THE COLLEGE OF COMPUTING & INFORMATICS

TALENT • RESEARCH • PARTNERSHIP

The UNIVERSITY of NORTH CAROLINA at CHARLOTTE
2013-2014
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## Our People
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This is an incredibly exciting time for the College of Computing and Informatics (CCI).

Our Data Science and Business Analytics (DSBA) Initiative, in collaboration with the Belk College of Business and the College of Health and Human Services, continues to build momentum. Chancellor Dubois has designated DSBA the top university academic priority, while the UNC System Board of Governors has identified data science as one of six “game-changing” areas of research and development within the University.

In addition to our highly-competitive degree programs in computer science, software and information systems, and bioinformatics, we launched several innovative education programs last year, including a Bachelor of Arts with a concentration in Financial Services Informatics, a minor in Bioinformatics, and a Professional Science Master’s in Health Informatics (in collaboration with the College of Health and Human Services, and the University Graduate School). In collaboration with the Belk College of Business a Graduate Certificate in Data Science and Business Analytics is now offered, with a PSM in Data Science and Business Analytics planned for the Fall of 2014.

Growing at a pace of 60% over the last five years, a student population now in excess of 1,500, CCI is the largest technology program in the state of North Carolina and one of the largest in the nation. Despite this tremendous growth we cannot keep up with the demand for our students, yet another example of how our innovative approach to curriculum is producing the talent needed to meet the demands of business and society.

There are many exciting developments in our research programs as well, from breakthrough discoveries in life sciences, to the creation of new Industry-University Collaborative Research Centers in Cyber-Security and in Robotics. Our faculty is leading the drive to bring cutting-edge discoveries into solving complex real-world problems in industry and society. This past year has been especially fruitful in our partnership development with industries and government agencies, ranging from financial services, healthcare, and retail, to national defense and homeland security.

It is our commitment to be a recognized leader in computing and informatics education and research for the 21st Century economy and society, a key partner to our community, and a catalyst for our region’s economic development. We are on track in realizing these strategic goals. On behalf of my colleagues in the College, I invite you to join us and work with us.
COMPUTING & INFORMATICS
for the 21st Century

From Computing to Informatics: Computer Science, Information Technology, Bioinformatics, Financial Informatics, Health Informatics, Data Science and Business Analytics  
T-Shaped Talent: Fundamental Knowledge, Cutting-Edge Technology, Soft Skills, Diversity, Market-Orientatio
Cutting-Edge Research: Computing, Informatics, Interaction, Cyber Security
Partnership: Interdisciplinary Collaboration, Industry, Community
The College of Computing and Informatics (CCI) is actively developing innovative programs and initiatives to ensure that the region is well supplied with cutting-edge technology, professionals, and leaders.

By integrating technology, business, and education into the interdisciplinary study called ‘informatics’ we can create 21st Century leaders who can convert “Big Data” into insights, helping businesses become more profitable, more efficient, and make smarter decisions than ever before.

Data Science and Business Analytics Initiative

The data-driven economy is here to stay. Success in the 21st Century will depend on innovation and collaboration. In response, UNC Charlotte has created the Data Science and Business Analytics (DSBA) Initiative to respond to the challenges of Big Data and position the Charlotte region as a leading hub for innovation and economic development. North Carolina is uniquely positioned for this leadership role due to the concentration of data-driven industries in the state, including Energy, Financial Services, Healthcare, Manufacturing, and Retail. Led by the College of Computing and Informatics and the Belk College of Business, with strategic input from the College of Health and Human Services, the DSBA brings together the best minds in academia and industry.

This unprecedented collaboration links the science of data with the business of data to create groundbreaking education, training and research programs.

Key industry partners have played an active role in developing the DSBA. The Charlotte Chamber has endorsed the DSBA as a key workforce development initiative, and the UNC System Board of Governors has identified data science as one of six “game-changing” areas of research and development within the University. The DSBA provides a dynamic solution to the demand for industry talent by creating education, training, and research programs in data science and analytics integrated with business and industry expertise. These interdisciplinary programs will develop a new generation of data scientists, business analysts, and managers with the technical and business skills to transform data into smart, innovative business strategies.

Professional development programs will provide a valuable bridge for industry professionals and executives interested in advancing in their industries or changing careers. The DSBA will include a comprehensive array of executive programs to provide state-of-the-art training in the strategic use of data for innovative decision-making. And, the DSBA Initiative will include an industry-university consortium that integrates academic research with business innovation, driven by real-world industry challenges. UNC Charlotte faculty are already collaborating with industry partners on a variety of Big Data-focused projects.

Go to dsba.uncc.edu to learn more.
In a continued effort to develop talent for the 21st century needs of business and industry, UNC Charlotte is offering the state’s first-ever Professional Science Master’s (PSM) degree in Health Informatics. This groundbreaking curriculum, developed in collaboration between the College of Computing and Informatics and the College of Health and Human Services, is designed to help meet the demand for innovative health information technology professionals who are urgently needed to address the mounting challenges facing the health care industry.

The PSM degree differs from a traditional master’s program; it is interdisciplinary in its approach and considered the MBA for science and technology. In addition to integrating the sciences of health and informatics, the PSM includes business “soft skills” that health care industry leaders are demanding: project management, communications skills, teamwork, etc. A real-world capstone project will place students in the labs and in the workplace laboring directly with industry leaders. This will result in more well-rounded graduates and position them to improve the quality of health care, reduce medical errors and costs, and transform healthcare as it is known in the Charlotte region and beyond.

For more information: hi.uncc.edu

“Informatics is moving at such a tremendous pace. UNC Charlotte is leading the charge in the field, giving students the ability to not only accumulate the data, but to analyze it in a new way that makes sense of it for the institutions to improve outcomes and the bottom line.”

Dr. Stephen Wagner
VP, Division of Medical Education and Research
Carolinas Healthcare System and Associate Faculty UNC Charlotte.
Professional Science Master’s in Bioinformatics and Ph.D. in Bioinformatics and Computational Biology

These interdisciplinary programs are at the intersection of the disciplines of biology, chemistry, mathematics and statistics, computing and informatics, and engineering. The degrees include additional training and demonstrated competence in both life sciences and scientific programming. These programs are structured to provide students with the skills and knowledge to develop, evaluate, and deploy bioinformatics and computational biology applications. They are designed to prepare students for employment in academia and in the biotechnology sector, where the need for knowledgeable life scientists with quantitative and computational skills has exploded in the past decade.

**For More Information:**
- bioinformatics.uncc.edu/degree-programs
- bioinformatics.uncc.edu/educational-opportunities/professional-science-masters-bioinformatics

Financial Services Informatics

The College is now offering a Bachelor of Arts degree with a concentration in Financial Services Informatics. This innovative and cutting-edge approach to curriculum, conceived by CCI along with Bank of America, Wells Fargo (then Wachovia), and TIAA-CREF, offers students a new degree concentration in order to provide highly-trained graduates who can immediately address the ever-changing demands of the financial world as outlined by financial industry leaders in the Charlotte region. The joint development of this program again emphasizes the commitment of the College to place our highly-trained graduates into the IT workforce where they can begin to provide significant value immediately.

**For More Information:** cci.uncc.edu/academics/undergraduate/financial-services-informatics-concentration
Professional Science Master’s (PSM) Degree in Data Science and Business Analytics  (Fall 2014)

The proposed Professional Science Master’s degree in Data Science and Business Analytics is a collaboration between the College of Computing and Informatics and the Belk College of Business. It is an interdisciplinary program at the intersection of business, computer and information sciences, statistics, and operations research. Students entering the program will have completed an undergraduate degree in economics, business, computer science, information technology or a quantitative discipline such as math, statistics or engineering. The program gives students an understanding of business theory and practice as well as deep informatics and analytics skills, providing students with the knowledge and ability to lead in the development, evaluation, and deployment of business analytics and informatics applications. The program is designed to graduate students well-equipped for employment in a wide variety of data intensive industries such as financial services, energy, retail, manufacturing, and health care, where the need for business analysts with quantitative and computational skills is growing at an explosive pace.

Applied Technology Program

The College of Computing and Informatics and the Belk College of Business have engaged in a strategic partnership with Bank of America that involves students performing work for the Bank and participating in career-oriented study while pursuing their undergraduate degrees. The Applied Technology Program (ATP) provides real-world experiences in the financial service industry. Students develop a key understanding of technology, as it's used in the field, and they learn how to integrate that technology within the financial services industry. For students who are always eager to understand how their academic learning impacts the business world and actively pursue coursework that enhances their job prospects, the ATP offers a real-world work and study experience that greatly enhances the quality of their education and their marketability after graduation.

