



Interdisciplinary Research and Computer Science at UCF



Gary T. Leavens
Professor
Department Chair

Computer Science is expanding the reach of science and technology, which involves our field in many new problems and challenges. At the University of Central Florida (UCF), the department of Computer Science is involved in several different interdisciplinary endeavors. We started a new Master of Science program in Data Analytics several years ago, and this is a joint degree program with the UCF

department of Statistics. The degree program had its first classes meet this semester. It is described in a separate article in this newsletter. UCF has also hired several faculty, including two in Computer Science, two in Statistics, and one in Mathematics in this area.

Two years ago the UCF administration announced an initiative to create several “faculty clusters” based on internal proposals for interdisciplinary work. In Computer Science we were involved in several of these clusters. I personally lead the cluster in “cyber security and privacy,” which also involved several other faculty from Computer Science, as well as faculty from our college, five other colleges, and the UCF Institute for Simulation and Training. Many departments have core and affiliated faculty involved in the cluster. The proposal for this cluster capitalized on the outstanding success of our Collegiate Cyber Defense Competition (CCDC) team. (The team’s coach and advisor, Dr. Thomas Nedorost, has described some of their recent success in an article in this newsletter.) In part due to the tremendous positive publicity that the CCDC team has generated, and due to the great interest among UCF faculty, the cyber security and privacy cluster was funded by the UCF administration. Last year was

spent searching for a leader for this cluster, and we are currently in negotiations to hire a distinguished leader for it. In addition, there will be 4 other faculty hires across the university this academic year.

Computer Science was also involved in the cluster on Genomics and Bioinformatics that was funded by the administration. We are very pleased to have hired the distinguished scientist, Dr. Shibu Yooseph as the lead of this cluster. Dr. Yooseph will be a professor in the department. An article about him appears in later in this newsletter. We hope for one or two other faculty in this cluster to complement our existing faculty that work in the interdisciplinary area of Bioinformatics.

Computer Science faculty are also involved in several other clusters that were funded last year.

Currently UCF is in the throes of another round of faculty cluster proposals. Several of these have Computer Science faculty involved, and we look to these clusters to increase our involvement in interdisciplinary research.

My vision for the department includes expanding our faculty into several areas where Computer Science expertise is indispensable and where the demands for that expertise will not easily be met by faculty who are not trained as Computer Scientists. Data Analytics (“big data”) is one such area, which we are already moving into. Cyber security and privacy is another such area, where the faculty cluster will make a large difference. Our department has been involved in Bioinformatics since at least 2007. We have also noted that several faculty have become involved in robotics. A faculty cluster in assistive robotics is one of the proposals current being developed, and we expect to announce some senior hires in robotics next year.

In addition to seeing bright prospects for interdisciplinary research, we have also recognized the need for training our students in multiple different areas. For this reason we have recently developed a new curriculum in the Computer Science bachelor’s degree that offers students several different tracks of study.

New Faculty



**Sharma
Thankachan**

Dr. Sharma Thankachan is an Assistant Professor in the Department of Computer Science at University of Central Florida, Orlando. Before that, he worked as a Research Scientist (research faculty member) in the School of Computational Science and Engineering, Georgia Institute of Technology, Atlanta. He earned his Ph.D degree in Computer Science from Louisiana State University in 2014 and bachelor's degree from National Institute of Technology Calicut, India.

Sharma's research interests are broadly in the areas of algorithms and data structures. Specifically, parallel and external memory algorithms, algorithms for sequence analysis problems in bioinformatics, and succinct/compressed data structures. Sharma has published over 20 journal articles and over 50 peer reviewed conference papers (h-index 11). He has served as a program committee member of several conferences and workshops, including the Combinatorial Pattern Matching Symposium (CPM, 2016), Foundations of Big Data Computing (BigDF 2016) and High Performance Computational Biology (HiCOMB 2016).



