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The debut of the data-driven degree
New data sciences major premieres this summer p.11
As we embark on a new year, I am happy to welcome new and returning students, faculty, and staff. The College of Information Sciences and Technology (IST) is a very special place, and I am excited for the year ahead. Our faculty are engaged in cutting-edge research, and their commitment to teaching and mentoring students is clear. Our staff are dedicated to the success of the faculty and students, making them one of the greatest resources within the college. As a result, our alumni and students go on to make a meaningful difference in our world through their research activities and their application of the insights gained through courses, internships, and co-curricular activities.

The College of IST has a firm foundation on which to build. The health of any organization is based upon the ability to define and pursue a clear vision, strategy, and culture. While still early in my tenure with the college, I would nevertheless like to share with you some thoughts on my vision for the college. There is no doubt the college’s academic programs prepare students for successful careers, but it is also clear we could do even more. I envision the college revisiting our current offerings to identify opportunities to make them even stronger while considering new programs building on emerging opportunities not addressed by our existing offerings. Many of these opportunities are likely to involve collaborations with other colleges as the importance of data and information technologies continues to increase in virtually every discipline.

In a similar way, I envision continued growth in the college’s research activities as we leverage the tremendous opportunities provided by the dramatic growth in the amount of data being produced as well as increased use of information technologies. The college’s research addresses critical topics ranging from security and privacy to data science, social computing, and human-centered design, to name just a few areas. Importantly, this research builds on the college’s foundation—people, information, and technology—an area that continues to grow in importance. We need to continue to invest in new opportunities that draw upon the college’s expertise while leveraging connections with researchers across campus.

In the coming months, I expect we will identify opportunities to expand both our academic offerings and research activities in ways that will build on the college’s success while expanding our impact into new areas. The College of IST is committed to excellence and to having an impact on the future as we prepare students to provide leadership and service within their local and global communities. I invite you to join us in this mission.

Andrew Sears, dean
The study of science
Dashun Wang receives Air Force grant to explore the future of science through big data

How does science work? What are the fundamental mechanisms underlying the scientific enterprise and to what degree can we understand and even predict science? Can we approach these questions from a data-driven perspective? These are questions Dashun Wang, assistant professor of Information Sciences and Technology. “We propose a pathway that no one else has considered.”

Grossklags and his colleague, Aron Laszka, a postdoctoral researcher at UC Berkeley, explain their approach in the article, “Should Cyber-Insurance Providers Invest in Software Security?” They presented the paper at the 20th European Symposium on Research in Computer Security, which was held in September in Vienna, Austria.

Their research was also awarded a special merit at the Science of Risk Prize by Lloyd’s, a specialist insurance market, to highlight its potentially great value to the insurance industry. The prize offers an opportunity for researchers to translate original work for a business audience. For insurers, the prize generates insights into some of the most challenging risk management problems they encounter. —Stephanie Koons
Let go my info: People are info-egoists when it comes to their privacy

People are much more concerned about sharing their own private information with third-party app developers than they are about revealing their friends’ data, according to Penn State researchers.

In a Penn State study, researchers measured the economic value of personal information that individuals place on their own and on other’s information. The participants valued data in their own social media profiles at $2.31 and their friends’ data at $1.56 when friends’ data was irrelevant to a third party app’s function. When friends’ data was necessary for app function, subjects valued their own data at $2.04 and their friends’ data at just 98 cents.

“The problem is becoming known as interdependent privacy,” said Jens Grossklags, Haile Family Early Career Assistant Professor of Information Sciences and Technology. “The privacy of individual consumers does not only depend on their own decisions, but is also affected by the actions of others.”

As mobile computing becomes more app-centered, the researchers suggest that interdependent privacy will likely affect mobile commerce as well.

“Mobile commerce becomes more and more significant and so what we are researching here is also relevant for data sharing and app adoption on mobile systems,” said Grossklags.

The study is not meant to suggest that all third-party developers will use the data they gather intentionally for negative reasons, according to the researchers.

