

COMPUTER & INFORMATION SCIENCE & ENGINEERING

CISE NEWS

2013

UNIVERSITY OF FLORIDA

www.cise.ufl.edu



CHAIR'S MESSAGE



"Computing for Life" is a new theme that grew out of our department's strategic planning in 2013. "Computing for Life" has a dual meaning that casts a vision for our department.

The first meaning is our commitment to solving problems that benefit the quality of life. These benefits can be achieved through multi-disciplinary collaborations, such as those with researchers in health care, agriculture, environmental observations and modeling, education, art and culture. Since the University of Florida is one of the most comprehensive schools in the country, we are among a privileged few institutions to have access to teachers and researchers in many fields. We can also benefit the quality of life by focusing research on computing itself. For example, computer and mobile security, data science, energy-efficient computing, graphics and visualization, high-performance computing, human-computer interaction and algorithmic theories can provide deep insight into the nature of biological molecules. This research results in abstract representations of data that can lead to more stable autonomous systems.

The second meaning is a renewed energy in the area of teaching and training. We are looking at different models of integrating computing into K-12 and curriculum at the university level. Computational devices are pervasive and the interaction between humans via social and other networks fundamentally changes the way we think, remember and communicate with others. Furthermore, computing is changing at a remarkable pace and may be much different ten years from now. This implies a commitment to instill students with the means to conduct lifelong learning. The rapid change fuels demand for advanced training and certificate programs for computer professionals in government and industry.

Our department has made huge strides towards becoming a positive agent of research and teaching since our unfortunate difficulties in April and May of 2012. We have a highly accomplished faculty, and our students are in high demand by industries throughout the state and nationwide. We produce Ph.D. students at a rate that ranks in the top 10 percent in the country. According to GPA and SAT scores, UF admits the best students in Florida, and Florida is the fourth most populous state in the country. Thus, we get some of the brightest and most motivated students in the country.

The State of Florida and UF are committed to moving the university into the top 10 percent of public research universities. Although it is essentially impossible to rank schools according to one number, I firmly believe that UF should be one of the premier institutions in the nation and the CISE Department should play a significant positive role. I am very excited about the progress CISE has made and our commitment to becoming one of the best departments in the nation.

Please contact me if you have any ideas about helping CISE successfully progress towards meeting our "Computing for Life" vision. Thanks and Go Gators!

Paul D. Gader, PhD
Chair, Computer & Information Science & Engineering Department

PROFESSORS LEAD SUCCESSFUL CONFERENCES



Dr. Benjamin Lok served as the general co-chair of the IEEE Virtual Reality 2013 conference in Orlando, Fla.

IEEE Virtual Reality 2013 is the premier international conference and exhibition on virtual reality. The conference focuses on innovative research in the fields of virtual environments, augmented reality and 3D user interfaces. The conference welcomed over 400 international researchers, entrepreneurs, students and industry attendees to Florida. The conference was co-located with ACM Interactive 3D Graphics and IEEE 3D User Interfaces.

Dr. Paul Gader hosted WHISPERS 2013, the 5th Workshop on Hyperspectral Image and Spectral Processing: Evolution in Remote Sensing, from June 25 to 28, in Gainesville, Fla.

Dr. Gader has attended every WHISPERS workshop and worked hard to make this year's premier international workshop a success. This year had a record number of submissions with outstanding contributions from around the world.

This was an excellent opportunity to show our international computer science friends just how great it is to be a Florida Gator!



A group of WHISPERS attendees in front of the New Physics Building.



Dr. Sumi Helal chaired the 19th Annual International Conference on Mobile Computing and Networking (MobiCom) in Miami, Fla. MobiCom is the premier international forum for research and emerging technologies on mobile computing and mobile and wireless networks.

The conference features research papers, keynotes, panels, demos, posters, industrial sessions and a mobile app competition. Nokia's chief technology officer and Cisco's vice president were the keynote speakers. CISE Professors Dr. My Thai and Dr. Ahmed Helmy serve on MobiCom's Organizing Committee as Registration and Finance Chairs, respectively.

For further information visit the conference web site: <http://www.sigmobile.org/mobicom/2013/index.html>

RESEARCH UPDATE

Learning the Language of our Genes

By: Tamer Kahveci, Associate Professor

You think you have been spending too much time on your favorite social network? Well, think again. Every day, every second, the genes and the proteins in each cell in your body are talking to each other in their own language through various social networks. This constant interaction and chatter starts from the time you were merely a single cell on your way to replicating and changing into an embryo. As your cells populate and deviate from stem cells into different types of cells, such as heart, lung and skin cells, so does the topology of the networks of their interactions.

Tamer Kahveci has been studying how molecules interact with each other through complex networks to carry out various functions. The key premise of his studies is we cannot understand how our cells operate without accepting the fact that biological molecules such as genes and proteins affect each other. In other words, the molecules do not operate as isolated entities, they rather create a society where they collaborate

or maybe compete with each other. They even pass information from one to the other. Therefore, any study that aims to understand cells or even single genes should consider the network in that cell or around that gene.

One of the key challenges in studying biological networks is to compare them and identify key similarities and differences. This is a notoriously difficult computational problem even for moderately-sized networks. Recently, there has been significant work in collecting and constructing biological networks. As a result, an enormous amount of biological network data is already available. As a natural outcome of this growth, the computational supply side of biological network analysis has already fallen way behind the biological demand side. This gap is further enlarged due to the fact that biological databases are dynamic in nature.

Tamer Kahveci's Bioinformatics Lab was awarded two separate NSF grants to develop novel computational solutions to tame massive,

dynamic and uncertain biological network databases. As a part of these projects, he will be developing scalable and accurate algorithms that allow comparing pairs of biological networks or searching a database of such networks quickly while ensuring mathematically provable confidence bounds on the optimality of the results. His solutions will adapt to changes in the network topologies like insertion of new networks, interactions of molecules and the removal of existing ones. Alternative topologies can also be observed due to uncertainty of the interactions.

