

CONNECTED

Spring 2014

— Inside this Issue —

Bitzer Inducted into
National Inventors
Hall of Fame

Faster Downloads
for Smartphones are
Coming Soon

Interactive Software
Targets Teen
Alcohol Use

NC State's Video Game
Design Program
in the Top 15

Engineering Online
Ranks Fourth
Nationally

Check out NC State's
Computer Science Department at
www.csc.ncsu.edu

and



NC State Partners With National Security Agency on Big-Data Lab

North Carolina State University Chancellor Randy Woodson recently announced a new partnership with the **National Security Agency (NSA)** to create the **Laboratory for Analytic Sciences (LAS)** on NC State's Centennial Campus. The lab will bring together some of the brightest minds from government, academia and industry to address the most challenging big-data problems and will be a cornerstone of the emerging advanced data innovation hub at NC State.

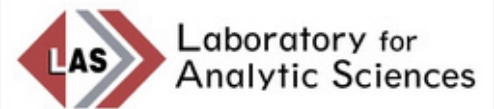
The NSA grant funding of the LAS is the second largest sponsored research contract in the university's history. The new enterprise is expected to directly bring 100 new jobs to the Triangle over the next several years, and to attract new government and industry partners.

"NC State is committed to developing partnerships that solve the grand challenges facing society and promote innovative products and solutions that improve lives around the globe," Woodson said.

"We appreciate the confidence of the National Security Agency to select NC State for this groundbreaking endeavor. Not only will it enhance the academic experience for our students and faculty, it will also add to the economic prosperity of our community through new jobs, new industry and new partnerships."

The NSA grant funding of the LAS (estimated at \$60M) is the second largest sponsored research contract in the university's history.

Through a highly competitive selection process, NSA chose NC State for this partnership due in large part to the university's national leadership and expertise in data analytics, computer science and interdisciplinary collaborations along with its strong existing partnerships with industry, universities and government agencies. The geographic proximity of the Research Triangle and NC State's strong connections to national industry leaders, local businesses and other leading research universities, including Duke University and the University of North Carolina - Chapel Hill, solidified NC State as the ideal host for the LAS.



NC State researchers will assist NSA scientists in establishing priorities and conducting research for the LAS. A key goal of the LAS is to promote new advances in the science of analysis through innovative collaborations between industry, academia and government.

NC State's expertise in big data ranges from its Institute for Advanced Analytics, which offers an intensive 10-month Master of Science in Analytics degree – the first program of its kind – that boasts before-graduation job-placement rates of more than 90 percent, to its Center for Innovative Management Studies, which examines the trends and technologies surrounding big data. The university also has traditional strengths in computer science, mathematics and statistics – all disciplines in which understanding large sets of data is paramount – and is currently hiring four faculty members for its new data-driven science "cluster."

Besides a major collaborative project on cybersecurity with the NSA, NC State also has multiple existing partnerships with the NSA's parent agency, the Department of Defense. Research projects include technology that can best help soldiers identify improvised explosive devices from a distance, as well as a study of the best dog breeds that can sniff out these IEDs; fire-protection research to help soldiers and first responders; research into "wrinkled layers" that can be added to ships' coatings to keep barnacles from forming, saving fuel and cleaning costs; and a language training center that works to improve the language skills, regional expertise and intercultural communication skills of military personnel.

Due to the high degree of confidentiality required for the LAS work, specific funding, personnel numbers and facility details cannot be provided. Although physical access to the lab itself will be restricted to individuals who have been issued a security clearance by the U.S. government, a portion of the fundamental research will be conducted at the unclassified level in existing faculty labs.

From the Department Head

Dr. Mladen Vouk



Greetings from Centennial Campus! When you reflect on 2013, you have to ask yourself these questions: Have I solved any problems this year? Have I

generated innovative and creative solutions this year? Have I used my talents as a computer scientist to make a difference in the world? I'm sure that most of you would answer "yes" to these questions, because that is what we equipped you to do as graduates of the NC State Department of Computer Science. We take great pride in knowing that you are life-long learners, creative and innovative problem solvers, and you are changing the world!