“We are not proposing that third-party developers are by default unethical, but there are questions of whether one engages in a fair deal here,” said Grossklags. —Matt Swayne

Addressing healthcare challenges

IST professors awarded grant to study healthy living for the elderly

A boom in the elderly population—led by declining birth rates and increasing longevity—has led to significant healthcare challenges. To address this critical issue, John M. Carroll, Distinguished Professor at Penn State’s College of Information Sciences and Technology (IST), and Mary Beth Rosson, professor and associate dean for graduate and undergraduate studies of IST, have been awarded a grant of $663,090 by the National Science Foundation (NSF) and National Institutes of Health (NIH) interagency Smart and Connected Health program. The grant will fund studies on timebanking interactions to expand and extend opportunities for elderly people to live independent and productive lives in cooperation with their communities.

Timebanking is a model of person-to-person engagement in which people exchange services that are assessed not by market value, but by the time it takes to complete the tasks. Volunteers are matched with people and opportunities in need of their skills. The project analyzes the co-production of healthy living—reciprocal services that benefit both parties—such as when two people take a walk or play cards together.

The project builds upon two previous NSF grants on mobile and context aware timebanking infrastructures awarded to Penn State in collaboration with Carnegie Mellon University and the Palo Alto Research Center. Tina Yuan, formerly of Cornell University, and Benjamin Hanrahan, formerly of Xerox Research Center Europe, have also joined the project.

The research team has partnered with Aging in Place/Centre County and with The Village at Penn State to investigate different living arrangements among the elderly. Further partnerships are being developed with other local groups.

“Elderly people contribute significant social assets to many organizations, corporations, and local communities,” said Carroll. “Engaging in personally meaningful activity directly contributes to enjoying longer and healthier lives.” —Mae Sevick

Eld. Care
Does green signal ‘go’ for health app users?

IST researchers study how color can motivate behavior

Researchers at Penn State’s College of Information Sciences and Technology (IST) recently studied how color choice for exercise progress bars in health apps and devices influences users’ beliefs in their ability to reach their health-related goals. Their results suggest that color choice can be a motivator for app users—depending on how far they are from reaching their goals and how sincere they perceive the feedback to be.

The importance of color choice is all around us. Red often has an aggressive or negative connotation—think of stoplights, red ink, and danger signs. Green, on the other hand, is often associated with go—i.e. green traffic lights and signs in Western societies. The researchers discovered that varying color choices may impact users’ beliefs in their ability to accomplish future goals at different distances to their goals today.

According to Elizabeth Eikey, doctoral candidate at the College of IST, to promote confidence in achieving future goals, it may be best to frame the information more neutrally when users are farther from reaching their goal, for instance, with a black progress bar. When users are closer to reaching their goal, it may be best to frame the feedback positively, for example, with a green progress bar.

“This is the first step to understand how the design of progress bars in fitness apps impacts users,” said Eikey.

Eikey is the lead author of a paper that explores information presentation in health apps that was presented at the iConference 2015 in Newport Beach, Calif. The paper was co-written by Erika Poole, user experience research program lead at Healthwise, and Madhu Reddy, professor of communication studies at Northwestern University. —Stephanie Koons

IST grad student forges ties with South Korean university through NSF fellowship

Priya Anand, a doctoral candidate in Penn State’s College of Information Sciences and Technology (IST), had an opportunity last summer to travel to Seoul, South Korea, to participate in a collaborative research project between Penn State and Sungkyunkwan University (SKKU). In addition to gathering useful data for her research on cloud security and expanding her professional network, Anand was able to get a glimpse of Korean culture, particularly its role in an academic environment.

Anand was selected by the National Science Foundation (NSF) as one of 200 doctoral candidates across the nation to receive the 2015 East Asia and Pacific Summer Institutes for U.S. Graduate Students (EAPSI). NSF and selected foreign counterpart science and technology agencies sponsor international research institutes for U.S. graduate students in seven East Asia and Pacific locations at times set by the counterpart agencies between June and August each year.

Anand, who was selected as one of 25 candidates to attend different universities in Korea, said that EAPSI is the only NSF fellowship that gives funding ($15,000) directly to the students. Anand’s research project was “Cloud Security—Architectural Analysis Using Security Patterns,” which she worked on at SKKU.

