORS TAMER KAHVECI AND ALPER ÜNGÖR WON THE PRESTIGIOUS NSF CAREER AWARD. THE CAREER PROGRAM RECOGNIZES AND SUPPORTS EARLY CAREER-DEVELOPMENT ACTIVITIES OF TEACHER-SCHOLARS WHO ARE MOST LIKELY TO BECOME THE ACADEMIC LEADERS OF THE 21ST CENTURY. THIS BRINGS THE DEPARTMENT'S NUMBER OF CAREER AWARDS TO 11, INCLUDING PROFESSORS MISHRA, CHEN, DOBRA, HELMY, JERMAINE, LIU, LOK, PEIR AND SCHNEIDER.

Professor **TAMER KAHVECI** received the NSF CAREER Award for his research project entitled "New technologies for querying pathway databases."

Just like every living organism, countless molecules in our body go through an exciting journey in which they interact with and change each other. When, where, how and how much they interact affects how well your body functions. All these interactions are governed by the pathways determined by our genes.

Genes interact with each other directly by suppressing or activating each other, or indirectly by altering the molecules each other help create. These interactions enable them to collaborate and serve functions they can not perform individually. The coffee you drank and the breakfast you ate will stimulate parts of this network of interactions — and maybe start, accelerate or slow down the reactions in a sub-network within this network.

Kahveci's research group is bringing a new computational perspective to understanding how organisms function through



Dr. Tamer Kahveci received his Ph.D. degree from the University of California, Santa Barbara and joined the CISE department of the University of Florida in 2004.

a complex network of interactions. The first step in this direction is to understand how these interactions can be modeled to formulate the functions of sub-networks. Modifying or simply knocking out a sub-network can have a butterfly effect on the rest of the network. The possibility of having such an effect depends on how that sub-network interacts with the rest of the network, the current state of the network and the state of the external stimulants. Kahveci's lab is developing efficient and scalable computational methods to compute or approximate this effect as a function of the steady state of the network.

Assume that somehow your biological

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UF WINS THE IEEE SOUTHEASTCON '09 PROGRAMMING COMPETITION

IEEE SoutheastCon is hosted annually by IEEE Region 3. This year, it was held at the beginning of March in Atlanta. In addition to professional activities, the conference also has several contests for university students, including a programming competition, a technical paper competition and a hardware robotic competition. These competitions attract some of the best and brightest engineering and computer science students from across the Southeast and Jamaica.

The programming competition is a relatively new addition to the conference and is modeled after the ACM's ICPC (International Collegiate Programming Contest). Teams of three students share a single computer and write programs to solve as many problems from a problem set as they can in a limited amount of time. The duration of the SoutheastCon competition is shorter (just three hours), and solutions must be coded in C/C++. Only one team per university may enter.

The UF team was lead by Miorel Palii (who is also the club's president) and

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UF UNIVERSITY of FLORIDA

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network is altered. It may be because of an external stimulant, such as the medicine your doctor gave, or maybe because the activity levels of some of your genes have changed. Clearly, this can change how your body functions greatly as it interferes with the biological network. Now, imagine this in an inverse scenario. Say, one wants to change how an organism functions for some reason. For example, maybe one wants to increase the production of fatty acids that are used in the cosmetics industry in creams and lotions. These molecules can be obtained from microorganisms. How can one alter the genes of these organisms to optimize the production of the molecules that are profitable for them? Kahveci's research lays the foundations to develop computational methods that can predict the most promising genetic alterations that will create desirable mutant organisms.

It is more practical to study and experiment on some organisms more than others. For instance, it is cheaper to perform experiments on bacteria than rats. Also, it is preferable to study new drugs on rats than humans. Assume that an experiment is performed on rats and its impact on the rats' metabolism is measured. What kind of measurements would we get if we had done the same experiment on humans? Clearly, there is great value in computationally predicting this before braving it on humans. Comparing the biological networks of the two organisms can reveal their similar regions. It can help in predicting the effect of an external stimulant on an organism when we know its effect on the other one.

Alper Üngör joined the faculty in 2004. He received his Ph.D. in computer science from the University of Illinois at Urbana-Champaign in October 2002 and spent two years as a postdoc at Duke University. Üngör, a native of Turkey, also has an M.B.A. from the Middle East Technical University in Ankara.