I am proud to say that our faculty, staff and students also are the living embodiment of that passion for making a difference in the world, and this is evidenced in our outstanding results over the last year. Our total enrollment is now approaching 1,500 students, as industry demand for software skills continues to rise. Our department is frequently involved in discussions with companies considering moving to or expanding their operations in NC. This year, we played a key role in the expansion plans for the likes of LexisNexis, Ipreo and MetLife. As the economy improves, there has been no shortage of jobs for our graduates, with many receiving multiple job offers.

We continue to grow our faculty in strategic areas, and we added two more NSF Career Award winners this year. Our active annual research now tops \$45M, an all-time record for the department, and we launched a new center – the Center for Educational Informatics. Distinguished Professor, Dr. Donald L. Bitzer, who helped develop the technology behind the plasma-screen televisions that sit in millions of living rooms around the world, was inducted into the National Inventors Hall of Fame this year. And the National Security Agency has established a \$60 million data analytics lab at NC State, resulting in the launch of the new Laboratory for Analytic Sciences here on Centennial Campus. This is the second largest research grant in NC State's history.

This issue of *Connected* is filled with related news, but below are a few highlights that I want to share:

UNDERGRADUATE PROGRAM:

- In 2012-2013, we awarded 168 BS degrees, about a 50% increase over last year, an upward trend expected to continue for several more years. In the fall of 2013, we had 866 undergraduate students, and the incoming freshman class was the brightest and most gifted ever, with an average SAT of 1344 (on 1600 scale) and an average GPA of 4.53.
- Demand for our undergraduates has surged as the economy continues to improve. Many of our graduates received multiple offers, and average starting salaries are now over \$65K, among the highest in the College of Engineering. Large numbers of our undergraduates were hired by the likes of Cisco, Boeing, Fidelity Investments, IBM, NetApp and SAS Institute. But a significant number of students pursued careers with smaller companies or entrepreneurial opportunities.
- Our Game Development Concentration is ranked 15th in the U.S and Canada, for the 3rd year in a row.

GRADUATE PROGRAM:

- Our graduate program continues to thrive! Applications for fall admission increased by over 39 percent this year! In Fall 2013, we enrolled 620 graduate students; 182 were PhD students – both record highs for the department. Similarly, we awarded a record number of graduate degrees (223), including 24 PhDs. Our graduate distance education program was ranked fourth nationally by the *U.S. News and World Report*.
- As with our undergrads, demand for our graduate students is extremely high, with starting salaries for our masters students averaging approximately \$93K, while starting salaries for our PhD students are starting around \$110K and some have exceeded \$150K. Some of the top consumers of our graduate talent include Cisco, IBM, Microsoft and Amazon.com.

RESEARCH:

- Our research productivity continues to grow with annual research expenditures exceeding \$14M. We now have an all time high of over \$45M in active research grants, which ranks us well within the top 20 for sponsored research funding among computer science departments in colleges of engineering.
- The department welcomed four new faculty members: Drs. Tiffany Barnes (intelligent tutoring and education analytics), Lina Battestilli (cloud computing and network-

ing and performance evaluation), Min Chi (applied machine learning and data mining) and Blair Sullivan (algorithm design, graph theory, parallel computing, and combinatorial scientific computing).

SHADES OF THINGS TO COME:

We clearly have much to be proud of. Our department is a national leader in gaming, educational informatics, cybersecurity, cloud computing and analytics. We play a key role in the multi-disciplinary efforts relating to NC State's strategic research areas: health and well-being, energy and environment, educational innovation, and safety and security. We are not only one of the largest producers of talent in the nation, our graduates are highly valued and sought after by the most innovative and respected companies in the world. Our corporate relations program is a model revered across the nation. And whether it is identifying the latest security threat to our smartphones or improving the speed and efficiency of our wireless networks or designing the future of the Internet, our faculty and students are making a real difference in the world, every day!

Despite being recognized as one of the nation's top computer science programs, we face some very real challenges. First and foremost, we must substantially increase our department's endowment levels, with the specific goals of naming the department and adding more named distinguished professorships. Growing our endowment produces transformational impact now, as well as creating a reliable source of support in perpetuity, minimizing the adverse impact of cyclical dips in the economy. The addition of more named professorships will allow us to attract and retain world-class research faculty. We will also work closely with our corporate partners to tweak our undergraduate and graduate curriculum to align with evolving business needs. We will continue to work closely with University leadership to virtualize the research and educational resources of Centennial Campus to meet the growing technology needs of the state and beyond for decades to come.