In recent years, Anand said, cloud computing has been a fast growing paradigm for storing and sharing data. However, there are many shortcomings in security. For her project, Anand plans to identify a catalog of security patterns for the cloud-computing environment. All of her contributions in her prototype design would be formulated as new cloud security patterns. Anand’s NSF EAPSI award is funded in collaboration with the National Research Foundation of Korea (NRF). —Stephanie Koons
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Hosted by the College of IST
IST lab gives students opportunity to think from the ‘red cell’

Anticipating security threats, analyzing disaster response, and thinking critically about how to better evaluate and manage threats—these are all things that Penn State’s Red Cell Analytics Lab (RCAL) students do every day.

“I found the club my first year during the annual IST [Information Sciences and Technology] Connections Day,” recalls RCAL officer Mason Northrop. “The first meeting hooked me after hearing about all of the cool past and future projects.”

Housed in the College of IST but open to any active Penn State student, the RCAL student organization provides hands-on experience using structured analytics to examine real-world problems—from cyber threats to natural disaster response and everything in between.

The term “red cell” refers to teams of military personnel, often called “red cells,” that are trained specifically to test the effectiveness of American military tactics.

“The notion of the red cell,” explains Col. Jake Graham (ret.), professor of practice in IST and director of the lab, “is to study threats from an adversarial point of view.”

One way students have honed their analytical skills is to work with THON committees to evaluate and test their security plan.

Outside of the University, social media monitoring teams have looked at social sentiment related to major world events. This included work with the Pennsylvania State Police to monitor social media ahead of and during the Pope’s visit to Philadelphia last year.

Many students involved in RCAL get jobs working for government agencies like the CIA, FBI or NSA, and others go into the information technology security field. Still others work in security divisions in the financial sector; security and risk analysis student and RCAL Director Meghan Graham, for example, exercised her red cell skills in an internship at Ernst & Young.

“RCAL is a great talking point for recruiters,” says Samantha Small, RCAL communications officer, a senior pursuing a double major in security and risk analysis and music, with a minor in international studies. “I’ve spent many job interviews impressing recruiters with all that I have accomplished while still in college.” —Stephanie Koons

NGA Director Cardillo Visits IST’s Red Cell Analytics Lab

In October, National Geospatial-Intelligence Agency (NGA) Director Robert Cardillo and Chief of Staff Ed Mornston visited Penn State to renew two partnerships with the University and visited various locations around campus, including the Red Cell Analytics Lab (RCAL) at the College of Information Sciences and Technology (IST).

Cardillo and Mornston met with RCAL student analysts who shared multiple projects, including their work on a geospatial game created by the Red Cell board and their research on Malaysian Airlines flight 370, said Andrea Forster, RCAL member and senior in the College of IST.

“Director Cardillo’s visit was great for the lab and the University,” said Forster. “He seemed impressed and was able to give us constructive feedback for places we can explore more.”

In fact, Cardillo himself was impressed, saying “Ed and I were both, to be frank, blown away. These students are doing more innovative work than I was able to do in my first few years in the intelligence community.”

Cardillo said he values the chance to engage with students and hopes that, through campus visits and meeting with researchers around the University, he can help grow Penn State’s relationship with the NGA over time.

“Penn State is known for, on top of the foundational aspect of educating students, having a broad-based research program,” said Cardillo. “And then all around those things is the unbridled enthusiasm, a different way of thinking—and the Red Cell Lab is an excellent example of this. When you combine those three things, it’s a win-win-win.” —Jennifer Cifelli
Leadership conference opens doors for IST students

Opportunities for engaged scholarship outside of the classroom abound for students in the College of Information Sciences and Technology (IST). Recently, two members of the IST Diplomat Leadership Academy—Erin McGovern and Elizabeth Kohler—attended the Grace Hopper Celebration of Women in Computing conference in Houston thanks to scholarship funding.

The conference, an annual event that boasts the world’s largest gathering of women technologists, is presented by the Anita Borg Institute for Women in Technology in partnership with the Association for Computing Machinery (ACM). Women studying in the College of IST are encouraged to apply for scholarships to attend this prominent event, which this year featured keynote speakers including Hilary Mason, founder of Fast Forward Labs, and Sheryl Sandberg, COO of Facebook and author of the best-selling book, “Lean In.” McGovern, a junior studying security and risk analysis (SRA), said that Sandberg’s address to a crowd of thousands was inspirational and thought-provoking, as she encouraged those in attendance to be courageous enough to take on more technical roles in the workplace, despite challenges that might seem daunting.