“The Applied Technology Program (ATP) is a perfect example of what can happen as a result of private and public collaboration. When you see the quality of our students, it becomes quite obvious the program is a win-win situation for both Bank of America and the University of North Carolina at Charlotte. We look forward to continuing this unique relationship with the University and to grow the program for years to come.”

Jim Kelly
Senior Vice President and Corporate Strategy Executive
Bank of America

Graduate Certificate in Data Science and Business Analytics

UNC Charlotte is now offering a graduate certificate in Data Science and Business Analytics (DSBA). This collaboration between the College of Computing and Informatics and the Belk College of Business will provide post-baccalaureate students with the opportunity to pursue graduate studies in this highly sought-after field. The certificate in DSBA is open to all students who hold a B.S. or M.S. degree in any scientific, engineering or business discipline and are either currently enrolled in a graduate degree program at UNC Charlotte or completed their undergraduate degree with a minimum 3.0 GPA. Students will complete five graduate courses to earn the certificate, studying topics such as Big Data analytics for competitive advantage, database systems, network science, and decision modeling. The DSBA certificate is UNC Charlotte’s latest academic program related to “Big Data.”

For More Information: dsba.uncc.edu/academic-programs/graduate-certificate
DEPARTMENT OF BIOINFORMATICS AND GENOMICS

Bioinformatics and Genomics is one of the major drivers of the emerging biomedical and biotechnology revolution. This Department is one of the few of its type in the U.S. and is at the forefront of 21st Century biological sciences, from plant genomics to ecology to medicine. These programs focus on applying new computational techniques to important, but very difficult, problems in biology and biomedicine. Faculty have active, federally-funded research programs in genomics, structural biology, molecular biophysics, systems biology, and biotechnology platform development. The Department plays a critical role in the development of a robust biotechnology industry in the Charlotte region through its Bioinformatics Service Division at the North Carolina Research Campus at Kannapolis, NC.

Research Areas
- Plant genomics
- Metagenomics
- Proteomics and metabolomics
- Structural bioinformatics
- Molecular biophysics
- Micro-array data analysis and genomic visualization
- High performance computing
- Systems biology

Highlights
- The Ph.D. degree in Bioinformatics and Computational Biology became the 19th doctoral program at UNC Charlotte in 2011
- One of the few stand-alone Bioinformatics and Genomics departments in the United States
- Bioinformatics Research Center offers fully-equipped biological laboratories as well as high performance computing laboratories

bioinformatics.uncc.edu

DEPARTMENT OF SOFTWARE AND INFORMATION SYSTEMS

The Department of Software and Information Systems (SIS) is a pioneer in information technology research and education with an emphasis on designing and deploying integrated, secure, reliable, and easy-to-use IT solutions. SIS offers a wide selection of courses in information technology, information security and privacy, human-computer interaction, web development, and software engineering.

Research Areas
- Information security and privacy
- Analysis, design, and modeling of information systems and networks
- Human-Computer Interaction
- Social, ethical, and policy issues related to information technology

Highlights
- Annually hosts the premier Cyber Security Symposium in the region, which addresses the latest issues surrounding cyber crime
- Winner of the 2006 National Collegiate Cyber Defense Competition
- Since 2001, SIS has been the recipient of almost $6 million in grants from the federally-funded Scholarship for Service program that provides full scholarships to students studying information security with guaranteed civilian government jobs upon graduation

sis.uncc.edu

DEPARTMENT OF COMPUTER SCIENCE

The Department of Computer Science (CS), with 30 faculty members and over 1,000 students, is one of the largest in the Southeast. Its new, lab-based, multi-path curriculum is helping to develop the workforce to meet the 21st Century demands of industry. These highly-trained individuals will be pursuing career opportunities in banking, insurance, analytics, gaming, data warehousing, web services, biomedical informatics, healthcare, and energy.

Research Areas
- Visualization and analytics
- Databases and knowledge discovery
- Game design and development
- Artificial intelligence
- Robotics
- Wireless networking

Highlights
- The Charlotte Visualization Center is one of only five in the U.S. supported and funded by the Department of Homeland Security in the growing new field of visual analytics
- Graduate program is one of the top 100 as rated by U.S. News and World Report
- Cutting-edge research efforts in visualization and visual analytics, robotics, machine intelligence, serious games, mobile networked systems and databases, and knowledge discovery

cs.uncc.edu
The College of Computing and Informatics focuses on balancing the fundamental science of computing with cutting-edge technology.

Ph.D. Program

The Ph.D. program in the College of Computing and Informatics (CCI) is the largest and fastest-growing at UNC Charlotte with almost 130 doctoral students. The program is uniquely designed to train Ph.D. students in innovative, interdisciplinary research of societal relevance, centered on computing and informatics. The program is staffed with a strong multidisciplinary faculty of international stature, which offers opportunities for students to develop advanced competencies in a number of related fields. Students who aspire to do academic research and teaching will benefit immensely from the diverse faculty and exposure to practical applications for their specialties.

Over 80% of Ph.D. students are fully-funded through assistantships and fellowships.

ci.uncc.edu/academic-programs/phd

RESEARCH FUNDING

Highly-competitive faculty with over $30 million in active research awards.

- National Science Foundation (NSF)
- National Institute of Health (NIH)
- Department of Defense (DoD)
- Department of Energy (DoE)
- Department of Homeland Security (DHS)
- Army Research Office (ARO)
- Major industrial funders
Undergraduate Programs

Computer Science
- BS Computer Science
- BA Computer Science
- BA Computer Science, Financial Services Informatics Concentration
- Certificate Program in Computer Game Development

Software and Information Systems
- BA Software and Information Systems
- BA Software and Information Systems, Financial Services Informatics Concentration

cci.uncc.edu/academic-programs/bachelors

Department of Bioinformatics and Genomics
- Minor
bioinformatics.uncc.edu/degree-programs/undergraduate-minor-bioinformatics-and-genomics

Collaborative Programs
Professional Science Master’s in Health Informatics
College of Computing and Informatics
College of Health and Human Services
- Graduate Certificate in Data Science and Business Analytics
  College of Computing and Informatics
  Belk College of Business
- Dual Master of Architecture III/Master of Science in Computer Science or Information Technology
  College of Computing and Informatics
  College of Arts + Architecture
hi.uncc.edu
dsba.uncc.edu/academic-programs/graduate-certificate
coa.uncc.edu/academics/school-of-architecture/degrees/master-of-architecturecomputer-science-or-information-techn

Graduate Programs

Bioinformatics and Genomics
- Ph.D. in Bioinformatics and Computational Biology
- Professional Science Master’s in Bioinformatics
- Certificate in Bioinformatics Technology
- Certificate in Bioinformatics Applications

Computer Science
- Ph.D. in Computing and Information Systems, Computer Science Track
- MS Computer Science
- Certificate in Advanced Databases and Knowledge Discovery
- Certificate in Game Design and Development

Software and Information Systems
- Ph.D. in Computing and Information Systems, Software and Information Systems Track
- MS Information Technology
- Certificate in Management of Information Technology
- Certificate in Information Security and Privacy
- Certificate in Health Information Technology
cci.uncc.edu/academic-programs/masters
cci.uncc.edu/academic-programs/phd
With over 50 research faculty supported by 150 Ph.D. students, post-docs, and research associates, CCI offers a highly-competitive, collaborative research effort, that bridges fundamental research with critical scientific, societal, and national defense challenges.

The Bioinformatics Research Center (BRC)

The Bioinformatics Research Center (BRC) offers space for both wet and dry laboratories and includes core facilities for molecular biology, proteomics, and computing. Additional genomics and proteomics core facilities are available through a UNC Charlotte partnership with the Carolinas Medical Center. The BRC has also taken a leadership role in developing Bioinformatics programs in collaboration with the developers of the North Carolina Research Campus, a billion-dollar, 350-acre research park that is home to the research programs of a large number of private biotechnology companies as well as university and medical research programs.

For more information: brc.uncc.edu

Center for Configuration Analytics and Automation

The University of North Carolina at Charlotte and George Mason University have formed the Center for Configuration Analytics and Automation (CCAA) under the National Science Foundation’s (NSF’s) Industry/University Cooperative Research Center (I/UCRC) Program. The Center enables collaborative industry and government directed research in configuration analytics and automation capabilities and their integration for the efficient, accurate, and timely operations management and defense of complex networked information technology systems and environments; and the encouragement and development of top-quality graduates with knowledge and experience in this field.