If you are reading this, you are probably one of more than 7,000 CSC alumni spread across the US and in over 20 countries around the globe. I encourage you to come back to campus, explore how you can get involved, and help us continue our upward trajectory.



Bitzer Inducted Into National Inventors Hall of Fame

Dr. Donald L. Bitzer, who helped develop the technology behind the plasma-screen televisions that sit in millions of living rooms, has been inducted into the National Inventors Hall of Fame. Bitzer is Distinguished University Research Professor of Computer Science at North Carolina State University.

The Hall of Fame, which was founded in 1973, honors inventors whose innovations and entrepreneurial endeavors have changed the world. Its membership includes Thomas Edison, Wilbur and Orville Wright, Alexander Graham Bell and Steve Jobs.

Bitzer co-invented the flat plasma display panel in 1964. The invention was originally designed as an educational aid that made it more comfortable for students to work in front of computers for long periods of time, as plasma screens do not flicker. The technology was eventually applied to

television screens, and millions of plasma TVs have been sold to the public since their introduction in the 1990s.

Bitzer is also known as the “Father of PLATO,” or Programmed Logic for Automatic Teaching Operations, the first computer system to combine graphics and touch-screen displays. His work on the technology began around 1960; descendant systems still operate today.

In 2002, Bitzer received an Emmy Award from the National Academy of Television Arts and Sciences for his work advancing television technology. He has been a member of the National Academy of Engineering since 1974.



Bitzer received his bachelor's, master's and doctoral degrees in electrical engineering in 1955, 1956, and 1960, respectively, from the University of Illinois at Urbana-Champaign. He joined the faculty at NC State in 1989.

Teaching a Computer to Play ‘Concentration’ Advances Security, Understanding of the Human Mind

Computer science researchers have programmed a computer to play the game Concentration (also known as Memory). The work could help improve computer security – and improve our understanding of how the human mind works.

The researchers developed a program to get the software system called ACT-R, a computer simulation that attempts to replicate human thought processes, to play Concentration. In the game, multiple matching pairs of cards are placed face down in a random order, and players are asked to flip over two cards, one at a time, to find the matching pairs. If a player flips over two cards that do not match, the cards are placed back face down. The player succeeds by remembering where the matching cards are located.

The researchers were able to either rush ACT-R's decision-making, which led it to play more quickly but make more mistakes, or allow ACT-R to take its time, which led to longer games with fewer mistakes.

The findings will help the researchers distinguish between human players and automated “bots,” ultimately helping them develop models to identify bots in a variety of applications. These bots pose security problems for online games, online voting and other Web applications.

“One way to approach the distinction between bot behavior and human behavior

is to look at how bots behave,” says **Dr. Robert St. Amant**, associate professor of computer science. “Another way is to look at what humans do. We’re focusing on the latter.”

“We’re looking for distinctions so subtle that they’d be very difficult to replicate outside of a cognitive architecture like ACT-R,” says **Dr. David Roberts**, assistant professor of computer science.

The researchers were also able to modify the parameters of their Concentration model to determine which set of variables resulted in gameplay that most closely matched the gameplay of the human study participants.



This offers a plausible explanation of the cognitive processes taking place in the human mind when playing Concentration. For example, the Concentration model sometimes has a choice to make: remember a previous matching card and select it, or explore the board by selecting a new card. When playing for speed, the model takes the latter choice because it's faster than retrieving the information from memory. This may also be what's happening in the human brain when we play Concentration.

“This is information that moves us incrementally closer to understanding how cognitive function relates to the way we interact with computers,” Roberts says. “Ultimately, this sort of information could one day be used to develop tools to help software designers identify how their design decisions affect the end users of their products. For example, do some design features confuse users? Which ones, and at what point? That would be useful information.”

The paper, “Modeling the Concentration Game with ACT-R,” was presented at the International Conference on Cognitive Modeling, in July, 2013 in Ottawa. Lead author of the paper is **Titus Barik**, a Ph.D. student at NC State. Co-authors include St. Amant, Roberts, and NC State Ph.D. students **Arpan Chakraborty** and **Brent Harrison**. The research was supported by the National Security Agency.