**Shibu
Yooseph**

Dr. Yooseph joined UCF in Fall 2016 as Professor in the Department of Computer

Science. He is also the lead for the Genomics and Bioinformatics Cluster, one of the interdisciplinary initiatives established recently at UCF. This cluster has a goal of developing strong multidisciplinary research and academic programs in the area of high-throughput genomics and bioinformatics to study biological systems, and encompassing a variety of disciplines including Computer Science, Biology, Medicine, Engineering, Mathematics, and Statistics.

Dr. Yooseph's main research area is Computational Biology and Bioinformatics, with a focus on the design and development of efficient algorithms for large-scale biological data analysis. His research has been very multidisciplinary, involving collaborations and applications in the fields of computing, genomics, microbiology, environmental research and biomedical science. He has published in both computational and applied science journals over the course of his career, with more than 23,000 citations of his work. Dr. Yooseph has worked in several areas of Computational Biology and Bioinformatics including phylogenetics, comparative genomics, functional genomics, proteomics, genome assembly, biomarker discovery, and sequence analysis. His primary focus in the past several years has been in metagenomics, a paradigm enabled by cost effective high-throughput DNA sequencing that allows for the study of the genomic composition of microbial communities (microbiomes). His research in metagenomics has centered on the development of efficient algorithms, software, and infrastructure for analyzing large datasets, and subsequently applying these computational tools to study microbial diversity, evolution, and ecology. He has led studies analyzing microbiomes from a range of environments including

water, air, and human. His current research also includes the use and integration of various '-omics' data to study microbiome composition differences in the context of diseases like Inflammatory Bowel Disease, Non-Alcoholic Fatty Liver Disease, and Malaria. His long-term research goals in genome and microbiome research include developing novel computational paradigms to elucidate mechanisms of microbial interactions with their environment and host, in particular, to understand human diseases.

Prior to joining UCF, Dr. Yooseph held joint appointments at the J. Craig Venter Institute (JCVI) and at Human Longevity, Inc. (HLI). At JCVI, Dr. Yooseph led the metagenomics informatics group and had a federally funded research program with a focus on developing algorithms for the analysis of genome and metagenome data, and applying them to study microbial communities. Dr. Yooseph was the informatics lead at JCVI on several large-scale metagenomic projects including JCVI's Sorcerer II Global Ocean Sampling Expedition and the NIH funded Human Microbiome Project.

Dr. Yooseph received his Bachelor of Technology in Computer Science and Engineering in 1992 from the Indian Institute of Technology, Banaras Hindu University, India. He obtained his Ph.D. in Computer and Information Science in 1997 from the University of Pennsylvania, where his doctoral thesis was in the area of evolutionary tree construction and consensus methods. He was a Postdoctoral Fellow at the Center for Discrete Mathematics and Theoretical Computer Science (DIMACS), Rutgers University from 1997-98. From 1998-2000 he was a Research Associate in the Department of Mathematics at the University of Southern California (USC) where he worked on algorithms for inferring evolutionary history of tandem repeat gene families and on algorithms for gene expression data analysis. After his postdoctoral work at USC, he became a Computer Scientist in the Informatics Research Group at Celera Genomics and Applied Biosystems, during which time he contributed to the the Mouse Genome Project, functional genomics and proteomics efforts, and the Human Genome Project.



UCF Computer Science Faculty Strives to Keep Teens Safe from Online Risks



Dr. Pamela Wisniewski, an Assistant Professor in the Department of Computer Science at UCF, earned considerable media attention with her recent work on adolescent online safety when she found that abstinence-only approaches aren't the best solution for protecting teens from online risks. Instead, teens can benefit from experiencing some level of online risk so they can learn how to become more resilient

to them – learning valuable coping skills and protecting themselves from more serious risks in the future. Dr. Wisniewski's work, which won Best Paper Awards (top 1% of submissions) for two consecutive years at ACM's Conference on Human Factors in Computing Systems, has also been featured in Science Daily, Medical Daily, Futurity, THE Journal, and the Matt Townsend Show on BYU Radio.