For more information: ccaa-crc.org
The Charlotte Visualization Center

The Charlotte Visualization Center strives to develop and promote the science of visual analytics and to advance interactive visualization as an integrative discipline that is indispensable for attacking key real-world applications. The Center is one of five regional centers across the United States that is supported and funded by the Department of Homeland Security. The Vis Center is also a formal partner in conjunction with two of the Department of Homeland Security’s Centers of Excellence.

For more information: viscenter.uncc.edu

Complex Systems Institute

The Complex Systems Institute (CSI) brings together academia, industry, and federal agencies to advance computing simulation, analysis, and modeling. Tools developed by CSI members help analysts model infrastructure and social networks, visualize and understand how individual networks behave, and understand multiple-network interdependency behavior, including second- and third-order effects and unintended consequences. There are two centers within the Institute.

The Complexity Laboratory focuses on dynamic non-linear systems and the development of tools and techniques for studying complexity in natural, physical, and social domains. The Defense Computing Center is responsible for defense- and intelligence-related research, emphasizing system-of-systems modeling and simulation for analysis of complex problems and phenomena.

For more information: complexity.uncc.edu

CCI Center for Education Innovation (CEI)

The CCI Center for Education Innovation (CEI) is established in the College of Computing and Informatics for the development and coordination of externally-funded projects that incorporate strategies and new technologies for innovation in computing and informatics education. This Center builds on and extends the efforts of the Diversity in Information Technology Institute (DITI) and the Students in Technology, Academia, Research, and Service (STARS) Alliance, where DITI has a focus on increasing diversity in the students that choose computing as a career path and STARS establishes educational practices and programs that broaden the skills of computing students.

For more information: cei.uncc.edu
The Defense Computing Center conducts basic and applied research in computing-related disciplines to address society’s defense, intelligence, and security challenges. Research within the Center emphasizes integrated modeling and simulation for analysis of complex problems and phenomena, with application areas including critical infrastructure protection, multi-network interdependency and consequence analysis, and information infrastructure behavior analysis.

For more information: complexity.uncc.edu

The Cyber Defense and Network Assurability (CyberDNA) Center offers high-impact quality research and education in the area of network security, defense, assurability, and privacy. Specific domains of interest include: assurable and usable network security configuration, security automation, security evaluation and optimization, security policy synthesis, and problem/threat diagnosis. In addition, the CyberDNA Center seeks novel scalable authentication, accountability and privacy techniques for emerging technologies, as well as critical infrastructure networks. The CyberDNA Center offers an excellent educational environment through conferences, seminars, mentoring, and security labs and test beds, which attract many graduate and undergraduate students to pursue rigorous research.

For more information: cyberDNA.uncc.edu

Safety, Security, and Rescue Research Center

Industry University Cooperative Research Center, I/UCRC, is a National Science Foundation (NSF)-funded consortium of companies and universities working together on industry-relevant research in an emerging field. The SSR-RC is the only NSF I/UCRC focused on robotics technologies with a focus on such topics as healthcare, manufacturing, homeland security, and emergency preparedness and response. The missions of the SSR-RC is to conduct partner-oriented, multi-disciplinary research on computation-driven robotic and sensor systems augmented by data analysis, to improve the safety, capability and well-being of humans.

For more information: ssrrc.uncc.edu
The Distributed Artificial Intelligence Research Laboratory

The Distributed Artificial Intelligence Research Laboratory is concerned with the design and development of reasoning techniques for resource-bounded single- and multi-agent systems. Lab members conduct research in meta-cognition, monitoring, and control of computation, safety in multi-agent systems, reinforcement learning, resource-bounded reasoning, and reasoning under uncertainty.

For more information: dair.uncc.edu

The Future Computing Lab

The Future Computing Lab excels in research, teaching, and learning in computer science, and engages with the broader community at UNC Charlotte, and beyond, to impact progress in computing and information technology. This is a distinguished research lab in many strategic areas of computer science such as computer-human interaction, digital human, virtual environments, biomedical image analysis, and computer vision. The lab recruits and trains the most talented students, and provides leadership in computing and information technology.

For more information: fcl.uncc.edu

The Human-Computer Interaction Lab

The Human-Computer Interaction Lab investigates novel ways for people to interact with computers and through computers, with their environments. Our research covers a broad range of areas related to Human-Computer Interaction, such as Novel Interaction and Multimedia, Computer Supported Cooperative Work, and Privacy. We collaborate with researchers in a number of areas related to HCI, such as visualization, virtual reality, gaming, and technical communications.

For more information: hci.uncc.edu
Laboratory of Information Integration, Security, and Privacy (LIISP)

The mission of the Laboratory of Information Integration, Security, and Privacy (LIISP) is to add value to the university, community, and society through innovative educational programs, research and development in the areas of information integration, security, and privacy. We aim to be one of the leading academic institution for research in information integration, security, and privacy and provide innovative education and training programs in information integration, security, and privacy.

For more information: liisp.uncc.edu

The Intelligent, Multimedia, and Interactive Systems (IMI) Lab

The Intelligent, Multimedia, and Interactive Systems (IMI) Lab focuses on investigating novel technologies and methodologies to enable and support intelligent interactions for effective use of information various forms and for optimal performance of tasks involved. This can include computers, robots, and other machines that interact intelligently with humans, the physical world, and each other.

For more information: imilab.uncc.edu

Interaction Design (InDe) Lab

The InDe Lab investigates how novel interface technologies can be applied to change the way we think, work and behave. We combine methodologies from interaction design, human-centered computing and design cognition to explore new approaches to learning, participating and creating. Our current research focuses include tangible and gestural interaction, crowd-sourcing, citizen science, and computational and cognitive studies of creativity.
The Knowledge Discovery in Databases (KDD) Lab

The Knowledge Discovery in Databases (KDD) Lab conducts research related to the design, analysis and implementation of data mining theory, systems, and applications including: data mining algorithms and methods, distributed data mining, ontologies, multimedia databases, distributed knowledge systems, soft computing, and application areas such as electronic commerce, bioinformatics, business intelligence, music information retrieval, and web intelligence.

For more information: kdd.uncc.edu

The Networking Research Lab

The Networking Research Lab conducts research in the areas of mobile network architectures and protocols, mobile computing (models, algorithms, and middleware), survivable networks, wireless ad hoc and sensor networks, three-dimensional networks, design, visualization, simulation, and modeling of network protocols, and network security.

For more information: nrl.uncc.edu
TRACKING the H7N9 INFLUENZA VIRUS
In July 2012, Daniel Janies, Ph.D., joined the faculty of the University of North Carolina at Charlotte as The Carol Grotnes Belk Distinguished Professor of Bioinformatics and Genomics. Dr. Janies is a national Principal Investigator in the Tree of Life program of the National Science Foundation and is funded by the Defense Applied Research Projects Agency. His work involves empirical studies of organismal diversity and development of software, such as Supramap.

Scientists around the world now have access over the web to supercomputing application, Supramap (http://supramp.org), which allows them to understand the global movement of pathogens, such as that caused by the H7N9 influenza virus. The maps generated, not only explain the evolution of the viruses, but the spread of the disease around the world. Daniel Janies, Ph.D., Carol Grotnes Belk Distinguished Professor, in the Department of Bioinformatics and Genomics, is the Principal Investigator in the development of this revolutionary technology.

“Supramap is used by public health scientists to put pathogen genomic data into context with geography and hosts,” says Dr. Janies. “The results are akin to weather maps for disease. With Supramap, the user can build an evolutionary, geographic, and temporal map based on the genetic information of pathogens that can be accessed on browsers such as Google Earth. The tools have easy-to-use interfaces thus allowing users to focus on public health rather than programming.”

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**Daniel Janies, Ph.D.**

Carol Grotnes Belk Distinguished Professor
Department of Bioinformatics and Genomics

Dr. Janies says he and other data scientists work with geneticists around the world on a daily basis, exchanging computing know how and cycles for genetic data on pathogens. The goal of this sharing is to put the raw information into context.
The data is very kinetic as new information is available every day that can be processed in near real time,” says Dr. Janies. “This is crucial as we track H7N9 and build up data on its relatives. We can determine where and from which animals novel diseases originate.

The next steps are to infer where pathogens might travel. Dr. Janies says birds may migrate, pigs may be traded, bats fly, but dispersal of a pathogen among animals is often regional and addressable with domestic animals. However, he says the whole game changes when it has been determined that as pathogen is being exchanged human-human, as happened with H1N1 in 2009-10 when the pathogen became a global pandemic in weeks. However, Dr. Janies points out, with Supramap, they are also able to track the human infections as well. He says with the information shared by global partners, they can have updates within days about patients who have been infected.