Alignment of two pathways, a fundamental problem in pathway analysis, seeks a mapping between the entities of the two pathways. Ideally the mapping should bring the similar parts of the two pathways together. Kahveci's research group is developing novel algorithms and software that can align large biological networks of any type, considering their homological, topological and functional similarities. They are also addressing the problem of finding such similarities in a large database of biological networks with the help of feature and reference-based indexing techniques.

Professor **ALPER ÜNGÖR** received the NSF CAREER Award for his research entitled "Computational Geometry, Mesh Generation, and Geometric Modeling."

Geometric problems are at the heart of many computational problems in science and engineering. Over the last few decades, computational geometers has made significant contributions to many areas in science and engineering by designing good algorithms, data structures and software. There remains, however, many fundamental geometric problems, open even in two dimensions. Geometric problems and the optimality of their solutions in three and four dimensions (e.g., space-time) where the most interesting applications reside are much less explored.

Üngör's recent work has been on figuring out "how to connect the dots." He designed algorithms connecting the dots modeling a geometric shape and producing optimal (in output size and quality) triangulations. His time-optimal algorithm has been well-received in the theory community as it comes with a proof of being the fastest possible algorithm. Experiments show that several variations of this algorithm run significantly faster than the previously available software. Üngör's algorithm and implementation are already integrated into award-winning triangulation software and is in use by thousands of engineers and researchers resulting in more efficient scientific simulations. Extension of these methods to higher dimensions and to dynamic problems is challenging but the promise for real-life applications is great. Üngör believes only by improving our understanding of the fundamental concepts can we provide efficient and correct solutions to more real-life problems. He expects the next few years to be very exciting for the researchers in the geometric algorithms field.

Geometric modeling for simulation of complex physical phenomena raises many challenges including algorithmic efficiency, practicality, scalability, robustness, theoretical guarantees and compatibility with the emerging numerical methods. Üngör's research group study solutions for geometric discretization problems for spatial domains (encountered in conventional scientific computing) and for space-time domains (motivated by the next-generation numerical methods being developed for solving PDEs directly in the space-time continuum). Their approach combines the strengths of theoretical algorithms (time complexity, output size optimality and quality guarantees) and practical heuristics (ease of implementation, performance in practice and scalability).

The algorithms and the software tools developed within Üngör's group are being integrated with applications and contribute to the fundamental research in engineering, scientific computing, solid modeling, computer-aided design, graphics, geographic information systems, computational biology, visualization and molecular modeling. As a result, his research has broader impact across a number of scientific, medical and industrial fields. Moreover, Üngör focuses on making an academic impact through the inclusion of underrepresented groups, and the development of interdisciplinary courses linking fundamental concepts in theoretical areas such as graph theory, geometry and topology to application problems in biology and engineering.

ÜNGÖR'S ALGORITHM AND IMPLEMENTATION ARE ALREADY INTEGRATED INTO AWARD-WINNING TRIANGULATION SOFTWARE AND IS IN USE BY THOUSANDS OF ENGINEERS AND RESEARCHERS RESULTING IN MORE EFFICIENT SCIENTIFIC SIMULATIONS.

CISE RESEARCHERS RECEIVE BEST SCIENTIFIC PAPER AWARD AT THE 2008 INTERNATIONAL CONFERENCE ON PATTERN RECOGNITION

Ph.D. students Karthik Gurumoorthy and Ajit Rajwade, along with their supervisors Professors Anand Rangarajan and Arunava Banerjee, received the best scientific paper award in the signal processing and representation track at the International Conference on Pattern Recognition held in Tampa from Dec. 8-12. Their paper is entitled, "Beyond SVD: Learning Matrix Orthonormal Bases for Compact Image Representation." ICPR is one of the largest and most popular conferences in the field of computer vision and pattern recognition.

In their paper, they have developed a new method to represent grayscale images compactly and applied their technique to image compression. Typically, existing image compression algorithms encode images or small patches from images as some linear combination of code words called bases. Once these bases are known, one need only store a few coefficients of this linear combination to be able to represent the entire image, thereby saving storage space. Conventionally, standards such as JPEG have been popularly used in image compression. Algorithms that are part of the JPEG standard typically encode images as combinations of a set "universal bases" that are obtained from the Discrete Cosine Transform, a tool in signal processing, popularly abbreviated as the DCT.