Her work applies resilience theory from developmental psychology, which frames resilience as the ability for an individual to thrive in spite of their negative risk experiences. While this theory has been used to show how teens overcome offline risks, such as sexual abuse, drug abuse, and other risky situations, her work is the first to apply resilience theory to the context of online risks experiences. By conducting a web-based diary study of 68 teens, Dr. Wisniewski and her research collaborators at the Pennsylvania State University examined four types of online risk (i.e., information breaches, cyberbullying, sexual solicitations, and exposure to explicit content) that teens encountered over a two-month period.

Teens in the study reported a total of 207 separate risk events with 74% reporting exposure to explicit content, 28% sexual solicitations, 24% information breaches, and 15% experiencing cyberbullying. However, through qualitative approaches, Dr. Wisniewski found that the

majority (87%) of these risk experiences only posed minimal risk to teens, ranging from no emotional distress to some discomfort. Nearly half of the time (47%) teens took active measures to deal with the risk experience, such as confronting or blocking the person who caused the issue, removing themselves from unwanted situations, fixing it themselves, or actively seeking help. In many cases, the experience also gave teens the opportunity to build important social skills, such as the ability to set boundaries, problem-solve, and display empathy. Teens reported being able to resolve the situation themselves about 66% of the time. Using advanced statistical methods on the pre-survey data of the diary study, her

Nearly half of the time teens took active measures to deal with the risk experience.

research team also confirmed that resilience played a statistically significant role in protecting teens from the negative effects of internet addiction and being exposed to online risks.

Based on these results, Dr. Wisniewski is currently working on technology-based solutions that move away from the widely available parental control software that protects teens from online risks through parental monitoring and restriction. Her goal is to find ways to help teens build resilience to online risks by increasing their self-awareness, impulse control, and risk-coping skills. The Associated Press has also solicited Dr. Wisniewski's expert opinion on online privacy and safety for two murder cases that involved the internet and young women. These stories were featured in The Chicago Tribune and on Fox News. Dr. Wisniewski's recently published work can be found in the ACM Digital Library at [http://dl.acm.org/results.cfm?query=persons.authors.personName%3A\(%252BPamela%20%252BWisniewski\)&srt=publicationDate](http://dl.acm.org/results.cfm?query=persons.authors.personName%3A(%252BPamela%20%252BWisniewski)&srt=publicationDate)



UCF's Digital Defense Dynasty

The UCF Collegiate Cyber Defense Competition Team won the 2016 National Championship for the third consecutive year in the National Collegiate Cyber Defense Competition. The NCCDC competition is one of the largest collegiate-level cyber competitions in the world and has become regarded as the “Super Bowl of Collegiate Cybersports”. Teams from 220 colleges and universities, comprised of more than 2,400 students, entered this year’s competition. Through a 3-tier elimination system, the top team from each of the 10 regions across the United States traveled to San Antonio, TX to battle for the National Championship title earlier this year. Although the competition was established in 2006, UCF entered its first team in 2013 and remains undefeated in the Southeast Region. “We’re sort of the new kid on the block” says Dr. Tom Nedorost, the team’s coach. UCF is the first team in the history of the competition to win the Championship three times. “Seeing our students bring home the ‘Alamo Cup’ not once, but three times, is extremely rewarding”.

Raytheon, the title sponsor of the NCCDC, brought the 12-member UCF team to Washington, DC in July for a championship tour. The team visit Raytheon’s Intelligence, Information and Services office in Virginia as well as U.S. Immigration and Customs Enforcement’s Cyber Crime Center, the FBI Academy and FBI Forensics Lab in Quantico, Virginia and the CIA headquarters in Langley, Virginia. Team members were also able to engage in some hands-on sleuthing at the International Spy Museum in DC. The tour culminated with a visit to the White House to participate in a panel discussion on cybersecurity competitions hosted by the Office of Science and Technology Policy.

Top: Team member Kevin Colley hoists the “Alamo Cup” for a victory photo
Above: (L to R) Dr. Tom Nedorost, Jonathan Haas, and Heather Lawrence spoke at the White House

CECS - College of Expanding Cyber Security programs?