“With such a quick turnaround, the medical community is then armed with predictive analysis tools,” says Dr. Janies. “They can see where outbreaks are starting, get a handle on where diseases are travelling, and develop preventative measures to keep diseases from spreading.” Dr. Janies says now that the information technologies are in place there are new opportunities in collecting and sharing raw genetic data on pathogens. He says new cheaper, faster sequencing technologies can be leveraged to be used in the field and clinic to track what bugs are infecting what animals. He cautions that we have to pay close attention to pigs, birds, and bats as they are becoming increasingly important hosts for infectious diseases for better public health.

“We have come to the point in computational genomics where we have generated a lot of raw data. Lately, we are seeing more and more applications being developed to help us analyze that data in practical, meaningful ways, putting it to work to benefit humanity. Supramap is just such a tool.”

Tiffany Trader
Associate Editor, HPCwire
diseases. Another key, he says, is for multiple disciplines around the world to work more closely together and share information.” In the community as a whole, the objective is to work more closely together and to unify all disciplines to do a better job of collecting and sharing information,” says Dr. Janies. “Physicians working better with veterinarians and computer scientists around the world thus creating a more robust public and animal health system – this is the concept of One Health.”

The Defense Advanced Research Projects Agency (DARPA) is funding the project and The Renaissance Computing Institute (RENCI) is the primary host for http://supramap.org.
CREATING SCIENTISTS out of ALL OF US
Mary Lou Maher, Ph.D., is the Chair of the Department of Software and Information Systems at UNC Charlotte’s College of Computing and Informatics. Dr. Maher brings an expertise in Human-Computer Interaction and a new way of teaching it in her newly-created InDe (Interaction Design) Lab.

“The InDe Lab is both a teaching and research studio,” says Dr. Maher. “This is unlike the conventional classroom, because you have a lab for research with special equipment and a teaching environment in the same room. We bring the methods of software design together with those of Human-Computer Interaction, where you focus on the needs and desires of users and stakeholders. In the InDe Lab I teach a studio course more like architecture or arts, rather than science, engineering, or computer science.”

The design challenges, says Dr. Maher, are presented to students in a very open-ended manner. She says students spend a lot of time in the lab in an unstructured environment. They are always working together, making and doing, and presenting to each other. She says one of the major ways of advancing their ideas is to present to others for criticism, be it from other students in the group or external experts. Dr. Maher says they also run design charrettes: Three to four students will be placed at each table to discuss a design problem. After ten minutes two students from each group will move to a different table and continue working on the design problem. Afterwards each table presents to the entire group.
Dr. Maher says it’s a way of brainstorming, problem solving, and learning. Some of her current research focuses on interaction design for a collaborative touch table computer.

“We want to design for a group of people as they stand around an interactive computer screen that is a flat horizontal surface,” says Dr. Maher. “If you interact with a computer screen that is horizontal, whether it is on the desk in front of you or on the wall, usually only one person operates it. At a table, multiple people interact and share the space, it’s a new dynamic for people interacting with technology at the same time.”

With National Science Foundation (NSF) funding, Dr. Maher has created the citizens science project called NatureNet. The premise of the research is to determine what happens when you put a tabletop computer in a nature preserve and encourage people, when they visit, to think like a scientist.

“People use a mobile app to capture photos, sounds, and take field notes while walking in the preserve, and while they are still in the preserve, the data is transferred to the tabletop computer at the entrance to the park. Just having the NatureNet app changes the way people look at and see the birds, insects,

“One of the features of NatureNet that excites me is that the program creates a catalog of first hand observations, and makes them available on the tabletop and through an online community, creating a powerful network that can showcase unique stories and observations. I hope to take advantage of this unique technology by creating directed activities to compare phenology (the study of the timing of life cycle events of plants and animals) observations from visitors, to add to the story of how change occurs in our preserve from year to year.”

Jim Kravitz
Director of Naturalist Programs
Aspen Center for Environmental Studies
flowers in the preserve. They are more aware of their surroundings and pay more attention to detail.” says Dr. Maher. “Our premise is that they will be more motivated to contribute the information if they can do it right at the park rather than waiting to get home. We want to see if we can transition people from being just visitors at the preserve, even those who are not scientists, to be motivated to think like scientists.” Dr. Maher says visitors will also be allowed to think like designers and contribute ideas on the tabletop on how to interact with the existing data, comment on what kinds of social structures are important to them, vote on existing design ideas and how to improve them. NatureNet is also available on an opensource web site so those who know how to design software have an opportunity to develop modules.

“The reason for NatureNet,” says Dr. Maher, “is we don’t have enough scientists to collect the data needed to understand bio diversity, the effect of climate diversity, the changes in climate. If we can get everyone who is out there in an urban or nature park to start thinking like scientists, the contributed data will then be available to scientists to aid them in their research. In the future, we hope to expand the project to include credit card sized computers that can be placed in backpacks that will collect environmental information when the visitor takes a photo and adds field notes.

The first version of NatureNet was installed in a nature preserve at ACES near Aspen, Colorado in July of 2013.
EMERGENCY RESPONSE GOES MOBILE
Researchers in the College of Computing and Informatics (CCI), with the help of funding from the Department of Justice, have developed a mobile emergency response application. What makes this app unique is that it provides 3D routing capabilities for large buildings.

“We wanted to develop a 3D routing app that would allow emergency responders access to a precise routing map of a building, rooms, number of people, floors, special access points, fire extinguishers, etc., that can also be updated on the fly and shared with other responders,” says Dr. William Ribarsky, Chair of the Department of Computer Science. “In order for this to happen, we also had to develop a separate GIS server that contains all of the GIS information for buildings on the UNC Charlotte campus.”

Dr. Ribarsky says they were able to do this through support from the Department of Homeland Security’s Visual Analytics for Command, Control and Interoperability Environments Center (VACCINE). Through this support Dr. Ribarsky, his colleague Dr. KR Subramanian, and their team were able to develop a complete set of routing instructions for every building on or around the UNC Charlotte campus, providing a complete routing map inside and out. It was then a matter of testing out the system. Working with campus Police Chief Jeff Baker and campus SWAT team members, a series of exercises

William Ribarsky, Ph.D., is the Bank of America Endowed Chair in Information Technology at UNC Charlotte and the founding director of the Charlotte Visualization Center. Since 2009, he has been Chair of the Computer Science Department. He is also Principal Investigator for the Department of Homeland Security’s (DHS) SouthEast Regional Visualization and Analytics Center.
have been undertaken. Everything from a shooter in a building, to a gas leak and explosion in the heart of campus.

“Through these exercises we were able to get invaluable input from the SWAT team members, which allowed us to enhance and improve the system,” says Dr. Ribarsky. “Through this input we were able to modify the capabilities so not only could the 3D maps be generated automatically, but respondents could also build a route by hand using their smart device.”

Dr. Ribarsky says there was also concern by University officials regarding the possibility of large-scale evacuations. In response Dr. Ribarsky, Dr. Subramanian, and their team also developed a total command center application for Chief Baker that he can use from his desk. It gives him the ability to know at any time of the day where and how many people are in each building on campus. If an emergency should come up he can then use the system to determine how best to move people around campus, evacuate a building, or buildings.

“There was a real need for this tool as there are more and more new buildings on campus, which has resulted in a totally different pattern of movement by
people,” said Dr. Ribarsky. “Through this application the Chief can explore the possible scenarios during any given emergency and come up with the best plan for moving people.”

Dr. Ribarsky says, moving forward, the team would like to develop even more emergency evacuation models such as a distribution of people in any given building, points of congestion, how to get people in and out of a building, etc. The 3D routing map and emergency evacuation models have been presented to several safety directors at UNC system campuses, who have expressed interest in the applications. The app has also been demoed for Charlotte police and fire officials. Dr. Ribarsky and his team also worked with the Department of Homeland Security on an emergency response exercise in Seattle. The scenario was a large earthquake off the coast of Washington resulting in a tsunami. The 3D routing map was used in a large skyscraper that was going to be impacted by the wall of water.
THE ROAD to PERSONALIZED MEDICINE
Xinghua (Mindy) Shi, Ph.D., Assistant Professor in the College of Computing and Informatics’ Department of Bioinformatics and Genomics, is part of a consortium of nearly 300 researchers from different institutions across the world, participating in the 1,000 Genomes Project.

Launched in 2008, the project is producing an extensive catalog of human genetic variation that will support future medical research studies. The goal of the 1,000 Genomes Project is to provide a resource of almost all variants, including single nucleotide polymorphisms (SNPs), small deletions and insertions, structural variants, and their haplotype (linked gene variations) contexts. This resource will allow genome-wide association studies at a fine scale toward investigating almost all variants founding human genome for their contribution to health and diseases.