Their paper replaces these DCT bases with other bases that are specifically tuned to a certain type of dataset by means of a machine-learning algorithm. This gives the bases the flexibility to represent the properties of a particular dataset effectively, as opposed to be being so general. The main contribution of their paper lies in using a matrix-based representation for images or image patches, which really treats the image or the image patch as a 2D signal. Though images are 2D signals, this representation has been rarely used in the machine-learning community for image representation. Using these matrix orthonormal bases that are learnt from a so-called training set of image patches, any unseen patch can be represented by means of a sparse projection onto these bases. The sparser the projection, the greater is the error incurred in reconstructing the patch. This error is a controllable user parameter that decides the quality of the compression algorithm. This issue of sparsity-based projections with matrix orthonormal bases is the novel feature of their algorithm. Their algorithm also poses an alternative to other techniques that use overcomplete sets of vectors as a dictionary. The latter require greedy approximation algorithms to obtain the projection (i.e. the encoding) of a given signal (image patch) onto the dictionary, whereas the method developed by the authors has a much simpler and optimal method to obtain the projection.

Their algorithm was trained and tested on well-known and large facial image databases, and its performance was seen to be comparable to the JPEG standard, as well as some other existing machine learning based algorithms. Besides simple image compression, the algorithm is easily extensible to compression of entire image databases as well. The same algorithm has also been elegantly extended to color images using higher-order matrix algebra. □

THEY HAVE DEVELOPED A NEW METHOD TO REPRESENT GRAYSCALE IMAGES COMPACTLY AND APPLIED THEIR TECHNIQUE TO IMAGE COMPRESSION.

The ICPR paper can be viewed at:
http://www.cise.ufl.edu/~anand/pdf/icpr2008_FinalSubmission_BeyondSVD.pdf

FACULTY NEWS

ARUNAVA BANERJEE / *assistant professor* was awarded a $199,894 grant from the National Science Foundation for his project, "Formal Characterization and Analysis of Computation in Networks of Spiking Neurons."

MANUEL BERMUDEZ / *associate professor* was appointed as Program Committee Chair for the LACCEI 2009 Conference (Latin American and Caribbean Consortium of Engineering Institutions), held in San Cristóbal, Venezuela, June 2-5, 2009. Dr. Bermudez also received a $15,000 grant from the College of Engineering's IPPD Program.

SHIGANG CHEN / *associate professor* will be the keynote speaker for The Third China Wireless Sensor Networks Conference, which will be held in ShuZhou, China, October 21-23, 2009.

PAUL GADER / *professor* was awarded a $2,103,360 grant from The U.S Army for his project entitled, "Multi-Sensor Detection of Obscured and Buried Objects."

TAMER KAHVECI / *assistant professor* received a $400,000 CAREER grant from the National Science Foundation for his research project entitled, "New technologies for querying pathway databases." He has also been appointed as the lead guest editor of the special issue on computational analysis of biological networks in the Journal of Advances in Bioinformatics.

PRABHAT MISHRA / *assistant professor* has been appointed as program chair for the IEEE International High Level Design Validation and Test Workshop, to be held in San Francisco from Nov. 4-6, 2009.

JIH-KWON PEIR / *associate professor* will serve as the co-chair of Architecture and Systems track in the 10th International Symposium on Pervasive Systems, Algorithms and Networks (I-SPAN 2009) to be held in Kaosiung, Taiwan, Dec. 14-16, 2009.

JORG PETERS / *professor* was an organizer for the Schloss Dagstuhl Workshop on Geometric Design at the 4th International Symposium on Visual Computing (http://www.isvc.net/08/) held May 25-30, 2008 in Las Vegas.

SARTAJ SAHNI / *distinguished professor and chair* recently received a $75,000 grant from the National Science Foundation through the University of Connecticut for a project entitled, "Computing with protein-based associative memory processors." Dr. Sahni also received a $52,000 grant from UltraHiNet for his project, "Co-scheduler for high-speed networks and high-performance."

MARKUS SCHNEIDER / *associate professor* received a $449,754 grant from the National Science Foundation for his project "III-COR: Modeling and Querying Moving Objects in Unconstrained Environment."

ALPER ÜNGÖR / *assistant professor* received a $400,627 CAREER grant from the National Science Foundation for his project entitled, "Computational Geometry, Mesh Generation and Geometric Modeling."