Scaling Up Personalized Query Results for Next Generation of Search Engines

NC State researchers have developed a way for search engines to provide users with more accurate, personalized

search results. The challenge in the past has been how to scale this approach up so that it doesn't consume massive computer resources. Now the researchers have devised a technique for implementing personalized searches that is more than 100 times more efficient than previous approaches.

At issue is how search engines handle complex or confusing queries. For example, if a user is searching for faculty members who do research on financial informatics, that user wants a list of relevant webpages from faculty, not the pages of graduate students mentioning faculty or news stories that use those terms. That's a complex search.

"Similarly, when searches are ambiguous with multiple possible interpretations, traditional search engines use impersonal techniques. For example, if a user searches for the term 'jaguar speed,' the user could be looking for information on the Jaguar supercomputer, the jungle cat or the car," says **Dr. Kemafor Anyanwu Ogan**, an assistant professor of computer science at NC State and senior author of a paper on the research. "At any given time, the same person may want information on any of those things, so profiling the user isn't necessarily very helpful."

Anyanwu Ogan's team has come up with a way to address the personalized search problem by looking at a user's "ambient query context," meaning they look at a user's most recent searches to help interpret the current search. Specifically, they look beyond the words used in a search to associated concepts to determine the context of a search. So, if a user's previous search contained the word "conservation" it would be associated with concepts like "animals" or "wildlife" and even "zoos." Then, a subsequent search for "jaguar speed" would push results about the jungle cat higher up in the results – and not the automobile or supercomputer. And the more recently a concept has been associated with a search, the more weight it is given when ranking results of a new search.

Researchers have devised a technique for implementing personalized searches that is more than 100 times more efficient than previous approaches.

Search engines have also tried to identify patterns in user clicking behavior on search results to identify the most probable user intent for a search. However, such techniques are impersonal and are applied on a global basis. So, if the most frequent click pattern for a set of keywords is in a particular context, then that context becomes the context associated with queries for most or all users – even if your recent search history indicates that your query context is about jungle cats.

"What we are doing is different," Anyanwu Ogan says. "We are identifying the context of search terms for individual users in real time and using that to determine a user's intention for a specific query at a specific time. This allows us to deal more effectively with more complex searches than traditional search engines. Such searches are becoming more prevalent as people now use the Web as a key knowledge base supporting different types of tasks."

Anyanwu Ogan's research team has now come up with a technique that includes new ways to represent data, new ways to index that data so that it can be accessed efficiently, and a new computing architecture for organizing those indexes. The new technique makes a significant difference.

"Our new indexing and search computing architecture allows us to support personalized search for about 2,900 concurrent users using an 8GB machine, whereas an earlier approach supported only 17 concurrent users. This makes the concept more practical, and moves us closer to the next generation of search engines," Anyanwu Ogan says.

The paper, "Personalizing Search: A Case for Scaling Concurrency in Multi-Tenant Semantic Web Search Systems," was presented at the 2013 IEEE International Conference on Big Data held October 6-9 in Santa Clara, Calif. Lead author of the paper is **Dr. Haizhou Fu**, a former Ph.D. student at NC State. The paper was co-authored by **Hyeongsik Kim**, a Ph.D. student at NC State. The research was supported by the National Science Foundation.

Faster Downloads for Smartphones



Tired of waiting around for your smartphone to play that video? NC State computer scientists have good news: Faster downloads are coming soon.

With help from the Chancellor's Innovation Fund (CIF), **Dr. Injong Rhee**, a professor of computer science, has helped develop

a new algorithm that cuts down data retrieval time for the software programs that power smartphones and tablets.

These mobile devices use "transmission control protocol (TCP) stacks," programs that send and receive packets of data between the device and the network. With help from **Dr. Kyunghan Lee**, a former senior research associate at NC State who is now an assistant professor at the Ulsan National Institute of Science and Technology in South Korea, Rhee demonstrated that the new algorithm makes the stacks more efficient.

That makes the user experience a whole lot better.

The researchers plan to quantify that improved efficiency on various network providers using several smartphone and tablet brands. They're also creating a business strategy for US markets. Eventually they want to expand to Asia.

"This technology will help make the smartphone and tablet experience much more enjoyable for users," Rhee said. "And the CIF funding will help convince network providers that it really works."

(Rhee is a 2013 Chancellor's Innovation Fund (CIF) award winner. The fund was established by Chancellor Randy Woodson in 2010 to provide money and support to help researchers bring their inventions to the marketplace.)