“It was incredible to meet like-minded women who are interested in information security, as well as be able to gain networking opportunities,” said McGovern. “And along with interviews and meeting professionals from other companies, I was able to listen to a lot of great talks.”

In addition to making new friends, McGovern’s networking paid off in the form of securing a summer internship with a consulting firm that interviewed her at the conference. She said attending the conference has sharpened her intentions regarding her career goals, and she now hopes to travel and work as a consultant to broaden her skills.

“The lectures I heard and the inspiring group of 12,000 women in technology made me feel so happy that I chose a major in which our community is so supportive and encouraging,” said McGovern. “Everyone at the conference wanted each other to succeed and find our passion—I hope that other women from Penn State get to share this experience in the future.”

Kohler, a junior double majoring in IST and SRA from Lansdale, said that attending the conference changed her outlook on life. She plans to take what she learned about the gender gap and the need for diversity in technology careers and apply it to her future as a leader in the field. —Jennifer Cifelli
Adam Abbott, a senior at Penn State’s College of Information Sciences and Technology (IST), was recently feeling a little apprehensive. He was nervous that Nao, a 58-centimeter tall humanoid social robot, would falter during the brief dance that Abbott and his fellow students programmed it to perform for their final demonstration in IST 402: Human-Robot Interactions this past fall. Abbott’s group had programmed the robot to dance to Michael Jackson’s “Thriller” and to the Isley Brothers’ “Shout” for their presentation but had run into some problems during trial runs. Fortunately, during the demonstration, the dance went off without a hitch.

“I think it went better than expected,” Abbott said, adding that the most difficult parts were coordinating the robot’s side-stepping and arm movement. “Programming Nao is like narrating a story.”

Nao is an autonomous, programmable humanoid robot developed by Aldebaran Robotics, a French robotics company headquartered in Paris. The robot’s development began with the launch of Project Nao in 2004. Nao robots have been used for research and education purposes in numerous academic institutions worldwide. As of 2015, more than 5,000 Nao units are in use in more than 50 countries.

In the class, students learn how to design interactions with the robot using a visual programming interface. For the final, the students form teams that demonstrate the robot performing tasks such as carrying on a conversation, identifying predefined signs, picking up a ball, and recognizing a face. Some teams took creative liberties within these themes and programmed Nao to do such novel activities as lifting a barbell and performing dance routines.

“I was really thrilled with what the students were able to do,” Yen said. “Many of the teams went beyond my expectations.”

Kaley Chicoine, a student in the course, said that her team programmed Nao to “recognize a bunch of different faces at once” and call the team members by name. Nao has 26 different motors that move its joints in different ways, she said, and is aware of where its body is in relation to self. “We kind of focused the whole project around our dialogue,” she said, adding that they programmed the robot to perform a routine in response to their verbal commands.

While robots dancing and talking may be entertaining, Chicoine said that the skills learned in the class can be transferred to non-academic settings. As a social robot, Nao is being used to care for the elderly and teach math and other skills to autistic children.

 “[The autistic children] can connect better with the robot because it’s less overwhelming and intimidating for them than dealing with people,” Chicoine said.

While robots may be able to replace humans in some capacities, such as automated jobs and dangerous tasks like defusing bombs, Yen said current technology doesn’t support a futuristic, science fiction-type of self-awareness in machines. For example, robots cannot reason instinctively the way humans do.

“People learn common sense over time,” Yen said. “We don’t have technology like that at this point.”

By taking the Human-Robot Interactions course, the students are exposed to technology that will continue to have an impact on society. The underlying technology of Nao is related to artificial intelligence, which is driving innovations such as the Google self-driving car.

The class’s emphasis on human-robot interactions, according to Yen, fits in with the College of IST’s mission of leveraging the interplay of information, technology, and humans.