BABA VEMURI / *professor* served as a Colloquium speaker for the Computer Science and Artificial Intelligence Laboratory at the Massachusetts Institute of Technology in October 2008. Vemuri was also appointed as Distinguished Lecture Series Speaker at North Carolina State University in Raleigh in February 2009. Vemuri was recently selected as an External Advisory Board Member for the Neuro-Imaging Analysis Center, Brigham & Women's Hospital, Harvard Medical School.

UF WINS THE IEEE SOUTHEASTCON '09 PROGRAMMING COMPETITION

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rounded out by Danial Afzal and John Iacona. The UF team decisively earned first place by solving six problems out of eight, the University of Miami took second (four problems solved) and Duke and the University of Central Florida came in third and fourth respectively.

Palii and Iacona are seniors and have been active members of the programming club since their freshman year. Afzal, also a senior, began competing this past fall, and was, with Palii, on the team that finished second in the ACM ICPC Southeast Regionals in October. □

GATORS *at* INFINITE ENERGY

INFINITE ENERGY IS A GAINESVILLE HI-TECH COMPANY WITH BOTH AN ENERGY MARKETING AND COMPUTER SYSTEMS FOCUS. IEI HAS A LONG STANDING RELATIONSHIP WITH THE UNIVERSITY OF FLORIDA.

With more than 330 employees in Gainesville, IEI currently has dozens of UF graduates throughout its departments representing undergraduate through doctorate Gator alumni.

"Our colors are definitely Gator orange and blue," said Darin Cook, president and co-founder of IEI. Cook graduated from UF with a degree in statistics, and feels his company, which was started in 1994, is closely connected to his alma mater. "Our relationship with UF is an integral part of our business. We draw upon the department of business and CISE for our programmers, and our sales department represents every facet of the University," he said. "But it's symbolic – we give back too."

Cook is a big part of that giving back. He teaches classes for the Entrepreneurship program and works on projects with students. He is a POE Ethics Fellow and frequently gives talks about ethics and business. Cook also serves on the School of Art and Art History advisory board. In 2004, Cook was recognized as the Gainesville Entrepreneur of the year by the Center for Entrepreneurship and Innovation at UF.

Gators at Infinite Energy credit their time at UF as having a major impact on their careers. Marshall Sutherland, a software architect, began programming in seventh grade. The same year the original IBM PC was released, Sutherland started at UF. He has worked in the field for over 20 years, since graduating with a degree in computer sciences. "UF was my first formal training," he said. "The most important thing they taught me was learning how to continue learning. That's really important to know how to do in this industry, because the technology and languages are constantly changing."

Jeb Beich, the senior software designer at IEI, credits his studies at UF for getting the attention of Infinite's Vice President of Technology and Development, Nick Shanks. "The undergraduate work I did at UF really helped me get my foot in the door, and early on Nick was interested in the graduate course work I was working on," Beich said. "UF's computer science graduate program is really focused on instilling pride in the discipline of software development. Their program has really helped me see my self differently – not as a code monkey – but as a designer and developer."

Charles Rodriguez has a degree from UF in geography and is currently working on an MBA. He started with Infinite as an intern, worked his way up as a software developer, and now, is a development supervisor. Rodriguez says his graduate work impacts his job daily: "The MBA program has given me a deeper perspective into business activities and its challenges. You have to solve real-world problems that companies face daily. I have been able to take a lot of things I have learned from the program and introduce them at the office."

Last year, Infinite Energy took in 15 interns from the graduate program of CISE, as well as interns from many other UF departments. Several of these interns are full-time employees now. IEI also sponsors H-1B visa candidates, which opens even more opportunities for UF grads. □

THE MOST IMPORTANT THING THEY TAUGHT ME WAS LEARNING HOW TO CONTINUE LEARNING. THAT'S REALLY IMPORTANT TO KNOW HOW TO DO IN THIS INDUSTRY, BECAUSE THE TECHNOLOGY AND LANGUAGES ARE CONSTANTLY CHANGING.