◆ Several CSC students have been chosen to receive prestigious and highly competitive **NSF Graduate Fellowships**: **Joseph Arthur, Veronica Catete, Andrew Hicks, Brittany Johnson, Fernando Rodriguez, Neil Shah** and **Jeffrey Wilson**. Fellows benefit from three years of funding (approximately \$122,500) for research-focused degrees in science, technology, engineering and mathematics fields.

◆ Congratulations to **Andy Smith**, a graduate student who works with the NC State STARS Student Leadership Corps, on receiving a **Presidential Service Award for Volunteerism (Gold Level)** from the **President's Council on Service and Civic Participation** for his service work with Citizen Schools at Lowe's Grove Middle School in Durham, NC.



◆ PhD student **Zhe Zhang** was recently awarded a prestigious **2013 IBM Ph.D. Fellowship Award**. Fellows are awarded tuition, fees and a stipend for one

academic year. Fellowships are eligible for renewal yearly for up to three years. Zhang is advised by **Dr. Munindar Singh**.

◆ **Ignacio Dominguez**, PhD student and TA for the Computer Science Senior Design Course (CSC 492), was recently awarded a **2013 NC State University Graduate Student Association (UGSA) Outstanding TA Award**. Only 15 TAs (out of 79 nominees campus-wide) were recognized with this award last spring. Other nominees from the department included: **David Comejo, Lucia Gjeltema, Jitendra Harlalka, Da Young Lee, Barry Peddy-cord, Yang Song** and **Jawahar Tadipatri**.

◆ **Chris Barile, Sagar Jauhari, Da Young Lee**, and **Savera Tanwir** were all recipients of **Graduate Industrial Traineeships**

Writing the Book on "Big Data"

NC State students wrote the book on analyzing "big data" – sifting useful information out of the sea of business, personal and other data available online and elsewhere. Or at least they've written a book about mining that big data. **Dr. Nagiza Samatova** and four PhD students are co-editors of a book released last summer that is a how-to guide for anyone interested in learning how to analyze big data. More than fifty other undergraduates and graduate students contributed as co-authors.

The book focuses on "graphs," a computer science term for a model that shows the connections between entities, whether those entities are people or power stations. These graphs can be visual if the networks they represent are small enough. But for large data sets, such as all the people who shop at Amazon.com, it is easier to create digital, machine-readable graphs. These digital graphs can be "mined" to identify patterns for various applications.

"This approach to analyzing large data sets – so-called 'big data' – is an important field in computer science, with applications in areas from climate

modeling to data security to the business community," says **Kanchana Padmanabahn**, an NC State Ph.D. student and co-editor of the book. "We wanted to see an introductory book that walks people through graph mining, so we decided to create it ourselves."

"Our goal was, in part, to create a book that could be used outside the classroom," says **Arpan Chakraborty**, an NC State Ph.D. student and co-editor of the book. "But we also wanted to come up with something that could be used by instructors in data-mining courses."

The book, "Practical Graph Mining with R," was published by CRC Press July 23 as part of its series on data mining and knowledge discovery. The other co-editors are Ph.D. student **John Jenkins** and former Ph.D. student **William Hendrix**, who is now on faculty at Northwestern. The work was done with support from the United States Department of Energy's Scientific Data Analysis and Visualization (SDAV) Institute and the National Science Foundation's Expedition in Computing on Understanding Climate Change.

(GIT) from **SAS**. They will provide SAS with research, analysis, generation, testing and documentation of operations research software.

◆ Several extraordinary women from the CSC Department have become mentors/role models in **SHE++**: current undergraduate student **Kamaria Hardy**, graduate student **Savera Tainwir**, and alumnae **Bushra Anjum, Piyali Dey, Pamela Ocampo**, and **Andrea Villanes**. SHE++ is a Stanford University initiative whose goal is to foster a community to inspire a new generation of female programmers.

◆ Recent CSC PhD graduate **Piyali Dey** was the recipient of a **2013 Anita Borg Facebook Scholarship** to attend the **Grace Hopper Celebration of Women**

in Computing Conference held October 2-5 in Minneapolis. The scholarship covers conference registration, hotel room, meals and travel reimbursement. Several other women from the Computer Science Department were sponsored by the NC State Women in Computer Science (WiCS) to attend the conference, too: **Veronica Catete, Dena Ford, Brittany Johnson, Lauren Koepnick, Anya Raspopovic, Marie Riaz**, and **Savera Tanwir**.