“During Phase I, we sequenced over one thousand individuals of different ethnic backgrounds from around the world,” says Dr. Shi. “This included individuals from Africa, East Asia, Europe, and the Americas. The goal is to sequence 2,500 individuals with data freely available to the public. The more sequencing we are able to do will result in the discovery of less common variations in these diverse populations.” Dr. Shi points out that not all variations are a bad thing and the research will allow scientists to explore the differences in our genetic backgrounds, what things were inherited from our parents, and how all of this may or may not make an individual more susceptible to different diseases. Ultimately, she says, we are defining a map of genetic variation. “The current sequencing is being done on presumed healthy individuals.”
says Dr. Shi. “What we will then be able to do is compare these variations with sequencing from individuals with known diseases, thus improving the power of study by physicians, and allow them to see what genetic variances actually are associated with a specific disease.” Through this discovery, Dr. Shi says, scientists, working with pharmaceutical companies, will be able to develop personalized medicine targeted for a specific genotype or mutation as we understand more and more about human genomes. She says normal drugs generally are not designed to attack a specific known issue. However, she says, personalized drugs will be targeted specifically for the variation in an individual’s DNA or RNA, which in the long term will help with disease management, treatment, and the long term health of the individual.

“A perfect example of this is a cancer physician at Washington University in St. Louis, who was diagnosed with Acute Lymphoblastic Leukemia (ALL),” Dr. Shi says. “After two years of chemotherapy the disease went into remission. However, he relapsed. Following a stem cell transplant and additional chemotherapy he went into remission, only to relapse one more time. It was then suggested a comprehensive sequencing should be done including whole-genome DNA and RNA sequencing. While there were a number of mutations associated with his leukemia from his genome, none of them were treatable with known drugs. However, the sequencing of his RNA provided a clue that one gene was more hyperactive than normal. Through the use of an existing drug-gene database doctors were able to find a drug developed specifically for that specific gene. Dr. Lucas Wartman has been cancer free now for over two years.”

Dr. Shi says as more and more healthy individuals are having their genomes sequenced to see if they may be predisposed to a certain disease, it becomes the responsibility of the physician, genetic counselors, support groups, etc., working as a team, to develop a strategy moving forward. She says
the recent story of Angelina Jolie, choosing to have a double mastectomy after learning that she was the carrier of a mutated gene that sharply increased her risk of developing breast and ovarian cancer, is an example of some of the tough decisions individuals may or may not be willing to make.

“The 1,000 Genomes Project,” say Dr. Shi, “has already created the largest repository of publicly accessible human DNA sequencing in the world. In a collaborative effort between the National Institute of Health and Amazon Web Service, over 200 terabytes, or the equivalent of 30,000 DVDs, is free and available on the Cloud. This will allow researchers and physicians to seamlessly and quickly access the information, thus accelerating their ability to understand variations and make informed decisions.”

“This project provides the next important step towards understanding the function of the rare genetic variants we see across a wide variety of populations. With this underpinning, we can go on to solve the puzzle of how this variation plays a part in human disease and health.”

Dr. Richard Gibbs, Director of Baylor College of Medicine’s Human Genome Sequencing Center, and study co-leader
MAKING WATSON COME TO LIFE
Meet Wlodek Zadrozny, Ph.D., Associate Professor in the Department of Computer Science in the College of Computing and Informatics. Dr. Zadrozny worked five years on the Watson project, with several responsibilities.

“I prepared all textual data for Watson, except for Wikipedia, which was incorporated into Watson before I joined the team,” says Dr. Zadrozny. “This textual data included general encyclopedias, a collection of topical dictionaries, song lyrics, important literary works, and other sources. It also included putting together a collection of n-grams, which are sequences of words with their counts. This resource allowed Watson to instantly determine whether a contestant’s answer was semantically related to the question.” In all, IBM researchers compiled 200 million pages of structured and unstructured content, which after pre-processing, consumed two terabytes of disk storage.

Dr. Zadrozny was also responsible for part of the legal work related to Watson. For example, many knowledge sources required special licenses, as publishers were not used to the sharing of information with computers. Another type of legal work was writing patent disclosures for much of the new technology associated with Watson. In all there are over 50 patents describing the core technology and its various applications. The overall vision for Watson was to compete and win against the best of the best on Jeopardy!. This required a new approach
In order to win, Watson would need to be able to answer 90% or more. IBM researchers felt that was an extremely ambitious project.

After the game, in which Watson and IBM won the $1 million first place prize (donated to non-profits), the focus of the team was on practical applications. The majority of the application effort is in medicine. The new field calls for additional advances in the core technology, such as adding natural language dialogue. It also requires

“The Watson supercomputer may be able to beat reigning Jeopardy champions, but scientists at IBM are developing new, super-smart computer chips designed from the human brain -- and that might ultimately prove much more impressive. Researchers believe one day the “Brain in a Box” will enable a new generation of apps that mimic the human brain’s abilities of sensory perception, action and cognition.”

Jennifer Booten
FoxBusiness
collaboration. One example of which is joint work with the Memorial Sloan-Kettering Cancer Center.

According to IBM, the technology will allow doctors to access huge amounts of data and receive real-time answers. Access to a comprehensive library of cancer data and practices will allow doctors anywhere to make more informed diagnoses, develop customized cancer treatment for patients by utilizing existing or new drugs, ultimately helping to lower costs and save lives.

IBM says other areas of interest include the financial services industry, as the amount of information available on a daily basis for decision makers is staggering. Watson is also being utilized in the area of customer care. “The main idea was to speed up the process of answering questions by customer care center reps,” says Zadrozny. “IBM runs many call centers. A lot of time is taken answering technical questions, diagnosing, and finding solutions for customers around the globe. If Watson could just reduce the time spent by ten percent it would have a big impact on customer satisfaction and on the bottom line.”

Dr. Zadrozny adds academia should be taking a closer look at innovations embodied in Watson. He believes many of the Watson innovations are relevant not only for building better technology, but are also scientifically important. He says he continues to stay in touch with his colleagues at IBM, and plans a collaborative effort to bring Watson technology to the University.
Looking at this student’s storied history, it certainly isn’t a surprise that Yi Shen is now a full-time employee with Internet giant Google at its U.S. headquarters in Mountain View, California. Yi Shen graduated from the College of Computing and Informatics (CCI) in June, 2013, with a Ph.D. in Computer Science, with a focus area of Computer Vision and Machine Learning. But the story begins a few years before that.

Shen, attended Fudan University in Shanghai, China. While there, he competed on a team which finished 6th in the 2005 Association for Computing Machinery (ACM) International College Programming Contest after winning the regional finals in Dhaka, China. 4,109 teams, representing 1,582 universities from 71 countries, participated in the international competition. Sponsored by IBM, the contest fosters creativity, teamwork, and innovation in building new software programs, and enables students to test their ability to perform under pressure. It is the oldest, largest, and most prestigious programming contest in the world. He also competed in the Google Code Jam finals in China and was ranked one of the top 40 coders in the competition. He graduated in 2008, ranked 9th in overall GPA, and first his last two years.

After graduation, Jianping Fan, Ph.D., a Professor in the Department of Computer Science, and the University of North Carolina-Fudan Senior Fellow, representing both CCI and the entire UNC system, recruited Shen. At the same time he also received a job offer from the president of Google China. However, Shen wanted to continue his education and receive his Ph.D. degree.
“I had a decision to make,” said Shen. “Did I want to be just an average software engineer, or continue my education and do something very innovative? I obviously chose the latter and I’m very happy I did.” In 2009 Shen began his Ph.D. degree at CCI. As a Ph.D. student, Shen had approximately 15 published papers. In 2011 he was a best paper finalist at an international conference on instrumentation, measurement, circuits, and systems. In the summer of 2012, with the help of his advisor Dr. Fan, he was able to receive an internship with Google at its national headquarters in Mountain View, California. He worked on the Search by Image technology. At the end of the three-month internship, he applied for a full-time position and soon received an offer letter signed by Google CEO, Larry Page.

“During my internship I had the opportunity to work directly with the Search by Image corps team,” said Shen. “As a full-time employee I continue to work with that group. As for the internship itself, it was wonderful. It is such a great working environment, there’s not a lot of stress, everyone was very kind, and I really enjoyed the food there.”