ROBUST COMPUTING SYSTEMS

Prabhat Mishra, Assistant Professor

WHETHER WE LIKE IT OR NOT, WE ARE SURROUNDED BY COMPUTING AND COMMUNICATION DEVICES EVERY DAY OF OUR LIVES — SOME ARE OBVIOUS, SUCH AS DESKTOPS AND LAPTOPS, AND OTHERS HAVE EMBEDDED COMPUTING IN THEM, SUCH AS CELL PHONES, GADGETS, MONITORING SYSTEMS AND MEDICAL EQUIPMENT.

When we fly on an airplane or even drive a car, there are many computing devices working together to ensure our journey is pleasant and safe. Can we assume that these embedded computing systems are correct by construction and therefore we can safely rely on them? The simple answer is that no one can prove their absolute infallibility. Yet, since we do not have a choice, we can sit back, relax and enjoy life.

Consider a simple "adder" to understand how difficult it is to verify today's embedded systems. An adder is one of the simplest computations in a calculator – it adds two input values and produces the result. Typically, the input values are 32-bit integers. Therefore, to verify this adder we have to simulate several trillions ($2^{32} \times 2^{32}$) of test vectors — not feasible. If we cannot completely verify a simple adder, what is the hope that we can verify today's embedded systems that consist of complex software and hardware including processors, memories, buses, controllers, interfaces and so on?

It is a major challenge to verify today's complex and heterogeneous embedded systems. Existing validation approaches use a combination of simulation-based techniques and formal verification methods. Simulation is the most widely used form of validation using random and directed tests. For instance, in the adder example, instead of trying all possible input combinations, verification engineers can create tests for interesting scenarios based on coverage criteria and corner cases. Since it is impractical to generate and apply all possible tests, simulation based validation does not guarantee correctness. On the other hand, formal verification methods such as model checking, theorem proving, equivalence checking and satisfiability solving do not use input vectors but explore the design space to ensure correctness and can lead to state space explosion for large designs. Today's state-of-the-art verification methodologies use both approaches — for example, the complete design is simulated using billions of tests whereas very critical components such as controllers or specific protocols are fully verified by formal methods.

In an effort to exploit the synergies between simulation and formal verification, our research group is working on several complementary directions. We are trying to develop a top-down validation methodology that tries to verify as much as possible at the specification level (which is orders-of-magnitude simpler than implementation but has all the functional details) and automatically reuse validation efforts. The golden specification enables generation of required executable models including the correct-by-construction implementation. We have proposed innovative ways of combining simulation and formal methods for verifying large designs — such as using model checking for generating simulation vectors, or employing symbolic simulation for formally verifying a set of important design properties. A successful implementation of our approach will drastically reduce the overall verification effort while improving the final quality of the embedded systems, so that the user knows that s/he is surrounded by friendly, robust systems. □

WE ARE TRYING TO DEVELOP A TOP DOWN METHODOLOGY THAT TRIES TO VERIFY AS MUCH AS POSSIBLE AT THE SPECIFICATION LEVEL

CISE CAREER DEVELOPMENT WORKSHOP

On Jan. 15, the spring Career Development Workshop was held again at Touchdown Terrace. This workshop almost didn't take place, as a sluggish economy forced several employers who were avid attendees of past workshops to forgo this one. Student volunteers deemed the minimum number of attending companies to be 10; less than that would not be worth students' time to participate, which is understandable when more than 500 students attended in the past. A week and a half before the event was scheduled to take place, only seven companies had signed up. The student volunteers from ASCIE and ACM met and decided if there were companies willing to talk to students, then students should have the opportunity to interview.

THIS SPECIFIC ARENA WAS MUCH MORE BENEFICIAL THAN THE TRADITIONAL JOB FAIR.

This workshop was planned with the struggling economy in mind. They decided not to have door prizes, or give away T-shirts — and the hungry masses of students were fed with pizza instead of hors d'oeuvres. Nine companies attended, and around 400 students participated. Feedback from employers was as positive as it has ever been. Again, the students were praised for their preparation and ability to speak intelligently to employers.

One employer wrote, "This specific arena was much more beneficial than the traditional job fair." All the comment cards collected indicated that the employers are interested in returning for future events.