◆ Alumna **Andrea Villanes** recently won the **Anita Borg Systems Pass-It-On Award** for her project called "Reaching Out Peru!" Villanes will use her \$1,000 prize to organize two "Girls Coding Dojo" events in the mountains of Peru to provide an opportunity for girls to learn more about computer science.

◆ Recent graduate **KaMar Galloway** was chosen to participate in the **Google Computer Science Teaching Fellows Practicum**. His area of focus is K-12 computer science education. The program seeks talented STEM (Science, Technology, Engineering and Math) teachers to join the two-year program designed to grow leaders in computer science education.

Our Financial Needs Change as Our Life Evolves.

In fact, if you are now a:

- ✓ Grandparent wanting to help with college expenses,
- ✓ Baby-boomer or Gen X who wants to supplement your retirement plans
- ✓ Retiree on a fixed income
- ✓ Adult caring for aging parents

then you might be an excellent candidate for a **Charitable Gift Annuity**. Contact Ken Tate (tate@csc.ncsu.edu) and he will connect you with one of NC State's gift planning experts. There is no cost; you have nothing to lose!

Researchers Design Interactive Software to Target Teen Alcohol Use

If you want teens to avoid risky behavior, you can't just give teenagers the facts – you have to get them to engage with the information, feel motivated to change, and have the confidence and skills to keep themselves safe.

That's the idea behind a project under way at NC State and the University of California, San Francisco (UCSF), to develop interactive software aimed at helping teens reduce alcohol use and the risks associated with drinking alcohol.

"Our goal is to help adolescents make informed decisions about alcohol use," says **James Lester**, a professor of computer science at NC State and one of two leaders of the project. Specifically, Lester's team will be creating software that engages adolescents aged 15-17 in role-playing scenarios about alcohol use and understanding the results of the various paths that they choose.



NC State is taking the lead on software development, while researchers at UCSF will be focusing on the behavior change associated with reducing risky behavior in adolescents. "We are excited about applying what we know from theories of behavior change to this cutting-edge technology

for adolescents," says **Elizabeth Ozer**, a psychologist and professor of pediatrics at UCSF, and the other leader of the project. The work is supported by two grants from the National Science Foundation that run through 2017, one to NC State and one to UCSF.

The NC State team plans to make the software "adaptive," allowing it to customize the scenarios that adolescents face based on each user's choices and preferences.

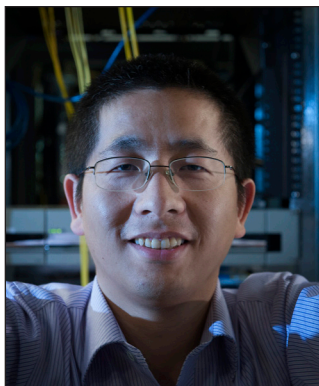
"This personalized approach will, we hope, be a more effective means of changing behaviors in a positive way," says **Brad Mott**, a research scientist at NC State who is working on the project.

Many Android Vulnerabilities Can Be Traced to Manufacturer Modifications

Computer security researchers have found that Android smartphone manufacturers are inadvertently incorporating new vulnerabilities into their products when they customize the phones before sale, according to a recent study. On average, the researchers found that 60 percent of the vulnerabilities found in the smartphone models they evaluated were due to such "vendor customizations."

Although Google creates the base Android platform that all Android smartphones use to operate, vendors – such as Samsung, Sony, and HTC – customize that platform to integrate their hardware. These vendors also incorporate applications they or their partners have developed.

A team led by NC State computer security researcher **Xuxian Jiang** sought to determine whether these customizations posed



a security threat. Jiang is senior author of a paper describing the study.

The researchers looked at 10 representative Android

smartphone models. They looked at an older model (version 2.x) and a newer model (version 4.x) from each of five manufacturers: Samsung, HTC, LG, Sony and Google. For those 10 models, vendor customizations were responsible for an average of 80 percent of the apps that came preloaded onto the phones.