We expect these solutions to have an enormous impact. It will expand our understanding of cell's response to major disorders and trauma. It will also help us characterize the process through which the cell deviates from stem cells to different tissues. As Tamer Kahveci says, "We have to pay attention to what our genes say when they talk to each other. They are actually talking to us." ►



Kahveci (center) with CISE students

Turning Big Data Into Big Knowledge

By: Daisy Wang, Assistant Professor

Daisy Wang is the director of the Data Science Research (DSR) Lab at UF. She obtained her doctorate degree from the Electrical Engineering and Computer Science Department at the University of California Berkeley in 2011. At Berkeley, she was a member of the Database Group, the Algorithms, Machines and People Lab and the Reliable, Adaptive and Distributed Systems Lab. She is particularly interested in bridging scalable data management and processing systems with probabilistic models and statistical methods. She currently pursues research topics such as probabilistic databases, probabilistic knowledge bases, large-scale inference engines, query-driven interactive machine learning and crowd-assisted machine learning. Her research is currently funded by DARPA, Google, Greenplum/EMC, Survey Monkey and the Levin College of Law at UF.

One of the main research projects Dr. Wang is currently working on aims at constructing and maintaining large-scale knowledge bases extracted from a plethora of text data from the Web or other domain-specific sources. This research is motivated by the Google Knowledge Graph project. The Knowledge Graph (KG) is Google's attempt to improve search engines by understanding the concepts (e.g., entity and relations) in documents and in queries to provide answers beyond keywords and strings. As far as we know, the current KG contains 580 million objects and 18 billion facts about relations between them. While this is the largest knowledge graph constructed, it is also a very sparse graph with on average only 30 relations per entity.

Large amount of relations are missing because (1) only high-confidence data sources are used to construct Google KG and (2) some of the relations are never recorded explicitly in any of the data sources. Dr. Wang and her students are working on new algorithms and systems to expand the KG by interpolating missing links using two methods. First, design a probabilistic knowledge base that can incorporate uncertainty data

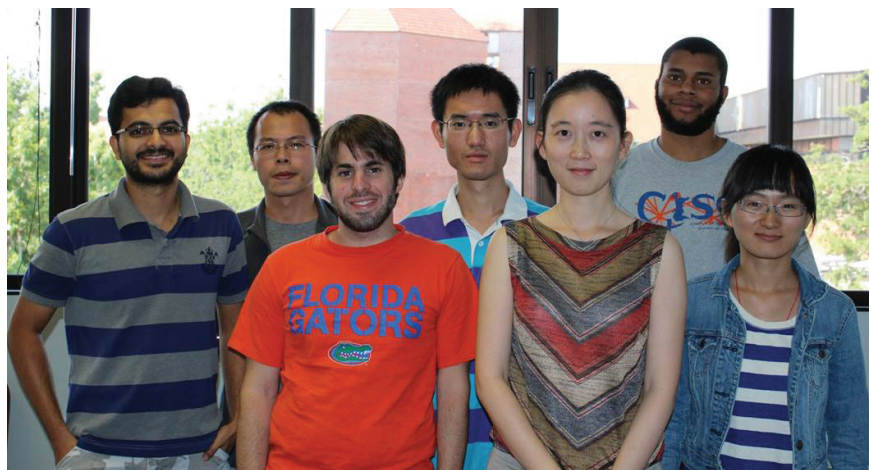
sources in addition to the high-confidence data sources. The key techniques used here are Markov Logic Networks (MLN) and Markov-chain Monte-Carlo (MCMC) inference algorithms. Second, develop a scalable statistical inference engine that can probabilistically deduce missing links based on an existing knowledge base and a set of first-order rules. The key techniques used are parallel inference algorithms over graphs on multi-core and/or distributed framework and parallel query processing.

In addition to developing technologies important to Google Research, the DSR Lab participates in the National Institute of Standards and Technology Text REtrieval Conference competition on Knowledge Base Acceleration. The problem is that it takes one year on average for a fact (e.g., the spouse or occupation of a person, the location of a company) to be updated in Wikipedia after it has been changed. The challenge is to update the Wikipedia as new information streams in the form of text in news, tweets and blogs. The team from the DSR Lab processed five terabytes of compressed text data from the web and social media to provide updates to 13 attributes of 170 entities specified by the competition. The techniques included large-scale parallel stream processing, keyword search engines, named entity extraction, relation extraction

and cross-document co-reference. The models used include Hidden Markov Models (HMMs) and Conditional Random Fields (CRFs).

Dr. Wang's group also looks at (1) using crowd-sourcing as a way to combine the power of human intelligence and machine intelligence to improve the quality of a probabilistic knowledge base, (2) generating visualizations for search over knowledge bases and (3) translating text analysis and knowledge base construction techniques to image analysis and retrieval.

Finally, DSR Lab is working on applying the system and algorithm built from this core probabilistic knowledge base research to solve big data challenges in other domains, including health informatics, education, law enforcement and ecology research. Early research results obtained by the DSR Lab in collaboration with UF Health show that a better outcome prediction model can be built using the knowledge extracted from text data in electronic health records.



Wang (first row second from right) with students

Geometric Network Science

By: Meera Sitharam, Associate Professor

“Network science” is a popular term referring to a body of techniques for extracting information and analyzing large networks of pairwise relationships between entities in our society, economy, engineered world and in nature. These networks could be explicit, say, atop the internet; or implicit, existing only in conceptual form.

The highly general network (aka graph) theory techniques use no further information about the entities (aka vertices) in the network, or their pairwise relationships (aka edges), except whether or not an edge exists between a given pair of vertices.

Consequently, graph theory techniques are typically widely applicable but relatively weak. When you utilize more information about the vertices and edges, it may restrict the scope of applications but usually yields stronger techniques.