“We are using robots as a basis to think about the broader interactions between people and technology,” he said. —Stephanie Koons
In today’s information society, professionals who can make sense of big data are in high demand. The College of Information Sciences and Technology (IST) is meeting that need by introducing a new data sciences undergraduate degree program as part of an intercollege initiative with the School of Electrical Engineering and Computer Science in the College of Engineering and the Department of Statistics in the Eberly College of Science.

“We started having conversations at the University and in the corporate world about the need for students with data analysis skills,” said Mary Beth Rosson, associate dean for graduate and undergraduate studies at the College of IST. “The world needs these people more and more but there aren’t many undergraduate opportunities to study data sciences.”

Data science, according to Wikipedia, is an interdisciplinary field about processes and systems to extract knowledge or insights from data in various forms, either structured or unstructured. Data science employs techniques and theories drawn from many fields within the broad areas of mathematics, statistics, information science, and computer science, to name a few.

The Data Sciences major was approved by the Penn State Board of Trustees at the end of February and will go into effect in summer/fall 2016. With the new processes enabled by LionPath, students will be able to apply for the major as soon as they meet the entrance-to-major requirements, Rosson said.

According to Rosson, the Data Sciences major will draw upon the strengths of the three colleges that are collaborating in the program. IST faculty members who will teach in the program include John Yen, Lee Giles, James Wang, Jessie Li, David Reitter, and Anna Squicciarini. Rosson said that the College of IST is already getting courses developed and implemented into schedules.

While a data sciences degree is not specific to any particular industry, Rosson said, internships will prepare students for careers in areas such as health, medicine, and business. In addition to providing numerous opportunities for graduates of the program, the new major will also benefit companies who will now be able to hire data sciences specialists for entry-level positions when they previously would have had to hire M.S. or Ph.D.-level candidates to meet certain business needs.

“We are very excited to be taking a leading role at the University and nationwide, in collaboration with the Colleges of Engineering and Science, to provide the core skills and problem-solving approaches that will enable our data sciences graduates to compete for leading-edge analytics positions across many different industry sectors,” Rosson said.

—Stephanie Koons
Technology & Terrorism
How technology is changing the landscape of terrorist and anti-terrorism activity
by Stephanie Koons
On February 9, the White House announced the Cyber Security National Action Plan, a major initiative to fortify the government’s digital defenses and educate Americans about ways they can improve their own digital security. Improving national cyber defenses is a key component in combating terrorist organizations such as the Islamic State of Iraq and the Levant (ISIL), which are relying on increasingly sophisticated techniques to wreak havoc on the international community.

At Penn State’s College of Information Sciences and Technology (IST), several faculty members are engaged in research and teaching activities that seek to identify the ways in which terrorists use technology to advance their agendas and how counterterrorism experts and law enforcement agencies can stay one step ahead of the perpetrators.

“Tech-savvy terrorism networks such as ISIL pose a global threat to peace and stability,” said Andrew Sears, dean of the College of IST and interim chief information security officer (CISO) for Penn State. “At the College of IST, we are dedicated to providing students the knowledge and skills they need to combat these malevolent actors as well as contribute to international efforts to fight cyberterrorism.”

Pete Forster, associate dean for online and professional education and the academic program coordinator of the Homeland Security Master of Professional Studies program at the College of IST, is on the front lines in the battle against cyberterrorism. He is co-chairperson of the Combating Terrorism Working Group (CTWG), which is composed of a body of international experts devoted to addressing critical terrorism-related challenges and formulating recommendations for appropriate policy responses. The CTWG is part of The Partnership for Peace Consortium of Defense Academies and Security Studies Institutes—a voluntary association of institutes of higher learning in defense and security affairs.

According to Forster, terrorists have always sought to communicate their actions to each other and the public generally, but in recent years have adopted the Internet to employ a “little twist to manipulate people to take action.” Terrorists are engaged in an online grooming process that is similar to tactics used by child pornographers or human traffickers, he said, in which they identify vulnerabilities and establish relationships with individuals. After ensnaring recruits, terrorists often transfer their interactions to the dark web—World Wide Web content that exists on darknets, overlay networks that use the public Internet but require specific software, configurations, or authorization to access.