"All 10 devices were vulnerable, based purely on the preloaded apps," Jiang says. "The older versions had an average of 22.4 vulnerabilities per device, while the newer versions had an average of 18.4 vulnerabilities per device. And the newer versions weren't always more secure. Some of the more recent models were actually less secure than their predecessors." Of the 10 models evaluated, the most recent Google device they looked at, the Nexus 4, had the fewest vulnerabilities.

Jiang's team discovered vulnerabilities including the ability to record audio without the user's permission, the ability to make phone calls without the user's permission, and the ability to wipe out the user's data.

Lei Wu, a Ph.D. student at NC State, is lead author of the paper, "The Impact of Vendor Customizations on Android Security." Co-authors are NC State Ph.D. students **Michael Grace**, **Yajin Zhou**, and **Chiachih Wu**. The paper was presented November 6, 2013, at the ACM Conference on Computer and Communications Security in Berlin, Germany.



NC State's Video Game Design Program in the Top 15

NC State has been recognized as one of the top 15 undergraduate programs to study video game design on **The Princeton Review's** fourth annual list saluting the best schools in the U.S. and Canada. This is the third year in a row that NC State's program has been recognized.

The list, "**Top Schools to Study Video Game Design for 2013**," is based on a survey The Princeton Review conducted in 2012-13 of 150 programs at institutions in the US and Canada offering video game design coursework and/or degrees. Overall, the list salutes 50 game design programs (30 undergraduate/20 graduate) at 35 institutions.

Criteria for The Princeton Review's school selections covered the quality of the curriculum, faculty, facilities and infrastructure. They also factored in data it collected from the schools on their scholarships, financial aid and career opportunities.

Faculty & Staff Wolf Bytes



◆ **Dr. George Rouskas** (above), professor of computer science, has been named **Director of Graduate Programs** in the NC State Computer Science Department. Rouskas, who joined the faculty in 1994, was named an IEEE Fellow in 2011, and served as an IEEE Distinguished Lecturer for the Communications Society in 2010-2011.

◆ **Dr. Mladen Vouk**, professor and head of the Department of Computer Science and associate vice provost for information technology at NC State, is this year's recipient of the **MCNC Robyn Render Endeavor Award**. The award is presented each year to at least one person who continually champions leadership, engagement and support of MCNC, the technology nonprofit that builds, owns and operates the NC Research and Education Network (NCREN). Vouk is the fifth winner with NC State ties joining, **Sam Averitt** in 2006, **Henry Schaffer** in 2008, and **John Streck** and **Phil Emer** in 2009.



◆ **Dr. Laurie Williams** (above), professor of computer science, has been named a **2013-2014 University Faculty Scholar**. Scholars are top NC State early- and mid-career faculty who will receive \$10,000 in donated funds for each of the next five years to support their academic endeavors. The recognition and award program is part of the university's strategic initiative to invest in and retain top faculty. There were 20 winners out of 42 nominees this year.

◆ Congratulations to **Drs. William Enck** and **Emerson Murphy-Hill** on receiving **Faculty Early Career Development (CAREER) Awards** from the National Science Foundation (NSF). **NC State's Computer Science Department now has 24 NSF CAREER Award winners (21 currently on faculty)**, one of the highest concentrations of any department in the nation.

◆ **Dr. Blair Sullivan**, assistant professor, has been named a **2014 National Consortium for Data Science (NCDS) Data Scientist Faculty Fellow**. She will receive \$30,000 in support of her project "Tracking Community in Dynamic Graph Data Using Tree-like Structure."



◆ Congratulations to **Dr. Robert Fornaro** (above), professor of computer science, on receiving the **2013 Computer Science and Engineering Undergraduate Teaching Award** from the IEEE. He was selected for "outstanding teaching and mentoring of undergraduate students in award-winning engineering projects."

◆ **Dr. R. Michael Young**, professor of computer science, has been named a **2013 Distinguished Scientist by the Association for Computing Machinery (ACM)**. The program honors members who have made significant accomplishments or achieved significant impact on the computing field. Additionally, Young has been awarded **Senior Member** status of the **Association for the Advancement of Artificial Intelligence (AAAI)**. Senior member status recognizes AAAI members who have achieved significant accomplishments within the field of artificial intelligence.

◆ **Dr. Robert St. Amant**, associate professor of computer science, recently received the **2013 Outstanding Teacher of the Year Award from the College of Engineering**. He is being recognized by his peers and his students for his commitment to creative and innovative teaching and learning practices.