The participating companies for the spring were Bloomberg, Harris Corp., Lockheed Martin, The Nielsen Company, Symantec, 352 Media Group, Raytheon SI Government Solutions, Florida Interactive Entertainment Academy, and Infinite Energy. There are high hopes to have a better economic climate in September. □

2008-2009 GRADUATES

DOCTOR OF PHILOSOPHY IN COMPUTER ENGINEERING

SUBRAMANIAN ARUMUGAM / *Efficient Algorithms for Spatiotemporal Data Management* / Adviser: C. Jermaine

ANGELOS BARMPOUTIS / *Tensor Based Representation and Analysis of Diffusion-weighted MR Images* / Adviser: B. Vemuri

RAJA BOSE / *Scalable Query Processing in Service-Oriented Sensor Networks* / Adviser: A. Helal

JEREMY PAUL BOLTON / *Random Set Framework for Context-Based Classification* / Adviser: P. Gader

VINEET CHADHA / *Provisioning Wide-area Virtual Environments through I/O Interposition: The Redirect-on-Write File System and Characterization of I/O Overheads in a Virtualized Platform* / Adviser: R. Figueiredo

LAUKIK VILAS CHITNIS / *Fault Tolerance and Scalability of Aggregation Algorithms for Spatiotamporal Data Management* / Adviser: S. Ranka

ARJIT GANGULY / *Self-Managing Virtual Networks for Wide-Area Distributed Computing* / Adviser: R. Figuerido

HEPING GAO / *Geometric Underconstraints* / Adviser: M. Sitharam

AMI MICHELLE GATES / *State-Of-The-Art Protein Secondary Structure Prediction Using a Novel Two Stage Alignment and Machine-Learning Method* / Adviser: A. Banerjee

WEN-JEN HSU / *Analysis of Large-Scale Wireless Network Traces and Its Impact on User Modeling and Protocol Design* / Adviser: A. Helmy

YING JIAN / *Fair Packet Scheduling and Bandwidth Management in Wireless Networks* / Adviser: S. Chen

KYLE JOHN JOHNSEN / *The Design and Validation of a Virtual Human System for Interpersonal Skills Education* / Adviser: B Lok

JAEYEON KANG / *Scheduling Algorithms for Energy Minimization* / Adviser: S. Ranka

MIN HO KIM / *Symmetric Box-Splines on the Root Lattices* / Adviser: J. Peters

PARBATI KUMAR MANNA / *Detection, Propagation Modeling and Designing of Advanced Internet Worms* / Adviser: S. Ranka

MARK MCKENNEY / *Map Algebra: A Data Model and Implementation of Spacial Partitions for Use in Spatial Databases and GIS* / Adviser: M. Schneider

ASHISH MYLES / *Curvature-Continuous Bicubic Subdivision Surfaces for Polar Configurations* / Adviser: J. Peters

RAAZIA MAZHAR / *Optimized Dictionary Design and Classification Using the Matching Pursuits Dissimilarity Measure* / Adviser: P. Gader

TIANYUN NI / *Real-Time Smooth Surface Construction on the Graphics Processing Unit* / Adviser: J.Peters

REASEY PRAING / *Moving Balloon Algebra: Desig, Implementation, and Database Integration of a Spatiotemporal Data Model for Historical and Predictive Moving Objects* / Adviser: M. Schneider

JOHN QUARLES / *The Design and Evaluation of a Mixed Reality Approach to Interactively Blend Dynamic Models with Corresponding Physical Phenomena* / Adviser: B. Lok

ANDREW RAIJ / *Using Immersion and Information Visualization to Analyze Human-Virtual Human Interactions* / Adviser: B. Lok

HASSAN SHARIF RASHEED / *Integrating Access Control With Real-Time Assessment: Adaptive Security Through the Acquisition, Analysis and Application of Context Data* / Adviser: Y. Chow

FLORIN RUSU / *Sketches for Aggregate Estimations over Data Streams* / Adviser: A. Dobra

MYUNGKEUN YOON / *Securing Computer Networks: Access Control Management and Attack Source Identification* / Adviser: S. Chen

XUIYAO SONG / *Novel Change Techniques in Multidimensional Data Mining* / Adviser: S. Ranka

ALINA ZARE / *Hyperspectral Endmember Detection and Band Selection Using Bayesian Methods* / Adviser: Paul Gader

XIAOYING ZHENG / *Optimization Technique in Communication Network* / Adviser: Dr. Xia

MASTER OF ENGINEERING IN COMPUTER ENGINEERING

Jose Ernesto Boada, Jr.
Jeremy Paul Bolton
David Ronald Cusick
Nathan Vanderkraats