“Terrorist groups are using the Internet very effectively to get their message out,” Forster said. “Their mode of communication has moved to a new plane in the cyber world.”

Don Shemanski, a professor of practice in the Security and Risk Analysis (SRA) program at the College of IST, has a wealth of experience to draw from when analyzing current events. He served for 23 years as a diplomat with the United States Foreign Service then, prior to joining IST in 2008, he served as Counselor for Global Affairs at the U.S. Embassy in Berlin, where he directed the office responsible for policy issues such as counter-terrorism, nuclear nonproliferation, climate change and international judicial assistance.

From a terrorist’s perspective, Shemanski said, cyberterrorism is advantageous since it can be done remotely and costs less than conducting physical attacks. To carry out their operations in cyberspace, he added, terrorists employ tactics such as using
graphics to conceal their online messages and soliciting donations through PayPal. In addition, they often broadcast their messages via YouTube clips.

Gerry Santoro, a senior lecturer of IST who teaches in the SRA program, said that many of the techniques used by hackers and cybercriminals are increasingly being adopted by terrorists. In June 2015, the Federation of American Scientists (FAS) disclosed a Congressional Research Service (CRS) report that warns that hackers potentially affiliated with terrorist groups or rogue nations have the ability to insert harmful malware into the internal systems governing the U.S. grid, which increasingly are being hooked into the Internet.

“The Internet can be used to deliver cyberweapons,” Santoro said. “The fear is that these skills are making their way to terrorists.”

Shemanski and Santoro both said that they incorporate discussions on current events in their SRA classes. Shemanski conducts simulation exercises in his classes that require students to think strategically. Santoro said that every morning, he highlights news articles for students to read, adding that they “need to stay up to date on technology and the evolving law around security.”

In many instances, Forster said, terrorists have “taken advantage of laws to protect the privacy of innocents” to conduct nefarious activities on the Internet. Edward Snowden—a former National Security Agency (NSA) subcontractor who made headlines in 2013 when he leaked top secret information about NSA surveillance activities—brought the issue of privacy versus security to the forefront.

“How do we need to adapt our legal system to address these issues and what is the balance of privacy versus security that we wish to achieve?” Forster said.

One major hurdle that counterterrorism experts and law enforcement officers face, Forster said, is that the amount of “digital exhaust,” which refers to everything consumers do on a daily basis—clicks, tweets, searches, Facebook posts—makes filtering out suspicious online activities extremely challenging.

“There’s so much data, how do you find those things that are a threat to us?” he said.

To deal effectively with the dark side of the Internet, Forster said, the law enforcement community needs to develop a communication-based plan and deliver better education to the public on the dangers of cyberspace.

In the aftermath of the November 2015 Paris attacks that killed 130 people, news organizations such as The New York Times and NBC News reported that unnamed officials suggested that terrorists used encryption and communication platforms like Silent Circle, Telegram, and WhatsApp to plan their activities. Encryption is where data is rendered hard to read by an unauthorized party. Since encryption can be made extremely hard to break, many communication methods either use deliberately weaker encryption than possible, or have backdoors inserted to permit rapid decryption. According to Shemanski, dealing effectively with cyberterrorists requires a national initiative to secure cyberspace that includes “good, active intelligence about terrorist operations.”

In contrast, Forster believes that breaking encryption may be necessary to successfully combat cyberterrorism, saying that law enforcement officials should “look for a streamlined legal process that would allow for the breaking of encryption.”

“The ability to look at encrypted data is probably going to be helpful,” he said.

Santoro, on the other hand, isn’t convinced that governments breaking encryption is a sound strategy to combat cyberterrorism.

“Do you want to allow governments to have a backdoor to encryption?” he asked, rhetorically. “If you do, I guarantee criminals and terrorists will also have access to those backdoors.”

According to Shemanski, dealing effectively with cyberterrorists requires a national initiative to secure cyberspace that includes “good, active intelligence about terrorist operations” and beefing up cyber defenses (i.e. firewalls).