Shen will help develop the algorithms that are the brains of the search engine. According to Google, “The technology behind Search by Image analyzes your image to find its most distinctive points, lines, and textures and creates a mathematical model. We match that model against billions of images in our index, and page analysis helps us derive a best guess text description of your image.” Simply put, Search by Image allows users to find out information about a specific image without having to type in keywords. It’s as simple as a drag and drop or an upload from your personal computer.
VISUAL ANALYSIS of CONSUMER BEHAVIOR from SOCIAL MEDIA
What do Twitter and Facebook have in common other than the fact that they are very popular social media tools for communication? For researchers in the College of Computing and Informatics’ (CCI) Charlotte Visualization Center, they provide key insights into consumer behavior. Through special funding from UNC Charlotte Chancellor Philip Dubois, CCI, and the Belk College of Business have embarked on a customer analytics project.

“Eight faculty members from the two colleges have been looking at social media and what information can be extracted about customer behavior or potential customer behavior,” says William Ribarsky, Ph.D., Chair of the Department of Computer Science and Director of the Charlotte Visualization Center. “By looking at Twitter and Facebook streams we can determine how people respond to marketing or ad campaigns, what they think about companies, how they talk amongst themselves about companies, etc.”

Dr. Ribarsky says with Twitter you can follow how ideas are spread through retweeting. He says it’s an implicit social network where information is passed along. By studying this process, he points out, one can determine how things can go viral.

“There is an actual social network structure,” says Dr. Ribarsky. “We look at what people are talking
about, but it’s not like trending. Rather, we evaluate the stream and let it tell us about what is going on. This is a very useful tool if you have unexpected things happening. You actually can see events as they are occurring or before they occur and do predictive or forensic analysis.”

Dr. Ribarsky says a perfect example of this is when Xiaoyu Wang, Ph.D., Associate Director of the Charlotte Visualization Center, did a forensic analysis on Occupy Wall Street tracing back to the dates before it happened. This analysis showed that if the tool developed here had been available, the start and formation of Occupy Wall Street could have been predicted some weeks before its launch. This predictive analytics tool, Dr. Wang says, is a new and very powerful way of allowing businesses to figure out what customers are thinking and what they may do. It provides up-to-the-minute data analysis, and offers business owners the ability to pin point market trends and patterns. Talks are currently ongoing with Belk, Inc., Bank of America, Lowe’s, and Family Dollar to see how these tools might be of value to them in their marketing efforts.

“By monitoring other stores in the area and doing analysis on what people are saying about their advertising campaigns it could provide very valuable information for counter advertising strategies,” says Dr. Ribarsky. “We can now see the information derived from the Twitter stream in near real time and have the ability to analyze and turn it around in five minutes or so. This would allow folks to take advantage of trends as they are unfolding.” Dr. Ribarsky goes on to say, “We can determine, for example, that people are going to the mall even before they get there.”
Using the tools developed by Dr. Wang and his colleague Wenwen Dou, Ph.D., Assistant Research Professor in the Department of Computer Science, the Center is now sifting through millions of tweets everyday, in near real time, for emerging events and event indicators. With these tools, Dr. Wang says, “we will be able to track trends of what people may be looking for and allow retailers to counter immediately with special sales and the like.” Dr. Ribarsky says Twitter allows his research team to look at one percent of its traffic for free. For anything more there is a fee. But, he is quick to point out that one percent is a considerable amount of data. The team is now extending these techniques to Facebook, where they just retrieve public facing pages and extract the information they are looking for. The team also has the ability to do similar analytical analyses on non-social media information supplied by companies.

“The College and the Charlotte Visualization Center,” says Dr. Wang, “are in the front and center, with support from the University, to unlock the key to big-data customer analytics.”
BRINGING INDUSTRY and HIGHER EDUCATION TOGETHER
An Industry/University Cooperative Research Center (I/UCRC) is a collaborative effort among universities, large and small companies, state and government agencies, and other organizations for the purpose of conducting pre-competitive research of shared value.

Led by the College of Computing and Informatics, the University of North Carolina at Charlotte is the hub for two new National Science Foundation (NSF) funded I/UCRCs. The Center for Configuration Analytics and Automation (CCAA) and the Safety, Security, and Rescue Research Center (SSR-RC), are part of a consortium of companies and universities working together on industry-relevant research in an emerging field.

UNC Charlotte along with George Mason University have partnered to create the CCAA.

“The mission of the CCAA,” says the Director of the center, Ehab Al-Shaer, Ph.D. with the College of Computing and Informatics’ Department of Software and Information Systems, “is to enable collaborative industry and government directed research in configuration analytics and automation capabilities and their integration, for the efficient, accurate, and timely operations management and the defense of complex networked information technology (IT) systems and environments; and the encouragement and development of top-quality graduates with knowledge and experience in the field.”

Dr. Al-Shaer goes on to say application domains that will be addressed include Large-scale Enterprise Networks, Cloud Environments,
Critical Infrastructure and Cyber Physical Systems, Mission Critical Networks, and Mobile and Pervasive Computing. He says the CCAA is being designed to build a critical mass of inter-disciplinary academic researchers and an industry partnership that will address the current and future challenges of configuration analytics and automation, to improve enterprise IT system and service manageability, performance, assurability, security, and sustainability. He says the goal is to research innovative analytics and automation for complex networked systems domains.

Industry members include Bank of America, BB&T, Depository Trust and Clearing Corporation (DTCC), Research Triangle International, MITRE, and Northrop and Grumman.

The SSR-RC is the only NSF I/UCRC focused on Robotic Technologies for Human Safety. In this multi-university center, UNC Charlotte is one of the sites. The others are the University of Minnesota, the University of Pennsylvania, and the University of Denver.

“The mission of the center,” says UNC Charlotte site Director, Jing Xiao, Ph.D., with the College of Computing and Informatics’ Department of Computer Science, “is to collaborate with industry partners to conduct partner-oriented, multi-disciplinary research on computation-driven robotic and sensor systems, augmented by data analysis to improve the safety, capability, and well-being of humans.”

Dr. Xiao adds that research projects at UNC Charlotte are member-driven, and focused on solving member industry challenges and accelerating technology innovation of bold industry initiatives related to Safety, Security, and Rescue of humans in a wide range of industries, including health care, energy, manufacturing, and material handling. She says patient/worker safety and well-being are the principal threads in health care technology research and development, from diagnosis to treatment, to nursing care, and Robotic and sensing technologies, augmented by big data analysis, can provide the needed solution.

“Robotic technologies will be crucial for both human augmentation and human safety in energy, manufacturing, and material handling,” says Dr. Xiao.

Industry partners of the UNC Charlotte site of SSR-RC include Carolinas HealthCare System, the Electric Power Research Institute (EPRI), Linet Americas, and the Daniel Group.

### AL-SHAER PROFILE
Ph.D., Computer Science
Old Dominion University

### XIAO PROFILE
Ph.D., Computer Science
University of Michigan
“Each center is established to conduct research that is of interest to both the industry and the university with which it is involved, with the provision that the industry must provide major support to the center at all times. The centers rely primarily on the involvement of graduate students in their research projects, thus developing students who are knowledgeable in industrially relevant research.”

National Science Foundation
MAKING a DIFFERENCE in HAITI
Spring Break for many college students conjures up images of warm sandy beaches and the roar of the waves. However, that wasn’t the case in March of 2012 for 12 students from UNC Charlotte’s College of Computing and Informatics (CCI) and five other universities that included Florida A&M University, the University of Delaware, North Carolina A&T State University, Johnson C. Smith University, and Indiana University Bloomington. They had their sights set on three rural schools in northern Haiti as they embarked on a volunteer effort to share their computer expertise with teachers and mentors of young Haitian girls.

Student participants were selected from universities involved in the Students & Technology in Academia, Research & Service (STARS) Computing Corps, a community that develops leaders to impact the world through computing. Led by the College of Computing and Informatics, STARS is a national consortium of 44 colleges and universities, dedicated to preparing a larger, more diverse computing workforce for the 21st Century.

During the trip, STARS students and professors taught female Haitian students how to use XO laptops to create animations, videos, and storybooks, using an intuitive program called Scratch. The approach was creative problem solving; the students could create whatever the imagined, all they needed to do was give it a little thought and figure it out by trial and error on the laptops.

Osarieme Omokaro
(fourth from left)
Ph.D. student

MAKING A DIFFERENCE IN HAITI
In addition, email accounts were created for each student in order to provide an avenue for sustained communication after the STARS students left.

“We were definitely able to leverage our technology expertise to impact the lives of the students,” says CCI Ph.D. student Osarieme Omokaro, “and sow seeds of change not just in the schools but also in the surrounding community. One of the things we did was to ask the girls what change they would like to see in their communities.”

Omokaro says they spoke passionately about issues like water pollution and electricity. She says they showed them how they could use technology as a tool for change.