The primary research focus of the Sitharam group is the study of networks where the edges represent pairwise geometric relationships between the vertex entities. The accepted term for such a “geometric network science” is the study of geometric constraint systems.

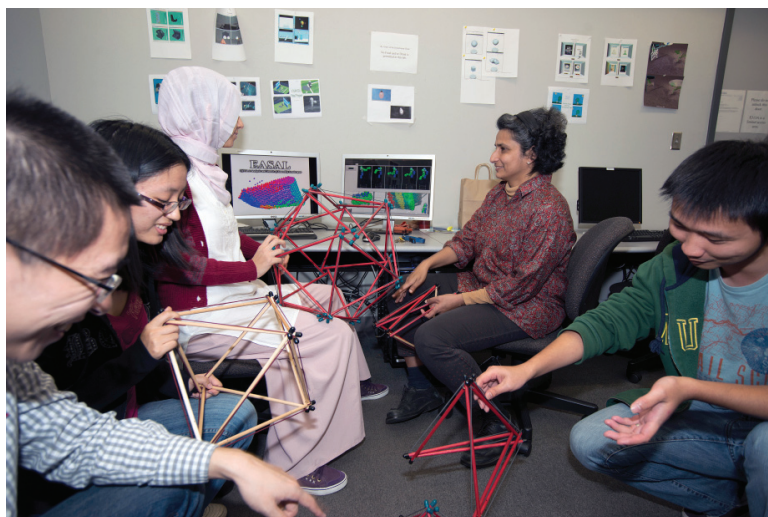


FIGURE 1: Sitharam research group 2013: Jialong Cheng, Menghan Wang, Aysegül Ozkan, Meera Sitharam, Ruijin Wu

Geometric constraint systems are immediately visible in some applications such as computer-aided mechanical and geometric modeling, design and manufacturing, robotics, gaming, virtual reality and user-interface design and geometry-based educational software. Although less obvious, they are the essential underlying structures in a variety of other applications, including molecular modeling and machine learning. In fact, geometric constraint systems are fundamental abstract structures inherent in many longstanding open problems at the interface of geometry, algebra, graph theory, combinatorics and complexity theory. Hence the study of geometric constraint systems generates new techniques of independent mathematical interest.

The Sitharam group works on all of the above-mentioned theory and applications of geometric constraint systems. In the past three years, group members have included five Ph.D. students, a Master's thesis student, an undergraduate research student and a K-12 teacher. The group works both independently and in collaboration with mathematicians, molecular scientists, engineers, education researchers and other computer scientists. The group's work ranges from proving theorems, designing algorithms to writing open-source software to providing applicable research experiences to K-12 teachers. The group's research has been supported for the past 20 years by grants from different divisions of the National Science Foundation sometimes jointly with the National Institute for General Medical Sciences (NIGMS), one of the National Institutes of Health that supports research on foundational principles. The group's support also includes a gift from SolidWorks, a computer-aided design and manufacturing company. Recently, the group's work is increasingly recognized by molecular scientists, improving its eligibility for grants directly from NIGMS.

A sketch of the group's projects from the past three years, publications and other details can be found at <http://www.cise.ufl.edu/~sitharam>.

Viral and Molecular Assembly Modeling

Supramolecular or macromolecular assembly is a remarkable phenomenon that occurs spontaneously and widely in nature in processes varying from assembly of viral capsids to the assembly of nanomaterials to intracellular mechanisms to the action of drugs. A molecular assembly configuration space refers to the set of configurations (positions and orientations) a collection of rigid molecules or molecular parts assume relative to each other in the presence of force fields, each of which is between a pair of atoms, situated in different molecules. The configuration space is typically high dimensional and geometrically intricate, yet it determines configurational entropy, an important ingredient of the free energy which in turn determines the preferred assembly configurations of the molecular collection. Predicting these

preferred configurations or designing molecules that arrive at preferred assembly configurations requires efficient and accurate free energy and configurational entropy computation, which is a notoriously difficult problem that computational molecular scientists have studied for decades. Established methods are generally based on full-blown molecular dynamics (MD) simulations or exhaustive Monte Carlo (MC) sampling of the configuration space. Both methods suffer from the dual curses of dimensionality and geometric intricacy of the configuration space.

By modeling the pairwise intermolecular atomic force fields as a geometric constraint system, the Sitharam

group has leveraged a theory of stratification and parametrization of assembly configuration spaces of geometric constraint systems developed by the group and designed an efficient algorithm for obtaining an atlas of an assembly configuration space that captures the intricate geometry as interconnected regions of varying dimensions.

Aysegul Ozkan, a Ph.D. student in the group, developed an open-source software EASAL implementing these algorithms with help from James Pence, an undergraduate researcher, and Ruijin Wu, a co-advised Ph.D. student. EASAL is currently being tested by a computational chemist (Maria Kurnikova, Carnegie-Mellon University) and physicist (Miranda Holmes-Cerfon, NYU) interested in using EASAL in conjunction with traditional methods for configurational entropy and free-energy computations.

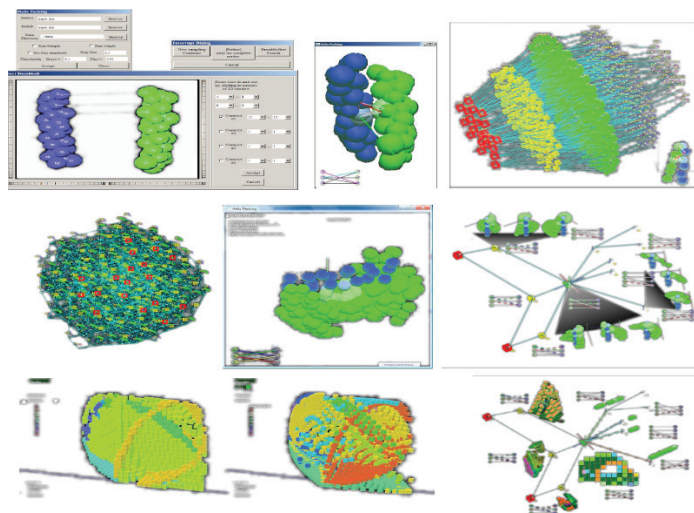


Figure 2: EASAL generates Atlas of molecular assembly landscapes

EASAL's predictions of crucial intermolecular interactions that drive assembly of viral capsids have been validated by a structural biology collaborator (Mavis Agbandje-Mckenna at UF).