“Our reliance on technology is clearly not going to become less in the next five to 10 years,” Shemanski said. “There are so many lucrative targets [for terrorists] and that is only going to increase as time goes on.”
The Syrian Civil War has caused millions of citizens to flee their homeland, but many have persevered and are seeking to rebuild their lives within refugee camps. Carleen Maitland, an associate professor at the College of Information Sciences and Technology (IST), is collaborating with other researchers as part of an ongoing effort to study how residents and service providers in the Za’atari Syrian refugee camp in Jordan are appropriating technology into their daily lives.

“Jordan is an interesting place in that it has been welcoming of refugees, first from Iraq and now from Syria,” Maitland said.

Maitland, along with her graduate student advisee, Ying Xu, visited the Za’atari camp, Jordan’s largest facility for Syrian refugees, in January and February of 2015. The trip was part of a project funded by the National Science Foundation (NSF) to catalyze collaboration with Jordanian computer scientist Nijad al Najdawi, to enhance the use of information technology by refugees and their service providers. In this exploratory visit, they studied Internet and mobile phone use in the camp, which was founded in 2012 and now provides a temporary home to roughly 80,000 refugees.

During that visit, the research that Maitland, Xu, and their colleagues conducted was part of an initiative by the Office of the United Nations High Commissioner for Refugees (UNHCR) to collect data on wireless infrastructure and Internet use by refugees. The agency, which was established in 1950 by the UN General Assembly, is mandated to lead and coordinate international action to protect refugees and resolve refugee problems worldwide.

Maitland’s research in organizational informatics examines information technology use and data flows in and between humanitarian organizations. Her work has been carried out in the U.S., Europe, Africa, and the Middle East, while working with organizations such as the UN Conference on Trade and Development (UNCTAD), the UN Office for Coordination of Humanitarian Affairs (UN OCHA), Save the Children, and the U.S. State Department.

Through field measurements of

The researchers also found that mobile phone use is relatively high among the residents, with 86 percent of youth in their sample owning a mobile handset.
A point-of-sale terminal at one of the camp’s two grocery stores.

mobile and wireless network signals, together with their surveys, Maitland and her colleagues have conducted an in-depth investigation of the Za’atari camp’s Internet infrastructure. The camp has three mobile carriers, Maitland said, but the bandwidth and general connectivity vary significantly within the camp, which causes problems since people don’t want to live in areas where there is poor cellular coverage.

There is also a high level of interest in a wide variety of Internet-based services, particularly social media and news. The researchers also found that mobile phone use is relatively high among the residents, with 86 percent of youth in their sample owning a mobile handset and more than half using the Internet once or multiple times per day, and that men are more likely to own smartphones. These results will be presented at the upcoming Information and Communication Technologies for Development (ICTD) 2016 conference in June, in Ann Arbor, Michigan.

One of the central issues in the researchers’ study of technology use in the Za’atari camp, Maitland said, is determining how the existing infrastructure can accommodate refugees’ and service providers’ needs. The international community has not been keeping up with the Internet needs in the camps, she added. Facebook CEO Mark Zuckerberg made a statement in an address to the UN General Assembly in September about wanting to wire refugee camps, Maitland said, but the UNHCR doesn’t have the budget for the ongoing costs of cyber-cafés or mobile Internet access—the refugees, who are legally prohibited from formal employment, must pay mobile phone bills out of their own pockets.

Another ongoing area of investigation, Maitland said, is the power dynamic between the UNHCR and the Za’atari camp residents. As is often the case with refugee camps, UNHCR is put in the role of a “benevolent dictator,” she said, particularly in regard to the electronic voucher program in the camp, which controls where refugees purchase food.

In this system refugees are issued a debit card containing their monthly food allowance, which they are only able to use at two camp-sanctioned grocery stores. This food-purchasing system is being integrated with data collected as part of the registration process during which refugees are issued identity cards. For these cards, UNHCR collects iris scans of all refugees. Plans are in place to begin using this data to secure transactions at the grocery stores using an integrated point-of-sale and iris-scan authentication process. This will provide a level of security unknown to most U.S. consumers. However, it is unclear whether or not the camp’s residents are happy about this development.

“One’s a lot of open questions about how the system works and who benefits,” Maitland said, citing this as a reason that she and her team “are interested in studying and supporting community engagement.”

She elaborated that their goal is to use for using information in community engagement that, in turn, can foster better relations within the camp and facilitate more effective problem solving.