“I believe that because of the work we did in Haiti, these young girls have been enlightened and motivated to believe that they can achieve much more than they imagined,” says Omokaro.

For fellow UNC Charlotte STARS student Nick Chandler, the experience was life changing. He says he was approached by one of the female mentors and asked if he would create a program that could teach them how to speak English.

“With the help of a fellow student from the college we were able to create a working prototype in about 20 minutes,” says Chandler. “It then took four of us about 30 hours to create a program with 75 words and phrases to teach English. Not only could you see the word but hear it. The program was also scalable so you can push updates through it.”

Chandler says the gratitude and appreciation that was expressed despite of all the hardships the

“We’re grateful for the interest and enthusiasm demonstrated by STARS students and we’re excited by this example of non-profit organizations and academic institutions working together for global good.”

Patricia Shafer, founder and chief catalyst, MAC.
Haitians are having was overwhelming. His plan is to develop his own non-profit and continue the effort.

The STARS alternative Spring Break was designed to build upon the “High Hopes Haiti” (HHH), project of Charlotte-headquartered 501c3 non-profit Mothering Across ContinentsSM (MAC) in collaboration with non-profit Hands for Haiti. HHH officially launched in June 2011 when MAC was selected by the Waveplace Foundation as a partner to provide XO laptops, training, and educational courseware to Haitian schools.

“We’re grateful for the interest and enthusiasm demonstrated by STARS students,” said Patricia Shafer, founder and chief catalyst, MAC. “And we’re excited by this example of non-profit organizations and academic institutions working together for global good.”

MaKinG a diFFerence in haiti
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AWARDS RECEIVED

National Science Foundation
CAREER Award
2. Xintao Wu (2006)

Department of Energy
CAREER Award
Aidong Lu (2006)

National Professorship Award from Bronislaw Komorowski, President of Poland
Yue Wang, Ph.D. student
Department of Computer Science

IEEE Fellow Award
Jing Xiao, Ph.D.
Department of Computer Science

UNC Fudan Senior Fellow
Jianping Fan, Ph.D.
Department of Computer Science

IBM Top Patent Award
Wlodek Zadrozny, Ph.D.
Department of Computer Science

Department of Homeland Security Fellowship
Lane Harrison, Ph.D. student
Department of Computer Science

2013 Graduate Dean’s Distinguished Dissertation Award
Deepak Verna, Ph.D.
Department of Bioinformatics and Genomics

Best Application Paper Award at the 2013 Pacific-Asia Conference on Knowledge Discovery and Data Mining
Xiantao Wu, Ph.D., Xiaowei Ying, Ph.D., and Yu Wang, Ph.D.
Department of Software and Information Systems

Best Student Paper Award at 2013 SPIE Conference on Visualization and Data Analysis
Jack Guest, Tod Eaglin, Kalpathi Subramnian, Ph.D., and William Ribarsky, Ph.D.
Department of Computer Science
Title: BPC-AE Scaling the STARS Alliance: A National Community for Broadening Participation
PI: Dahlberg, Teresa
Co-PI: Barnes, Tiffany; Lipford, Heather
Sponsor: National Science Foundation
Period: 1/1/11 - 12/31/2015
Award Value: $3,766,000

Title: Collaborative Project: Carolina Cyber Defender Scholarship
PI: Chu, Bei-Tseng
Co-PI: Lipford, Heather; Wu, Xintao; Al-Shaer, Ehab; Wang, Weichao; Shehab, Mohamed
Sponsor: NSF
Period: 9/1/12 - 8/31/16
Award Value: $983,815

Title: DAT: A Visual Analytics Approach to Science and Innovation Policy
PI: Ribarsky, William
Co-PI: Yang, Jing
Sponsor: National Science Foundation
Period: 7/1/09 - 6/30/14
Award Value: $848,984

Title: Career: A Structure Based Approach to Transcription Factor Binding Site Prediction
PI: Guo, Jun-Tao
Sponsor: National Science Foundation
Period: 7/15/09 - 7/30/14
Award Value: $765,392

Title: S-STEMS: STRS Leadership Corps Computing Scholars: Pathways from Community College to Graduate School through Technology
PI: Dahlberg, Teresa
Co-PI: Chu, Bill; Chen, Keh-Hsun; Ribarsky, William
Sponsor: National Science Foundation
Period: 3/1/10 - 2/28/14
Award Value: $600,000

Title: Continued Maintenance and Development of Software Integrated Genome Browser
PI: Loraine, Ann
Sponsor: National Institutes of Health
Period: 7/1/11 - 3/30/15
Award Value: $584,312

Title: Collaborative Research: IUCRC Center for Configuration Analytics and Automation
PI: Al-Shaer, Ehab
Co-PI: Chu, Bei-Tseng
Sponsor: National Science Foundation
Period: 6/1/2013 - 5/31/2018
Award Value: $531,375

Title: S12-SSE: Reducing the Complexity of Comparative Genomics with Online Analytical Processing
PI: Gibas, Cynthia
Sponsor: National Science Foundation
Period: 9/15/10 - 8/31/14
Award Value: $448,253

Title: RI-Medium: Collaborative Research: Real-Time Continuum Manipulation
PI: Xiao, Jing
Sponsor: National Science Foundation
Period: 8/1/09 - 7/31/15
Award Value: $437,587

Title: CiC (SEA): Large Scale Prediction of Transcription Factor Binding Sites for Gene Regulation using Cloud Computing
PI: Su, ZhengChang
Co-PI: Akella, Srinivas
Sponsor: National Science Foundation
Period: 4/1/11- 3/31/14
Award Value: $425,000

Title: VOSS: Crowdsourcing Interaction Design for Citizen Science Virtual Organizations
PI: Maher, Mary L.
Sponsor: National Science Foundation
Period: 9/15/12 - 8/31/14
Award Value: $399,872
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<th>Title: REU Site: Exploring Human Centered and Socially Relevant Interactive Technologies in Computer Vision, Visualization, Pervasive Computing, Serious Games, and Social Networks</th>
<th>Title: CSR: Small: User Centric Policy Management for Social Networks</th>
<th>Title: MCA-PGR: Genomic Analysis of Two-Component Signaling Elements in Rice</th>
</tr>
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<tbody>
<tr>
<td>PI: Payton, Jamie</td>
<td>PI: Shehab, Mohamed</td>
<td>PI: Loraine, Ann</td>
</tr>
<tr>
<td>Co-PI: Barnes, Tiffany</td>
<td>Sponsor: National Science Foundation</td>
<td>Sponsor: UNC Chapel Hill</td>
</tr>
<tr>
<td>Sponsor: National Science Foundation</td>
<td>Period: 9/1/11 – 8/31/14</td>
<td>Period: 10/1/12 – 9/30/13</td>
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<tr>
<td>Award Value: $343,658</td>
<td>Award Value: $200,000</td>
<td>Award Value: $172,495</td>
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<tr>
<td>PI: Tolone, William J.</td>
<td>PI: Wang, Weichao</td>
<td>PI: Maher, Mary L.</td>
</tr>
<tr>
<td>Co-PI: Walsh, James; Whittmeyer, Joseph; Hadzikadic, Mirsad</td>
<td>Sponsor: National Science Foundation</td>
<td>Sponsor: National Science Foundation</td>
</tr>
<tr>
<td>Sponsor: Engineer Research and Development Center (ERDC)</td>
<td>Period: 9/1/11 – 8/31/14</td>
<td>Period: 9/1/12 – 8/31/15</td>
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<tr>
<td>Award Value: $297,627</td>
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<tr>
<th>Title: CSR: Small: Collaborative Research: Towards Collaborative Overlay Problem Diagnosis Usine Evidential Reasoning and Adaptive Monitoring.</th>
<th>Title: Building Bridges Within the Undergraduate Major in Computer Science</th>
<th>Title: Continuation of Novel Analytical and Empirical Approaches to the Origin and Prediction of Pathogenicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>PI: Al-Shaer, Ehab</td>
<td>PI: Subramanian, Kalpathi</td>
<td>PI: Janies, Daniel A.</td>
</tr>
<tr>
<td>Sponsor: NSF</td>
<td>Co-PIs: Payton, Jamie; Goolkasan, Paula</td>
<td>Sponsor: American Museum of Natural History</td>
</tr>
<tr>
<td>Period: 9/1/10 – 8/31/14</td>
<td>Sponsor: National Science Foundation</td>
<td>Period: 7/31/12 – 10/31/13</td>
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<tr>
<th>Title: SHF: Small: Collaborative Research: Constraint-Based Generation of Database States for Testing Database Applications</th>
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<tr>
<td>PI: Wu, Xintao</td>
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<tr>
<td>Sponsor: National Science Foundation</td>
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<tr>
<td>Period: 9/1/09 – 8/31/13</td>
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<tr>
<th>Title: Collaborative Research: Supporting Secure Programming Education in the IDE</th>
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<tbody>
<tr>
<td>PI: Lipford, Heather</td>
</tr>
<tr>
<td>Co-PI: Chu, Bill</td>
</tr>
<tr>
<td>Sponsor: National Science Foundation</td>
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<td>Period: 8/15/11 – 2/28/14</td>
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<tr>
<th>Title: MCA-PGR: Genomic Analysis of Two-Component Signaling Elements in Rice</th>
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<tbody>
<tr>
<td>PI: Loraine, Ann</td>
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<tr>
<td>Sponsor: UNC Chapel Hill</td>
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<tr>
<td>Period: 10/1/12 – 9/30/13</td>
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<tr>
<th>Title: HCC: Small: Designing Tangible Computing for Creativity</th>
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<tr>
<td>PI: Maher, Mary L.</td>
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<tr>
<td>Sponsor: National Science Foundation</td>
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<td>Period: 9/1/12 – 8/31/15</td>
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<td>Award Value: $156,661</td>
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<tr>
<th>Title: Continuation of Novel Analytical and Empirical Approaches to the Origin and Prediction of Pathogenicity</th>
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<tr>
<td>PI: Janies, Daniel A.</td>
</tr>
<tr>
<td>Sponsor: American Museum of Natural History</td>
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<td>Period: 7/31/12 – 10/31/13</td>
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<tr>
<td>Award Value: $153,545</td>
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</table>
Title: TC: EAGER: Investigations of Next-Generation Network Reconnaissance Attack Techniques and Limitations
PI: Al-Shaer, Ehab
Sponsor: National Science Foundation
Period: 9/1/10 - 8/31/14
Award Value: $145,000