Another aspect of entropy that plays a crucial role in the case of symmetric macromolecular assemblies is the notion of combinatorial entropy that indicates the number of different pathways of subassembly formations that lead to successful assemblies. In collaboration with UF mathematicians Miklos Bona and Andy Vince, the Sitharam group has given a method to explicitly count a simplified type of assembly pathways for symmetric macromolecular assemblies.

Computer-aided Geometric and Mechanical Modeling and Robotics

Instead of specifying parts, assemblies and mechanisms as explicit drawings to scale one would ideally like to simply declare various crucial geometric constraints that should hold within and between parts and automate the actual drafting of the part, assembly or mechanism. In addition, we would like software to visualize or answer queries about the configuration or motion space of a mechanism that has been specified as a geometric constraint system. Despite the passage

of three decades since the introduction of the concept of geometric constraint systems into the computer-aided mechanical design community, CAD systems are only able to handle a very small percentage of these tasks even for two-dimensional parts, mechanisms and assemblies.

The Sitharam group introduced efficient algorithms for so-called decomposition-recombination planning for geometric constraint systems arising in CAD. The group then developed an open-source software called FRONTIER for geometric constraint decomposition about a decade ago (still maintained on SourceForge). More recently, the group added efficient recombination algorithms to FRONTIER, which incorporated semi-numeric polynomial system solving, collaborating with the Dr. Jorg Peters' group here at CISE.

The Sitharam group's later work with mathematician Neil White (UF) and computer scientists Audrey Lee-St. John and Ileana Streinu (Mount Holyoke College) on a grant from SolidWorks provided the first formal treatment of many of the geometric constraints useful in mechanical computer-aided design.

Current Ph.D. student Menghan Wang has developed efficient algorithms and open-source software called CayMos to represent and visualize the movement of mechanisms specified using geometric constraints. This employs a new theoretical technique called Cayley analysis of linkage configuration spaces also developed by the group (see below). In a paper accepted to the 2013 SIAM-ACM Solid and Physical Modeling conferences, Menghan uses CayMos to analyze and find unusual properties and motions of common mechanisms such as the well-known and amusing Strandbeest. The paper will also be published in the computer-aided design journal.

Continued on page 8

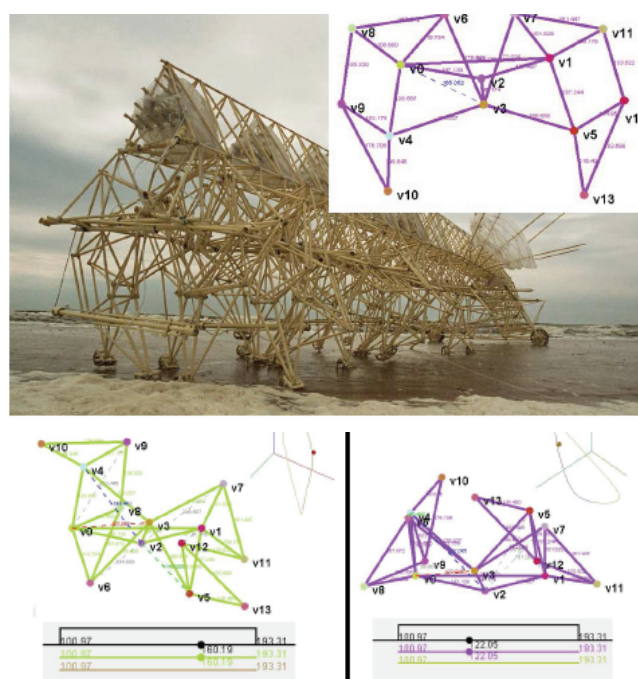


FIGURE 3: CayMos' Cayley analysis of Theo Jansen's Strandbeest

Combinatorial Geometry, Algebra and Complexity Theory

A senior Ph.D. student Jialong Cheng from the Sitharam group made progress on a 150-year-old problem posed by James Clerk Maxwell in 1874 concerning a characterization of when a 3D bar-linkage (in effect a distance constraint system) is rigid. The goal is a characterization that is purely combinatorial, i.e., independent of the actual lengths of the bars in the linkage (distance values in the constraint system), yielding a graph algorithm for determining 3D rigidity. The question was completely answered for 2D in 1970 and has since given rise to an entire area of mathematics called combinatorial rigidity theory. Jialong's dissertation shows that either he has found a much sought-after combinatorial characterization of rigidity of 3D distance constraint systems, or he has disproven another longstanding conjecture about a purely combinatorial abstract rigidity notion.

Two of the group's previous results led up to the above result, and one of them settled another question that has remained open since Maxwell. Both earlier results were well-received in two of three invited talks the group gave at a Fields Institute for Research in Mathematical Sciences in 2011 and a Banff Institute in 2012. One of these papers gives systematic constructions of so-called "nucleation-free" graphs that are highly flexible and yet have pairs of vertices that maintain a fixed distance (implied non-edges). This is an obstacle in obtaining combinatorial characterizations of 3D rigidity. An earlier version appeared as a conference paper with Ileana Streinu (UMass) in the Canadian Conference in Computational Geometry in 2009.

The three invited talks discussed fundamental mathematical results concerning when Cayley configuration spaces of distance constraints systems (linkages) in 2D can be described using simple ruler and compass construction. Such algebraic questions date back to the time of Galois. This work is a continuation of recent papers by a former Ph.D. student Heping Gao and recently graduated Master's student Ugandhar Chittamuru on efficient parametrizations of Cayley configuration spaces.