Student interest in cybersecurity continues to grow exponentially every year. The Collegiate Cyber Defense Club (aka Hack@UCF) celebrates its 4th anniversary this Fall. In that short time, Hack@UCF has become the largest student organization within the College of Engineering and Computer Science. Club member surpassed 280 student members last year and exceeded the capacity of the ENG2-102 Auditorium which had hosted the club’s weekly meetings since Fall 2012. The club kicked off the 2016-2017 academic year by moving to the larger 229-seat HEC125 Auditorium. Dr. Tom Nedorost, Faculty Advisor for the Club, said “We moved the club’s meetings to the largest auditorium on the East side of campus and we still ended up with a standing room only crowd”. The club hosts guest speakers, discusses current cyber events and topics, provides training and demonstrations during the general membership meetings held Fridays from 4:30-6:30pm. The Friday meetings are open to the public and attendance often tops 200 people. “I’m inspired and amazed by the large attendance every week. Campus was deserted by Friday afternoons when I was a student at UCF.” The club has grown through word-of-mouth and even welcomes students visiting from high schools and other colleges and universities. The club also holds Sunday afternoon workshops on more advanced skills like reverse engineering and return oriented programming techniques.

Due to the popularity of cybersecurity among UCF students and the success our students have obtained competing on a national level, the college is increasing the number of cyber courses offered and upgrading teaching facilities. CIS4940C Topics in Cybersecurity became a permanent course this Fall. A new course, CGS4203C Digital Forensics, will be offered starting in Spring as a CS and IT restricted elective. There are also changes planned for CIS 4615 Secure Software Analysis and Assurance and a proposed new course, COP 4137 Introduction to Malware Analysis, coming in Fall 2017. In August, the college announced that it is building a state-of-the-art Cyber Operations Lab where several of these courses will be taught and where our National Championship cyber defense team will practice staring next summer. Stay tuned as construction gets underway!



Above: Conceptual design for the new Cyber Operations Lab in HEC125 building
Below: SROC – Standing Room Only Crowd at a recent Friday afternoon meeting





Computer Science and Statistics Create MS Degree in Data Analytics

This fall marks the beginning of a new Master of Science degree in Data Analytics at UCF. This MS degree program is being jointly taught by the UCF departments of Computer Science and Statistics. We expect that the cooperation between Computer Science and Statistics faculty will be a strength of the program.

The degree program is aimed at professionals, many of whom are already working in the Orlando area in related jobs, such as software engineers. Most do not presently work with big data, but are attracted to the field by the prospects of career advancement that it offers. Many have been looking for some time to learn more about data analytics, but have not wanted to take online courses. Teaching will be face-to-face at the UCF main campus in Orlando.

The degree program itself consists of 10 courses, each having 3 credits, comprising the usual total of 30 credits for an MS degree. There is no required thesis, but there is a required capstone project course, where students will apply what they have learned in previous courses. Students attend classes in cohorts taking the same set of 7 other required courses before branching out into taking 2 electives and the project course (which is also required). The cohorts will allow them to form professional networks.

In the first semester (going on this fall) they take a class in network science and another in statistical analysis. In the second semester (next spring) they take machine learning and a first course in data mining methodology. The following summer they take a course in parallel and distributed databases and a second course in data mining methodology. The next fall they take a course in parallel and cloud computation and a first elective. This is followed by a spring semester with another elective and the project course. The project course can also be delayed until the following summer.

Elective courses include: a first course in text mining, a course in data preparation, a course in computational analysis of social communities, a course in social media and network analysis, a course in interactive data visualization, and a course in machine learning for biomedical data.

We expect the first graduates of this program at the end of Spring semester 2018.

In the next admission cycle for Fall 2017, the program will also be open to international students, whom will be eligible for paid internship during the program and to optional practical training after their graduation via the UCF Office of Experiential Learning.