◆ **Dr. Douglas Reeves**, professor and former director of graduate programs in the Department of Computer Science, has been appointed **interim assistant dean for graduate programs in the NC State College of Engineering**. As part of his new role, Reeves will represent the College on graduate matters, including serving on the Graduate Studies Committee, the Administrative Board of the Graduate School and the Graduate Operations Council.

◆ Congratulations to **Dr. Injong Rhee**, professor of computer science, on having his co-authored paper ("On the Levy-Walk Nature of Human Mobility") selected to receive the **2013 IEEE Communications Society William R. Bennett Prize in the Field of Communications Networking**. The prize is given to the best paper published in any journal sponsored by the IEEE Communications Society in the previous three years.

◆ **Dr. James C. Lester** was recently named **Distinguished Professor in Computer Science** at NC State University. Lester leads multidisciplinary R&D projects on intelligent learning environments that integrate AI with commercial game technologies for K-12 science, literacy and computer science education, and serious games for training. He joined the computer science faculty in 1994, and is director of NC State's new Center for Educational Informatics.



◆ **Dr. Carla Savage** (above), professor of computer science, has been named **Secretary of the American Mathematical Society (AMS)**. Since the Society was formed in 1888, there have only been nine secretaries. Savage becomes the tenth. In addition to being named Secretary, Savage was invited to join the inaugural class of **Fellows of the American Mathematical Society**. The inaugural class of 1,119 Fellows represents over 600 institutions.

Triangle Universities Awarded \$3 Million Grant for Cybersecurity Research

U.S. Senator Kay Hagan announced in August that UNC-Chapel Hill, North Carolina State University and Duke University have received cybersecurity research awards totaling more than \$3 million from the National Science Foundation (NSF).

"As Chair of the Emerging Threats and Capabilities Subcommittee, I know that cybersecurity is one of the most pressing issues we should be focused on when it comes to national security in the digital age," said Hagan. "I'm pleased that these

three outstanding North Carolina universities will be working together to develop new solutions to bolster the security of our digital infrastructure."

This five-year award entitled, "Rethinking Security in the Era of Cloud Computing," was competitively awarded through the Foundation's merit-review process and will be supported by the NSF's Secure and Trustworthy Cyberspace (SaTC) program. The award supports collaborative, multi-university research and education activities

that will help protect the nation's vast, critical, digital infrastructure and enable a more secure information society.

Dr. Peng Ning, professor of Computer Science in the NC State Computer Science Department, is the principal investigator for NC State's portion of the project.



Engineering Online Ranked Fourth Nationally

The **computer science and computer networking programs** NC State's Engineering Online placed **fourth nationally** in the new *US News & World Report's* 2014 list of the **Best Online Graduate Computer Information Technology programs**.

Engineering Online at NC State has again been ranked among the **top 10 online engineering programs in the United States** by the *U.S. News & World Report*. Engineering Online was rated **ninth nationally** on the magazine's list of **Best Online Graduate Engineering Programs**, tied with Texas A&M University-Kingsville. NC State's program was also ranked in the top 10 in 2013 by the magazine.

In 2013, *U.S. News & World Report* ranked Engineering Online at NC State as the **nation's best online graduate engineering program for veterans and active-duty personnel**.

CREDITS: Photography & Graphics: Nate DeGraff, Becky Kirkland, Roger Winstead;
Stories & Content: Tammy Coates, Mick Kulikowski, Brent Lancaster, Matt Shipman, Jessica Wilson; **Layout/Design:** Tammy Coates

Contact Information

NC State University
Dept. of Computer Science
Campus Box 8206
Raleigh, NC 27695-8206
Phone: 919-515-2858
Fax: 919-513-1684
Web: www.csc.ncsu.edu

Primary Contact: Ken Tate,
Director of Development &
External Relations - tate@csc.ncsu.edu

Online Alumni Contact update available:
http://www.csc.ncsu.edu/alumni/alumni_update.php

North Carolina State University is committed to quality of educational opportunity and does not discriminate against applicants, students, or employees based on race, color, national origin, religion, sex, sexual orientation, age, or disability. NC State University commits itself to positive action to secure equal opportunity regardless of those characteristics.

Copyright © 2014
Department of Computer Science
NC State University
7,300 copies of this document were
printed at a cost of \$0.34 each.