Machine Learning and Cognitive Architectures

Machine learning is an area sparse in mathematical proofs or guarantees of quality and efficiency. In August 2012, there was an entire workshop at the NSF Center for Intractability in Princeton titled "Provable Bounds for Machine Learning." In contrast, computational learning theory has proofs but simplistic models. The group's recent Ph.D. graduate Mohamad Tarifi's goal was to bring a marriage of the two using core geometric constraint techniques. His 2012 Ph.D. dissertation succeeded in giving provable bounds for dictionary learning by using rigidity theory for a new type of incidence-based geometric constraint system. In addition, his dissertation included a new brain-inspired model of hierarchical machine learning using dimension reduction for the solutions of geometric constraint systems.

His paper, written with co-advisor Jeff Ho on formalizing a model of hierarchical machine learning appeared in the proceedings of BICA (Biologically Inspired Cognitive Architectures) 2011.

Geometry-based CS education

Geometric constraint systems provide a natural entry into computational thinking and coding for K-12 teachers and students since the same structures that are intuitively and physically constructed are also formally and algorithmically manipulated on a geometry-based user interface using both algebra and geometry.

The algorithmic problems that arise implementing the back-ends of user interfaces are at the cutting-edge of geometric constraint solving research. The Sitharam group's current grant from the NSF's Division of Mathematical Sciences contains a "Research Experiences for Teachers (RET)" supplement. Having been exposed to the group's research, local K-12 teacher Eric Lenasbunt ("MisterE") found robust and inexpensive ways to get elementary and middle school students to make and appreciate the unusual and counterintuitive 3D linkages such as nucleation-free linkages with implied non-edges described above. Additionally, having observed the enthusiastic reception at a weekly Math-CS circle the Sitharam group runs at a local school for the past six years, MisterE is now a proponent for teaching children to write geometry programs and geometry-based, game-like apps in the Scratch programming language. This success will lead to a larger RET grant proposal that would involve a larger number of K-12 teachers.

Additionally, these ideas resulted in a collaboration between the Sitharam group and two faculty members in the College of Education at UF, Albert Ritzhaupt and Pasha Antonenko, to propose to NSF a Massively Open Online Course for educating in-service K-12 teachers in computer science so that they can meet the CSTA standards for teaching high school Advanced Placement CS classes. A slight modification of the same idea shows promise for one or two UF general education courses, both for attracting UF undergrads into CS to meet the demand for CS graduates. This gives all UF grads the opportunity to learn how to code, one of the 21st century's essential skills. ►

NEW CISE FACULTY HIRES



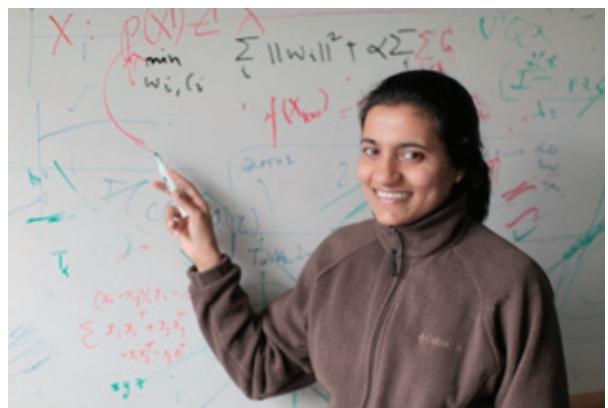
Assistant Professor Lisa Anthony
Ph.D. Human Computer Interaction Institute
Carnegie Mellon University

Dr. Anthony is an excellent new faculty member who will help strengthen the department's Digital Arts and Science and Human-Centered Computing areas. Her Ph.D. dissertation topic was "Handwriting-based Interfaces for Intelligent Tutoring Systems for Algebra Equation-solving." Dr. Anthony already has an NSF funded project named Mobile Touch and Gesture Interaction for Children to investigate the differences in ways that children use touch and gesture interactions compared to adults, especially on mobile devices.

Dr. Anthony designed and taught a special topics course called "Natural User Interfaces" in Fall 2013 as her first course in CISE. It was supposed to be a small, research-oriented seminar. However, since the course covered touch interaction on Androids and whole-body interaction on the Microsoft Kinect, enrollment quickly reached non-seminar numbers. A total of 54 students registered for the class! Dr. Anthony covered the latest advances in research on user interactions and students worked in groups to prototype an application with a NUI as a central component. They performed user-centered design, a user study and improved their prototype based on user feedback. The course was so popular it is slated to become a regular course taught at regular intervals. You can see the video demos of some of the projects at <http://ufcisenui.wordpress.com/videos/>.

The CISE Department is excited to welcome Dr. Eakta Jain. Her research focuses on perceptually-driven algorithms for human-centered computer graphics. Her Ph.D. dissertation topic was "Attention-guided Algorithms to Retarget and Augment Animations, Stills and Videos."

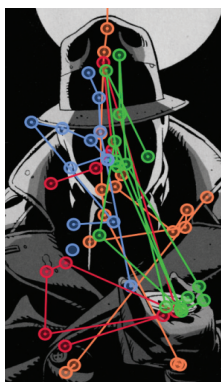
Dr. Jain is interested in connecting artist-created visual content with computer-driven technologies. In her lab, they ask questions such as "How do comic artists create a comic book?" and "How do film editors edit a movie?" Asking such questions leads to research at the intersection of computer graphics, applied perception and data-driven algorithms. This intersection is called human-centered computer graphics. Her research opportunities teach students how to use an eye tracking device to collect gaze data, analyze that data and then apply it towards different computer graphics applications.



Assistant Professor Eakta Jain
Ph.D. Robotics Institute
Carnegie Mellon University



Algorithms find this picture very hard to understand.



Humans easily understand that this man is looking at the smiley button.