MASTER OF SCIENCE IN COMPUTER ENGINEERING

Girish Pitamber Aher
Adeel Ahmed
Meenakshi Sundaram Ambasamudram Sailappan
Sarthak Anand
Sreenandan Atur
Tarek Fares Ayna
Akshat Bhatia
Rohan Dhananjay Bhoyar
Aditya Kumar Bhuwania
Ananya Devi Bhuyan
Deepti Buchi
Ryan Christopher Busser
Carlos Manuel Casanova
Harsimranjit Singh Chabbewal
Sourav Chatterjee
Vinayaka C.A.
Yan Cheng
Chaithanya Chikkur
Swapnil Sham Daingad
Dattatraya
Rebecca Vera David
Anatariksh De
Sravani Duggirala
Bappan Dutta
Manas Jyoti Dutta
Elanchezhiyan Elango
Xinyue Fan
Linda Robert Fernandez
Nirmal V Ganapathy
Jainwei Gao
Cherry S. Ghandi
Meghna Gopalakrishnan
Amool Gupta
Bhargavi Hanumanthu
Bhavani Kumar Hari
Thames A Harrison
Piyush Harsh
Ankit Hirdesh
Sheng Hu
Peidi Huang
Cheng-Wei Hwu
Ghais Issa
Arpan Anil Jain
Suchi Jain
Yunsik Jeong
Ying Jian
Min Jiang
Nakul Jindal
Koushik Kalyanaraman
Amith Kamath Kaup
Chiquita Kerur
Anuradha Khemka
Megha Vijay Kokane
Balaji Krishnan
Amruta Praka Kulkarni
Oh Bum Kwon
Mahesh Kuppi Reddy
Jae Woong Lee
Jong Ho Lee
Nikhil Satish Limaye
Hechen Liu
Raazia Mazhar
Swathi Reddy Mekala
Ralph Brinton Mills IV
Rishi Mishra
Joyesh Mishra
Viplav Shanker Mishra
Jacqueline J Mullings
Sona Muthuvijayan
Chetan Murthy
Rama Muthukumar
Lakshmanan Muthuraman
Karthik Nagarajan
Krithika Narayan
Thien Nguyen
James Ian Nichols
Subramania Siva Palanivel Swaminathan
Esha Parmar
Abhishek P Patel
Saurabh Prabhakar Rahul
Koushik Rajagopal
Preetha Lakshmi Rajaran Mohan
Gnana Sund Rajendiran
Chitra Ramanathan
Sanjay Ramankandath
Arunkumar Ramasamy
Rahul Ramesh
Hassan Sharif Rasheed
Suhasini Rayadurgam
Fnu Regunathan
Varun Rishi
Muralidhar Sathsahayaraman
Soumyajit Sahu
Sakib Rahman Saikia
Arvind Kumar Saikumar
Sarvesh Sakalanaga
Somak Sen
Amit Sharma
Sashya Sharma
Supriya Sharma
Nirmal Shekar
Bharat Shetty Bakur
Kailun Shi
Jungmin Shin
Parmvir Singh Sidhu
Hardeep Singh
Siddharth Singh
Rajiv Omprakash Soni
Rao Ramacha Srinivasa

Karthikeyan Subramaniam
Varun Sudan
Vasanth PR Sundararaj
Chuan Sun
Subha Suresh
Brian James Timmons
Akash Tiwari
Mrigank Tiwari
Atul Baburao Ugalmugale
Santosh Kumar Vamaraju
Srikanth Veerapaneni
Aparna Venkatesan
Kartik K. Vempala
Harish Kumar Vittal Murthy
Dana Ashley Ward
Sandeep Warikoo
Shailendra Man Watave
Siddharath Wighe
Guoyi Xiao
Fei Xu
Sweta Yalamanchili
Chen Yang
Cheng Yang
Hang Yu
Inkwan Yu
Liang Zhang
Shizhao Zhou

MASTER OF SCIENCE IN COMPUTER SCIENCE

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Omprakash Vishwanath Dhyade
Rohit Gopalakrishnan
Sandeep Rayadurgan Mohan
Nikita B. Rasam
Chun-Ning Chris Poon
Swati Srivastav