Title: Diet, Obesity, and the Etiology of Diverticulosis
PI: Fodor, Anthony
Sponsor: UNC Chapel Hill
Period: 4/1/12 - 3/31/14
Award Value: $117,178

Title: Collaborative Research: Teaching Multi-Core and Many-Core Programming at a Higher Level of Abstraction
PI: Wilkinson, Anthony
Sponsor: National Science Foundation
Period: 8/15/12 - 7/31/15
Award Value: $89,942

Title: Unc-Ch Nutrition Obesity Research Center
PI: Du, Xiaxia
Sponsor: UNC Chapel Hill
Period: 4/5/11 - 3/31/16
Award Value: $131,339

Title: Continued Improvement of Oats for Human Health
PI: Brouwer, Cory
Co-PI: Schluter, Jessica; Schluter, Shannon
Sponsor: General Mills
Period: 5/15/11 - 5/14/14
Award Value: $104,847

Title: Air Pollution-Exposure-Health Effects Indicators: Mining Massive Geographically Referenced Environmental Health Data to Identify Risk Factors for Birth Defects
PI: Yang, Jing
Sponsor: Texas State University
Period: 2/1/11 - 1/31/14
Award Value: $85,590

Title: TRPGR SoyMap II: Leveraging Untapped Genetic Diversity in Soybean
PI: Schluter, Jessica
Sponsor: University of Georgia Research Institute
Period: 10/1/11 - 2/28/14
Award Value: $104,222

Title: New Site of I/UCRC Safety, Security, and Rescue Research Center
PI: Xiao, Jing
Co-PI: Akella, Srinivas
Sponsor: National Science Foundation
Period: 6/1/2013 - 5/31/2018
Award Value: $60,000

Title: Dietary Nutrient Status and the Risk of Colon Cancer
PI: Fodor, Anthony
Sponsor: UNC Chapel Hill
Period: 10/1/12 - 9/30/15
Award Value: $71,194

Title: NCAT: Investigating Next-Generation Attack Techniques and Limitations
PI: Al-Shaer, Ehab
Sponsor: National Science Foundation
Period: 9/1/10 - 8/31/14
Award Value: $145,000

Title: Collaborative Research: BPC-LSA: Forming an ACM Special Interest Group to Scale the Impact of BPC Activities
PI: Dahlberg, Teresa
Co-PI: Rorrer, Audrey
Sponsor: National Science Foundation
Period: 9/15/10 - 8/31/14
Award Value: $144,648

Title: UNC-CH Nutrition Obesity Research Center
PI: Du, Xiaxia
Sponsor: UNC Chapel Hill
Period: 4/5/11 - 3/31/16
Award Value: $131,339

Title: Leveraging Structural Characteristics of Interdependent Networks to Model Non-Linear Cascading
PI: Raja, Anita
Sponsor: NAVSUP Fleet Logistics Center, San Diego
Period: 02/05/13 - 06/04/14
Award Value: $119,010

Title: Research Associate in Robotics
PI: Xiao, Jing
Sponsor: CoroWare, Inc.
Award Value: $99,768

Title: EAGER: Data Analysis for Nursing Care Assistance
PI: Xiao, Jing
Sponsor: National Science Foundation
Period: 9/1/12 - 8/31/14
Award Value: $55,389
ACTIVE GRANTS

Title: Collaborative Project: Developing Faculty Expertise in Information Assurance Through Case Studies and Hands-On Experiences.
PI: Chu, Bill
Sponsor: National Science Foundation
Period: 9/1/11 – 8/31/14
Award Value: $50,000

Title: Interactive Models for Application Privacy
PI: Lipford, Heather R.
Sponsor: Google, Inc.
Period: 3/1/12 - 5/31/13
Award Value: $29,865

Title: Expansion of the University of North Carolina System-Wide Professional Science Master’s (PSMs)
PI: Akella, Srinivas
Sponsor: NC State University
Period: 2/1/12 - 11/30/13
Award Value: $6,000

Title: Modeling and Analysis of Gene Duplication
PI: Schlueter, Jessica
Sponsor: University of Wyoming
Period: 8/14/12 - 6/30/15
Award Value: $47,275

Title: Doctoral Mentoring Consortium at the Twelfth International Conference on Autonomous Agents
PI: Raja, Anita
Sponsor: National Science Foundation
Period: 05/15/13 - 04/30/14
Award Value: $20,000

Title: Collaborative Research: RCN: Integrative Pollen Biology
PI: Loraine, Ann
Sponsor: National Science Foundation
Period: 5/1/10 - 4/30/15
Award Value: $43,907

Title: Collaborative Research: I/UCRC Center for configuration Analytics and Automation
PI: Al-Shaer, Ehab
Co-PI: Chu, Bei-Tseng
Sponsor: National Science Foundation
Period: 6/1/2013 - 5/31/2018
Award Value: $13,000

Title: Genomic and Proteomic Analysis of Ovarian Cancer
PI: Mostafavi, Taghi
Sponsor: Carolinas Medical Center (CMC)
Period: 9/1/11-12/31/13
Award Value: $10,000

Title: Studying Ovarian Cancer Translational Research
PI: Mostafavi, Taghi
Sponsor: Carolinas Medical Center
Period: 8/1/2013 - 7/1/2014
Award Value: $38,400
Yi Deng, Ph.D.  
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Executive Assistant to the Dean

Rick Lejk, Ph.D.  
Interim Associate Dean

William J. Tolone, Ph.D.  
Associate Dean

Olin Broadway  
Executive in Residence

Liezl Breitwise  
Business Manager

Shena Cunningham  
Business Coordinator CCI

Marjorie Bray  
Director of Development

Clark Curtis  
Director of Communications

Joe Matesich  
Executive Director Technology Solutions Office

Nancy Clarke-Jones  
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Interactive Media

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Plant Molecular Biology Lab Technician, Department of Bioinformatics and Genomics

Debbie Roseman
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CCI Student Learning Outcomes Lead and Research Associate for Center for Education Innovations

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Barry Wilkinson, Ph.D.
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Affiliation: Department of Computer Science
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Dale-Marie Wilson, Ph.D.
Position: Teaching Associate, Professor
Affiliation: Department of Software and Information Systems
Education: Ph.D., Computer Science, Auburn University (2006)
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Education: Ph.D., Computer Information and Control Engineering, University of Michigan (1990)
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Jing Yang, Ph.D.
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Affiliation: Department of Computer Science
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Leweb, flickr.com/leweb
Paul Hudson, flickr.com/pahudson

34  Paul Hudson, flickr.com/pahudson

36  From top right, clockwise
See-Ming Lee, flickr.com/seeminglee
Brionv, flickr.com/brionv
Ted, flickr.com/tedsblog
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