FACULTY NEWS

MANUEL BERMUDEZ / Associate Professor / received an award from Lockheed Martin/IPPD for the project "Lockheed Martin MST: Automated Conversion of Data."

DOUG DANKEL / Assistant Professor / was honored by the Florida Artificial Intelligence Research Society (FLAIRS) with the creation of "The Douglas D. Dankel II Lifetime Achievement Award for Service to FLAIRS". The first of these awards will be given at the 2014 FLAIRS Conference.

ALIREZA ENTEZARI / Associate Professor / received an award from Harris Corp/IPPD for the project "Harris Corporation, Digital Oil Field Vision."

PAUL GADER / Professor and Chair / received an award from the Army for the project "Spatial, Temporal, and Frequency Analysis of Wideband, Ground Penetrating Sensor Data." He also received an award from Fibertek, Inc. for the project "Comparative Evaluation of Landmine Detection Algorithms."

SUMI HELAL / Professor / received an NSF award for the project "Knowledge Expansion using Inference Over Large-scale Uncertain Knowledge Bases."

AHMED HELMY / Associate Professor / received an NSF award for the project "NeTs: Small: MobiBench: Benchmarking Mobility Models for Simulation and Design of Future Networks." He received an award from King Abdulaziz City for Science and Technology for the project "iHospital: Design an Intelligent Environment for Hospitals Using RFID-based Sensors." He won the UF College of Engineering Doctoral Dissertation Advisor/Mentoring Award. He participated in the IEEE IWCMC, in Cagliari, Italy in July 2013 and presented three papers. He gave invited talks at Aalto University for the ComNet DTN group (Prof. Jorg Ott), and at Elisa Inc. in Finland.

TAMER KAHVECI / Associate Professor / received two NSF grants for the projects "CIF: EAGER: Modeling and Querying of Probabilistic Biological Networks" and "ABI Innovation: Querying Massive Dynamic Biological Network Databases." He organized a summer workshop titled "Algorithms for Comparative Sequence Analysis". He also gave a talk at the 2013 ENCODE Consortium meeting.

BENJAMIN LOK / Associate Professor / received an NSF award for "Student Support for the IEEE VR 2013 Doctoral Consortium" and an award from Georgia Regents University for the project "A Randomized Controlled Study Using Virtual Patients to Enhance Medical Student's Empathic Communication." Additionally, he received an award from the U.S. Department of Veteran Affairs for "Virtual Environment for Therapeutic Solutions (VETS) iTBI/PTSD Phase II."

JIH-KWON PEIR / Associate Professor / served on the program committee and as a section chair at the 2013 IEEE International Parallel & Distributed Processing Symposium in Boston, MA.

JORG PETERS / Professor / received an award from Invivo/IPPD for the project "Invivo Corp., Cloud Based Service for Image Processing."

SANJAY RANKA / Professor / received an award from the DOE for the project "Center for Compressible Multiphase Turbulence (CCMT)."

MARK SCHMALZ / Associate Scientist / received an award from Frontier Technology Inc. for the project "Multiphysics-Based Sensor Fusion."

MY THAI / Associate Professor / received an award from NSRI for the project "Efficient DPI Methods for Control System Network using SCADA-oriented Application Protocol." She chaired the Workshop on Computational Social Networks (CSoNet '13). She founded and become editor in chief of the Computational Social Networks Springer Journal and was the plenary keynote of the International Conference on the Dynamics of Information Systems. She served on the organizing committee as registration chair for the 19th Annual MobiCom Conference in Miami, Fla.

BABA VEMURI / Professor / gave an invited talk at the Biomedical Image Analysis Summer School at the Institute of Henri Poincare in Paris, France in July 2013. He served as the area chair for the International Conference on Medical Image Computing and Computer Assisted Intervention. Additionally, he is a member of the IEEE Pattern Analysis and Machine Intelligence TC Board and IEEE CS Fellow Evaluation Committee.

DAISY WANG / Assistant Professor / received an award from Google for the project "Knowledge Expansion using Inference Over Large-scale." She gave invited talks at Google Research, Pivotal and Fudan University in Shanghai, China. She also received the 2013 Google Faculty Award.

JOE WILSON / Assistant Professor / received an award from Walt Disney for the project "The Walt Disney Company, Femtocell Identification Tool."

STUDENT NEWS

CISE Students Land Great Jobs

Over 500 UF computer science students interacted with company recruiting representatives at the 13th Biannual Career Development Workshop on Feb. 4, 2013. This year the event moved to the Hilton UF Conference Center. Nineteen companies participated including Microsoft, Amazon, Mindtree, ExxonMobil, Harris Corporation and others.

The feedback from students, faculty and industry professionals has been overwhelmingly positive.

Lauren Frizzell, a fourth-year CISE student, said "I will have a job at Harris Corporation when I graduate in December because of the personal connection established at the CDW. The CDW provides exclusive access to recruiters because the event is just for CISE majors, so the lines are shorter. I'm very excited for my future career."

We look forward to continuing to improve the event in order to expand connections between CISE students and the computer science industry. We welcome current and former students to participate in the opportunity to network with top companies. For more information: <http://www.cise.ufl.edu/careerworkshop>

Computer Science Day

Hundreds of students gathered on the ground floor of the CSE Building for UF's first Computer Science Day on April 22, 2013. The event partnered with Assistant Professor Doug Dankel's Eighth Annual Computer Games Day where students show off newly developed computer games.

Students from the Artificial Intelligence for Computer Games and Theory & Practice of Multimedia Production course demonstrated the games they developed during the semester. There were 19 PC and Android-based games ranging from tower defense, role-play, puzzles and educational real-time strategy games. Several companies came to recruit students, and four companies gave short presentations about what they look for in new hires. Dr. Gader also led a panel discussion with members from industry, the CISE faculty and a CISE Ph.D. student.

Computer Science Day helped computer science gain campus-wide recognition!