The degree program has gathered strong industry support from a diverse set of companies in local industry. Several have agreed to join the program's external advisory board. These include: IBM, Disney, Lockheed Martin, Leidos, Siemens, Blue Health Intelligence, Duke Energy, Nielsen, Deloitte, and EA among others. The advisory board will advise on matters of curriculum, internships and overall program direction.

From all the members of our advisory board, we have heard first hand of the real and present need for well-trained data scientist and data analyst in their industries. This only strengthens our resolve to provide the best quality education in this program and to further develop collaborative efforts with industry partners to contribute to our local innovation ecosystem and ultimately to the economic development of our region.

Programming Team: Knowledge, Fun, and Fortune



In previous newsletters, we have concentrated on the UCF programming team record in the International Collegiate Programming Contest (ICPC). Other topics have been discussed, for example, encouraging more female participation. Not only has the programming team been a positive feature for the department of computer science at UCF, but we have always felt it to be a positive feature for the student participants themselves.

To get a first hand account of this, we asked Evan Dorundo, a team member from 2013 to 2016 and who ended his ICPC career with two trips to the World Finals, to describe his participation and what he felt of its value. His response is the following.

“I started out college wanting to be a part of something extracurricular that I could be proud of. Having heard of the UCF Local Programming Contest, I tried out for the programming team but didn’t make it. However, I was encouraged to keep trying for the next year. After participating in the programming team’s practices as a guest, I became more and more certain that this was the club for me.

“After my first semester at UCF, the programming team coaches noticed my persistence and added me to the developmental team. It was at this point that I noticed the great culture of learning and problem solving inherent in the UCF Programming Team. Team members are always collaborating to learn new algorithms and programming techniques while pursuing their goal of solving harder and harder problems. This culture helped me to become increasingly confident in my problem solving skills.

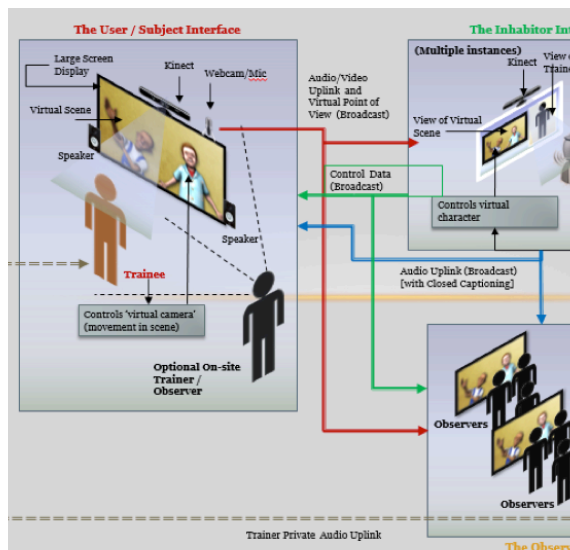
“Once my sophomore year came along, I was ready to move up to the varsity programming team. During the next couple years, I was fortunate to receive one-on-one training with my coach, Matt Fontaine. Through this training, I gained a love of algorithms that prompted me to learn a large collection of algorithmic techniques well beyond what is normally taught in classes.

“This experience with problem solving was very useful during internships as well. I have been able to transfer the skills I learned in programming team to successfully complete one Microsoft and two Google internships.

“Of course, it was most satisfying to apply my coding and problem solving skills to programming contests. I was chosen to compete in the Southeast Regional Programming Contest three times with different sets of teammates. My team came out on top two of the three times, leading me to the ACM ICPC World Finals twice – first in Marrakech, Morocco and second in Phuket, Thailand. Having never gone overseas before, these trips were something I will never forget! However, the most exciting part was having a chance to further the team’s goal of winning World Finals. Overall, the UCF Programming Team gave me the means to improve myself, and it would be unwise not to make the most of that opportunity.”

Evan has gladly volunteered to be a coach during his last semester at UCF and hopes to transfer his experience to the current group of team members.

Please feel free to contact the team faculty advisor, Dr. Ali Orooji (phone: 407-823-5660, email: orooji@cs.ucf.edu), for more details.