MASTER OF SCIENCE IN DIGITAL ARTS & SCIENCES

Chih-Yu Chang
Nandhini Giri
Rajakumar Singh

MASTER OF SCIENCE IN COMPUTER INFORMATION SCIENCES

Dinakar Meda
David E. Richmond

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

Danial Afzal*
Karina Isabel Alvarez
Cyrus M. Banisi*
Benjamin C. Bryant*
Jo Caltagirone-Holzli
Christopher A. Cash
William H. Chapman***
Austin D. Cooley*
Shahrouz Ebadian
Jan Paul Erkelens*
Zachary W. Floyd*
Robert Alfred Gadala-Maria
Curtis Wesley Gray
Hysam N. Halabi*
Joshua C. Hartman*
Gabriel A. Jimenez*
Peter Stephen Kehagias*
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* Cum Laude
** Magna Cum Laude
*** Suma Cum Laude

STAFF SPOTLIGHT

JOAN CRISMAN

Coordinator, Graduate Student Services

Joan Crisman joined the CISE Department just before Christmas of 2006. She is part of the graduate student services team, initially in graduate admissions and currently in a coordinator of Graduate Student Services position, which includes graduate student advising.

Crisman was raised on a farm in rural downstate Illinois. She earned a B.S in biology teacher training and an M.S. in paleobotany at the University of Illinois. Crisman has worked for UF for over 15 years, including a few years in the botany department and a short stint with entomology, both focusing on electron microscopy. For 10 years, she worked in graduate admissions for the Physician Assistant Program. She and her husband, John, have three grown children. In her spare time, she enjoys singing, reading, bird watching, sewing, linguistics and word puzzles, beading, stained glass and graphic arts. □

SPRING 2009 STUDENT TRAVEL AWARDS

KOTRANZA, AARON*: "Virtual Humans That Touch Back: Enhancing Nonverbal Communication with Virtual Humans through Bidirectional Touch" and "Virtual Multi-Tools for Hand and Tool-Based Interaction with Life-Size Virtual Human Agents," IEEE Virtual Reality and IEEE 3D User Interfaces (concurrent) Conferences, Lafayette, La., USA, March 14-18th, 2009. (http://conferences.computer.org/vr/ and http: conferences.computer.org/3dui/3dui2009/)

LIU,GANG: "Enhanced Stream Prefetcher with Stride Prefetching, Noise Filtering and Stream Repetition," IEEE International Symposium on High-Performance Computer Architecture, Raleigh, N.C. Feb. 14-18, 2009. (http://www.comparch.ncsu.edu/hpca/)

OUTMAN, SHAWN: "Identifying Task-Level Parallelism by Functional Transformation with Side-Effect Domains," ACM Southeast Regional Conference, Clemson, S.C., March 19-21, 2009. (http://www.cs.clemson.edu/acmse09/)

RASHEED, HASSAN: "Automated Risk Assessment for Sources and Targets of Vulnerability Exploitation," World Congress of Computer Science and Information Engineering, Anaheim, Calif., March 31 - April 2, 2009. (http://world-research-institutes.org/conferences/CSIE/2009/)

RUSU, FLORIN: "Sketching Sampled Data Streams," IEEE International Conference on Data Engineering, Shanghai, China, March 29 - April 4, 2009. (http://i.cs.hku.hk/icde2009/)

** Denotes College of Engineering Travel Award*

SPRING 2009 COLLOQUIUM SPEAKERS

The following distinguished speakers visited the CISE department in Spring 2009:

Amr El Abbadi
Department of Computer Science
University of California, Santa Barbara
"Novel Challenges in the Management of Data Streams"

Li-Ming Su, M.D.
Department of Urology
University of Florida College of Medicine
"Exploring Biomedical Engineering Applications to Minimally Invasive Urologic Surgery"

Juan Feng
Department of Information Systems and Operations Management
University of Florida Warrington College of Business Administration
"Price Cycles in Oligopoly: What We Can Learn from Online Advertising Auctions"

Bharat Bhargava
CERIAS Security Center and Department of Computer Sciences
Purdue University
"Detecting Service Violation in Internet and Mobile Ad Hoc Networks"

Joe Warren
Department of Computer Science
Rice University
"Building a Better Mouse Brain Atlas"

Todd Austin
Department of Electrical Engineering and Computer Science
University of Michigan
"Why Tools Matter"

Rahul Razdan
CEO of Raztech LLC
"What is the Future of Computer Architecture?"

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