CISE Grad Student Receives UF Award



In April 2013, the UF Graduate Teaching Assistant Award was given to CISE's Sencer Nuri Yeralan. Only about 20 graduate students are given this award at UF each year. Awards to engineering students are very rare. Nuri is the third engineering student to win this award since it was established in 2003.

We often wonder if students eventually will bypass classroom learning completely? With the availability of internet services today the answer is uncertain. Nuri believes classroom instructors are vital to the continued success of our education programs. He approaches this challenge by developing and delivering engaging lectures that examine relevant non-trivial problems and by using different approaches in discovering a solution. In his course (COP 4431, Object Oriented Programming) they discuss not only how to build software theoretically, but practically and efficiently. By introducing novel problems and posing complex questions, Nuri motivates and challenges his students to leverage global technological assets and information. Congratulations Nuri for receiving this teaching award!



A CISE student at Computer Science Day.



Association for
Computing Machinery

Advancing Computing as a Science & Profession

ACM Programming Team Advances to World Finals

The UF CISE programming team traveled to Russia for the world finals. The squad —Cookies 'n Cream, consisting of Alex Anderson (team captain), Joseph Thuemler (former team captain) and Cheran “Nan nao” Wu, as well as the team coach Dave Small— attended two prestigious events: the University of Chicago Invitational Programming Contest 2013 and the previously mentioned 37th Annual World Finals of the ACM International Collegiate Programming Contest (ICPC).

At the end of March 2013, the 23 best teams from the United States and Canada assembled for the University of Chicago Invitational Programming Contest. The purpose of this event is to strengthen the North American super-region in international competition (which has been increasingly dominated by Eastern Europe and Asia) through joint practices and problem solution discussions, exchange of coaching tips, and of course, an actual programming contest. Then, Cookies 'n Cream traveled to St. Petersburg, Russia to compete in the ICPC World Finals.

Overall, 2013 was a productive year for ACM. Members regularly practiced necessary skills for success, competed in multiple online contests and two prestigious on-site contests and even hosted a community service project, the High School Programming Contest.

The team organized all the details of the 2013 High School Programming Contest to foster interest in computing, raise awareness of competitive programming challenges and attract talented students to study computer science at UF. Twenty six teams from around Florida participated.

Although ACM lost experienced people due to graduation, the team continues to attract dedicated new members. We wish our graduates great success as they begin careers at companies such as Google, Facebook and Microsoft. ►



GATORS @ MINDTREE



Gator grads that work at Mindtree pictured left to right: Nathaniel Wingfield, Nick Wilson, Kyle Van Wie, Ashley Clifton, Jeremy Johnson, Tara Parkins, Leesa Ross, Andrew Melnyk, William Deich and James Doolittle (not all are pictured).

A GROWING GAINESVILLE SOFTWARE DEVELOPMENT CENTER OFFERS INTERNSHIPS AND JOBS TO RECENT GRADUATES

Gators wanting to stay in town after graduation can find a fun, positive and team-orientated culture at Mindtree. The office closes at 3 p.m. on Fridays during home football game weekends to encourage employees to participate in football festivities.

Mindtree, a global IT solutions company with headquarters in Warren, New Jersey and Bangalore, India, celebrated its first birthday in Gainesville last October. The Gainesville office began in the Florida Innovation Hub at UF with just four or five people and rapidly grown to 120 employees in just one year.

The new office on the third floor of the Ayers Medical Plaza in Innovation Square encourages collaboration with plenty of open meeting space and adjacent work stations for client projects. The company's ability to communicate effectively with overseas clients and bring exposure to Gainesville earned them the International Business Award from the Gainesville Chamber of Commerce. Over 12,000 IT experts worldwide engineer

meaningful technology solutions to help businesses and societies flourish.

Mindtree Gainesville works with Fortune 2000 clients using the Agile Scrum process to map their day-to-day work. They have project teams and projects that use Java, .Net, mobile, business intelligence, testing, UX/UI and range in functionalities based on client's needs, from testing center of excellence to full software development lifecycle teams. A typical day will have a daily stand-up call with the client to facilitate communication, transparency and to insure requirements are being met. Developers engage in coding, unit testing, paired programming, peer review of code and bug fixes.

For many UF graduates, being close to the heart of The Gator Nation is a perk to sticking around after graduation. "I met representatives from Mindtree at the Career Development Workshop," said Nick Wilson, CISE alumnus and intern at Mindtree. "I decided to start my career at Mindtree because they've helped me

understand software management, and I want to stay in Gainesville."

Beyond hiring graduates, Mindtree's ties to UF are numerous. The company recognized College of Engineering Dean Cammy Abernathy and Innovation Square's Ed Poppell as Honorary Mind-Tree Abassadors.

Mindtree is contributing to Gainesville's growing innovation economy, and the CISE Department is proud to play a part in fostering their growth by providing computer science talent.

"Our relationships with the University of Florida, the Chamber of Commerce and the IT community here in Gainesville has not only provided us with top talent in Florida but has allowed us to thrive and provide opportunities for students, recent graduates and alumni. We are excited by the energy in this growing technology community and the support from UF and look forward to employing many more amazing Gator Minds in the years to come," said Center Head Joelle Smith. ▶

CONGRATULATIONS 2013 GRADUATES

DOCTOR OF PHILOSOPHY IN COMPUTER ENGINEERING

WILLIAM CHAPMAN/Dissertation Title: *Multiresolution SAR Image Formation and Change Detection on High-Performance Heterogeneous Architectures*/ **Advisor: S. Ranka**

JIALONG CHENG/Dissertation Title: *Towards Combinatorial Characterizations and Algorithms for Bar-and-Joint Independence and Rigidity in 3D and Higher Dimensions*/ **Advisor: M. Sitharam**

YU-TSEH CHI/Dissertation Title: *Block, Group, and Affine Regularized Sparse Coding and Dictionary Learning*/ **Advisor: J. Ho**