Semi-Automated Digital Puppetry Control

Patent US 9,381,426 B1, titled Semi-Automated Digital Puppetry Control, was issued to the UCF Research Foundation on July 5, 2016. This patent evolved from a partnership between UCF computer scientists, Charlie Hughes and Arjun Nagendran, and educators, Lisa Dieker and Mike Hynes. Its intellectual contributions include the technologies developed at the Synthetic Reality Laboratory (<http://sreal.ucf.edu>) and the processes developed in the College of Education and Human Performance to enable the worldwide delivery of interactive virtual learning experiences involving human avatars. The primary examples of this collaboration can be seen in the TeachLivE system and its variants (<http://www.ucf.edu/teachlive>) through which the practice of over 50,000 teachers and teacher candidates were positively influenced in the 2014-16 academic years. In fact, the initial motivation for creating this paradigm was the need of our education colleagues who wanted to have their candidates rehearse teaching skills (classroom management, pedagogy and content delivery) with virtual rather than real children. Their goal was to be able to better prepare teachers and to do this in a manner where they could be assured that “no real children were harmed in the making of this teacher.”

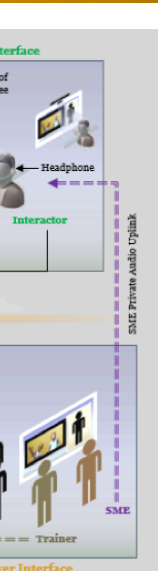
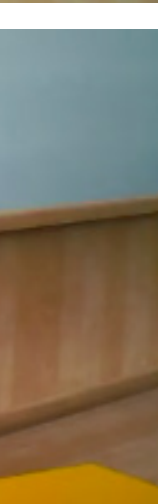
Each scenario delivered by our system involves developing deep backstories about a group of virtual characters and then presenting these avatars in a virtual setting (see above). The virtual characters are brought to life by a professional interactor – a person who “inhabits” virtual characters, playing fictional roles with distinct objectives for achieving specified emotional and behavioral responses in the participant(s). Generally, the interactor controls all critical actions by avatars, both verbal and nonverbal, while software agents manage less intense behaviors. Where appropriate, a participant can walk around in a physical space with a virtual camera mimicking their motion in the synthetic setting to give them a sense of physical presence in the setting with an associated strong social presence with the avatars.

The framework on which all our avatar-based systems are built is called AMITIES (Avatar Mediated Interactive Training and Individualized Experience System). AMITIES encapsulates software components needed to remotely deliver, receive and observe avatar-based, role-playing experiences. This infrastructure permits the creation of a broad range of realistic and compelling interactive scenarios. Examples include preparing learners to exhibit good interpersonal skills; teachers to address the varying needs of students including those in inclusive classrooms; law enforcement personnel in how to

improve de-escalation skills; and students (middle school to college) on how to hone their ability to carry out protective strategies for self and others. In addition to its use to help over 50,000 individuals to become better teachers and communicators, variants of TeachLivE have been used to train hotel desk staff to be politer and more efficient, administrators to give better employee feedback, students with social challenges to develop better interaction skills, and college students to have improved interview strategies. AMITIES also includes components to help its users reflect on their performance (e.g., for after-action review), with or without a coach providing guidance during such reflection.

At a more detailed level, the patent describes a low-cost, low-demand (physical and cognitive) interface for interactors to remotely control the verbal and non-verbal activities of a set of virtual characters or avatars (see above). Typically, one interactor controls many (often five or six) avatars in a single experience but, in addition to this common one-to-many model, the system affords one-to-one (used for interactions with a single customer, patient, interviewer, interviewee or parent) many-to-many (usually two interactors sharing the load during a formative study) and even many-to-one control (generally used when a master interactor is training a novice, much like a driving instructor who can periodically take control from a student driver). The patent also describes a low-cost, unencumbered interface for participants that allows them to employ both natural movement and verbal/non-verbal interaction with virtual characters. Finally, the patent presents a network protocols based on micro-poses that affords a means to support the use of gestures rather than motion capture to control remote avatars, thereby leading to low-latency, low-bandwidth and minimal lag.

Specific computer science problems addressed in this patent are in Human-Centered Computing (HCC) and Network Protocols. The HCC contributions are in interaction paradigms, including that of the interactor(s), focusing on naturalness, flexibility and low cognitive/physical demand; the participant(s), focusing on physical and social presence in Virtual Environments; and the observer(s)/evaluator(s), providing automated and semi-automated means for analysis of a participant’s task performance, e.g., kinds of questions asked and wait time after asking questions, and emotional responses, e.g., poses and vocalizations. The Network Protocols contribution is the design and implementation of the micro-pose paradigm and the means to transmit the associated gesture-based avatar control through a low-demand network protocol.



PhD Graduates

Fall 2015



Dr. Steven Feldman is from Hobe Sound, Florida. He completed his dissertation, The Design, Implementation, and Refinement of Wait-Free Algorithms and Containers, under the supervision of Dr. Damia Dechev in the Fall of

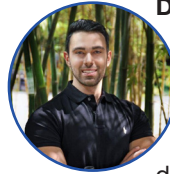
2015. Steven's research into non-blocking algorithms included the development of wait-free versions of the stack, hash map, ring buffer, vector, and a multi-word compare-and-swap algorithms. To unify these algorithms and techniques, Steven released Tervel, a wait-free library of common algorithms and containers that includes a framework that simplifies the design of non-blocking algorithms. Steven is currently employed as a site reliability engineer at Google in Mountain View, California.



Dr. Gurkan Solmaz was born and raised in Ankara, Turkey. He received a Ph.D. degree in Computer Science at UCF under supervision of Dr. Damla Turgut in Fall 2015. His dissertation was titled Modeling Crowd Mobility and

Communication in Wireless Networks which presents contributions to the fields of crowd mobility, wireless sensor networks (WSN's) with mobile sinks, and opportunistic communication in theme parks. The two main directions of his PhD studies were human mobility and strategies for the mobile sink positioning and communication in wireless networks. Gurkan is currently living in Germany and working as a research scientist at NEC Labs Europe.

Spring 2016



Dr. Afshin Dehghan, originally from Iran, where he received a B.S. degree in 2011. He then came to UCF and received a M.S. degree and, in the Spring of 2016, a Ph.D. in Computer Science. His dissertation, under supervision

of Dr. Mubarak Shah, was entitled Global Data Association for Multiple Pedestrian Tracking. When dealing with high-density crowd scenarios such as religious rites participations, political rallies, concerts or marathons, modeling and analysis of crowd dynamics can become quite complex. This dissertation contributes to automatic video analysis of such scenarios and has resulted in 10 publications with 524 citations. Currently, Afshin is a Research Scientist in Sighthound Inc. in Orlando, Florida.



Dr. Faraz Hussain, originally from New Delhi, India, completed a Ph.D. in CS at UCF in the Spring of 2016, with co-advisors Sumit Kumar Jha and Gary T. Leavens. His dissertation, Techniques for

Automated Parameter Estimation in Computational Models of Probabilistic Systems, centered around the design of two new algorithms for automated parameter synthesis in probabilistic models. Faraz earned a best paper award in 2014 at the 4th International Conference on Computational Advancements in Bio. and Medical Sciences. He is currently a Postdoctoral Associate at University of Utah.



Dr. Jun Ding, originally from China, graduated in the Spring of 2016. His dissertation, under advisement of Haiyan (Nancy) Hu was entitled Transcriptional and Post-Transcriptional Regulation of Gene Expression and is a computational study of how genes

are turned on and off in a cellular system. Jun investigated novel computational methods for transcriptional factor and microRNA binding site prediction towards better understanding of gene regulatory mechanisms. Together with others, Jun has published over ten papers based on his dissertation work. Most of these papers are high-impact Journal papers and Jun is the first author. Dr. Ding currently has a Postdoctoral position at CMU.