JOONHAO CHUAH/Dissertation Title: *Identifying and Exploring Factors Affecting Embodied Conversational Agent Social Presence for Interpersonal Skills Training*/ **Advisor: B. Lok**

THANG DINH/Dissertation Title: *Complex Networks under Attacks: Vulnerability Assessment and Optimization*/ **Advisor: M. Thai**

TAYLOR GLENN/Dissertation Title: *Context-Dependent Detection in Hyperspectral Imagery*/ **Advisor: P. Gader**

GUNHAN GULSOY/Dissertation Title: *Querying Large Biological Network Datasets*/ **Advisor: T. Kahveci**

EUN JU KIM/Dissertation Title: *Knowledge Assisted Human Activity Recognition for Improved Accuracy and Programmability*/ **Advisor: A. Helal**

JEEYOUNG KIM/Dissertation Title: *A Data-Driven Framework for Multi-Dimensional Prediction Processes for Wlan Mobile Users*/ **Advisor: A. Helmy**

DUCKKI LEE/Dissertation Title: *Models and a Framework for Cyber Human Persuasion*/ **Advisor: A. Helal**

XINXIN LIU/Dissertation Title: *Privacy Preserving Techniques in Mobile Networks*/ **Advisor: X. Li**

MANU NANDAN/Dissertation Title: *Fast SVM Training Using Approximate Extreme Points*/ **Advisor: P. Khargonekar**

DUNG NGUYEN/Dissertation Title: *Cascading Propagation and Optimization in Networks*/ **Advisor: M. Thai**

NAM NGUYEN/Dissertation Title: *Community Structure and Its Applications in Dynamic Complex Networks*/ **Advisor: M. Thai**

SHAoyu QI/Dissertation Title: *Image Retargeting and Smart Projectors*/ **Advisor: J. Ho**

MUHAMMAD RUSHDI/Dissertation Title: *On Learning and Regularization in Super-Resolution Imaging*/ **Advisor: J. Ho**

SUBHAJIT SENGUPTA/Dissertation Title: *Two Models Involving Bayesian Nonparametric Techniques*/ **Advisor: A. Banerjee**

YILIN SHEN/Dissertation Title: *The Exploitation of Power-Law Networks: Robustness, Optimization and Its Impact on Communication Networks and Social Behaviors*/ **Advisor: M. Thai**

ANTHONY SMITH/Dissertation Title: *Category Space Dimensionality Reduction for Supervised Learning*/ **Advisor: A. Rangarajan**

XIN YANG/Dissertation Title: *Design and Implementation of Mapreduce Systems for Block-Oriented Iterative Scientific Applications*/ **Advisor: X. Li**

HAN ZHAO/Dissertation Title: *Exploring Cost-Effective Resource Management Strategies in the Age of Utility Computing*/ **Advisor: X. Li**

|||||
According to
www.code.org,
computer science is
the **2nd highest-**
paid college
degree and
computer
programming jobs
are growing at **2X**
the national
average.

STAFF NEWS

NEW STAFF MEMBERS



**CORY SPENCE-THOMAS,
DEPARTMENT FISCAL OFFICER**

Cory joined CISE as the new Fiscal Officer in March 2013. Cory graduated from the University of Florida and has worked in several Engineering Departments over the last nine years. She oversees fiscal processes and works with other CISE staff members in handling the Department's financial matters.



**SKYLAR RAMSEY,
SENIOR SECRETARY**

Skylar Ramsey joined CISE in August 2013 as the Senior Secretary to Department Chair Paul Gader. Skylar graduated in May 2013 with a public relations degree from UF. As the Senior Secretary she is responsible for preparing reports and documents between the Chair and the CISE faculty, arranging and scheduling meetings, the Chair's travel arrangements and coordinating the Industrial Advisory Board meetings and Career Development Workshops.

**PAULA CUNNINGHAM,
OFFICE MANAGER**

Paula Cunningham joined CISE from the IFAS Shared Services Center in McCarty Hall. There she was instrumental in establishing human resources practices for 11 departments/units, which ensured timely payroll processing. She is excited to be a part of the already amazing administrative staff of the CISE. Feel free to come by and say "Hey."



**JOAN GLISSON,
OFFICE ASSISTANT**

Joan joined CISE in December 2013 as an Office Assistant. She is responsible for processing travel, inventory management and assists in processing J-1 Visas. She has a number of years of experience, having previously worked with UF Agronomy and IFAS. She enjoys gardening and spending time with her family.

STAFF SPOTLIGHT

ADDISON LAURENT, UNIX Systems Administrator



Addison attended the sartorially similar Clemson University uneventfully, (with the notable exception of the Great Carbon Fiber Incident of 1992) and was awarded a Bachelors in Textile Chemistry in 1993. Having fallen accidentally into IT, he's since been a system administrator in four states, worked for three universities, two years as a federal contractor and one year doing e-business connectivity. Addison joined the CISE department in 2011.



The Foundation for The Gator Nation

**DEPARTMENT OF COMPUTER &
INFORMATION SCIENCE & ENGINEERING**

E301 CSE Building
P.O. Box 116120
Gainesville, FL 32611-6120

**SUPPORT
CISE!**

Editors: Jennifer Jackson and Skylar Ramsey

YES! I WANT TO SUPPORT CISE

Amount (please circle):

\$1,000 \$500 \$250 \$100 \$50 Other \$ _____

Please choose a payment method:

Credit Card:

Type: VISA MasterCard Discover

Number: _____

Exp. Date: _____ / _____

Check: Please make checks payable to The University of Florida Foundation and note that your gift is for the CISE Department

Name

Address

City

State

Zip

Phone

Email

Please return to:

University of Florida Foundation

P.O. Box 14425

Gainesville, FL 32604

Don't forget your company's matching gift form!

OR GIVE ONLINE AT: <https://www.uff.ufl.edu/OnlineGiving/FundDetail.asp?FundCode=000591>