Dr. Jared Bott's work at UCF focused on developing tools to support application developers and researchers to better understand how sketch recognition accuracy effects the user experience. His Ph.D. dissertation, advised

by Joseph LaViola, was entitled The WOZ Recognizer: A Tool For Understanding User Perceptions of Sketch-based Interfaces. Jared graduated in Spring of 2016 and now works at Meta, an augmented reality startup company.

Summer 2016



Dr. Deli Zhang is from Yueyang, China. He completed his dissertation, High-Performance Composable Transactional Data Structures, with his advisor Dr. Damia Dechev, in the Summer of 2016. Deli's

dissertation presents two ways to implement high-performance transactional data structures based on existing lock-based or lock-free data structures. Deli developed the libtxd library of transactional data structures that is based on his approach for transforming traditional lock-free data structures into transactional ones. He also developed MRlock, a scalable lock algorithm for shared-memory multiprocessors that is capable of interfacing with his library of transactional data structures, so that lock-based data structures can be made transactional as well. Deli is now employed as a software engineer at Microsoft in Redmond, Washington.



Dr. Dong Zhang was born in Datong, China, and completed a Ph.D. in Computer Science at UCF in the Summer of 2016. His dissertation, Spatiotemporal Graphs for Object Segmentation and Human Pose Estimation

in Videos, was under the supervision of Dr. Mubarak Shah. His research has been crucial for many real-world applications such as video editing, movie production, and vision guided surgery. Thus far, his work has resulted in 6 publications, with over 122 citations and 2 patents. Dong is currently a Postdoctoral Associate for the Center for Research in Computer Vision at UCF.



Dr. Taranjeet Singh Bhatia, originally from India, came to UCF and worked under the guidance of Ladislau Boloni. In the Summer of 2016, Tarnjeet received a Ph. D. in Computer Science. His dissertation, Quantitative Framework For

Social Cultural Interactions, describes a series of contributions that allow robot observing or interacting with humans to perform an analysis of social behaviour by capturing cultural conventions and socially acceptable behaviour models. Taranjeet has accepted a full time position as a Software Developer in a cloud computing start-up known as Mosaixsoft in Silicon Valley, California.



Dr. Roghayeh (Leila) Barmaki received a B. S. degree in 2008 from Kharazmi University in Iran and in 2012 an M.S. degree from the University of Science and Technology, also in Iran.

In the Summer of 2016 her PhD dissertation in Computer Science at UCF under guidance of Dr. Charles Hughes was titled Gesture Assessment of Teachers in an Immersive Rehearsal Environment. While at UCF, Leila won a Grand Challenge People's Choice Award at the International Conference on Multimodal Interaction in 2015. Also an ACM Student Research Competition Award at Human Factors in Computing Systems in 2016. Leila is currently a Postdoctoral Research Associate in the Science of Learning Institute at Johns Hopkins University where her current project is titled Magic Mirror: A Novel Human Anatomy Education Environment with Augmented Reality Technology.



Dr. Muhammad Ali received his B.S. in Engineering from the University of Engineering and Technology of Lahore, which is one of the top engineering schools in Pakistan. Later, he became interested in the field of computer science. He

received his master's degree from the University of Punjab with distinction. He then received the prestigious Fulbright Scholarship, and proceeded to pursue his doctoral studies in the Computational Imaging Laboratory (CIL) of the Computer Science Department, at UCF. Muhammad received his Ph.D. in the summer of 2016 under the guidance of Dr. Hassan Foorosh. The title of his dissertation was A Study of Holistic Strategies for the Recognition of Characters in Natural Scene Images. His research in CIL was focused on the challenging problem of scene text recognition in video data, which required studying various topics on the intersection of computer vision, image processing, and machine learning, including low-rank representation of high-dimensional spaces, tensor space representation of high-dimensional data, rank-decomposition methods, mid-level visual feature extraction, and deep learning. Muhammad is now an Assistant Professor in the College of Information Technology (PUCIT) at the University of the Punjab, Lahore, Pakistan.