Maitland and Yu returned to the Za’atari camp in March 2016 to continue their research exploring the use of information technologies to foster community engagement. Since the refugees have no access to higher education or scholarships, the researchers are also investigating how the Internet can provide tertiary education.

—Stephanie Koons

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CROWDSOURCING MILITARIZED DISPUTES

Researchers help create technology to promote world peace
Understanding the nature of international conflicts is a key component in stabilizing tensions between nation states. Researchers at Penn State and the University of Texas at Dallas are creating technology to analyze large amounts of newswire articles to help scholars address issues of global importance.

“Our goal is to curate a database of news articles that detail militarized interstate disputes,” said David Reitter, an assistant professor at Penn State’s College of Information Sciences and Technology (IST).

Reitter, along with Glenn Palmer, a professor of political science at Penn State and Vito D’Orazio, an assistant professor in the School of Economic, Political and Policy Sciences at the University of Texas at Dallas, were recently awarded a National Science Foundation (NSF) grant of about $1 million to support their project, “Updating the Militarized Dispute Data Through Crowdsourcing.” The goal of the project is to create a digital catalog of militarized incidents between nation states across the world, covering a period of several years.

“This will help others understand where and why conflicts arise, what the trends are, and ultimately, how we can counteract militarized tensions,” Reitter said.

To build their database, he said, the researchers are using “software algorithms that learn something about the world through data.” The Correlates of War Project’s Militarized Dispute (MID) Data is the most prominent and heavily used collection in the study of international conflict, and is curated at Penn State by Glenn Palmer. The most recent version (MID4) was released in 2014 and covers the years 1816-2010.

Over the course of the MID project, Reitter said, experts coded the news documents—a costly and painstaking process. To address the problem, the researchers recently completed a pilot project to determine whether crowdsourcing techniques could be used to code the news stories. In the pilot, non-expert workers were paid small sums to read documents and to answer sets of questions, the answers to which were used to identify features of possible militarized incidents. The Penn State software combined and corrected the crowd workers’ answers. A systematic comparison of the crowdsourced responses with those of the MID4 Project’s experts revealed that the crowdsourced codings were completely accurate for many of the news reports.

“As a result, we are now able to automatically document militarized incidents in near-real-time and cost-effectively,” Reitter said.

Political science is a new area of focus for Reitter’s research group at IST, which studies cognitive processes involved in communicating and decision-making. However, the study of the human brain has inspired much recent progress in machine learning, and the group has recently explored techniques that learn from long-term streams of natural-language data such as decades of news stories. These techniques are fundamental to successful crowdsourcing. The project now examines natural-language processing and machine learning to produce the new database.

The project will provide updated data, which will eventually cover the period of 1816-2017. Because the MID data are so widely used by the scholarly community, Reitter said, the update will benefit researchers who are addressing a wide range of research questions, including the effects of regime type on conflict, the role of natural resource competition on militarized disputes, and the effects of power cycles, arms races, and alliances on the initiation and escalation of conflict. Extending these data into more recent years, Reitter said, will also allow scholars to address timely questions such as whether and how recent climate change has influenced international conflict.

“The expansion of the MID data through 2017, and the continual development of our efficient data collection system, ensure that researchers have the data they need to reach empirical conclusions in these important areas of social science research,” he said.—Stephanie Koons
One of the most compelling aspects of the role I’ve been privileged to hold over the past year and a half is to view Penn State truly as a community of communities. Our University family at large represents the pride, passion, and tradition of over a century and a half of achievement in American higher education. However, within the bounds of each of our campuses one finds communities of achievement in nearly every quality imaginable: achievement in scholarship, in research, in the arts, in philanthropy...the list goes on.

Within the College of Information Sciences and Technology (IST), we see those achievements manifest in the advances that our students, faculty, and alumni are making in everything from healthcare to diplomacy, even transforming the very model of education as we know it. Our students are learning to identify and defend against threats that were inconceivable a decade ago, and with initiatives like this year’s high school Propose-An-App Challenge, a whole new generation of technologists is being primed to create a future that will be unrecognizable to us, just as today’s world is to generations past.

And so, we look ahead to what the coming year will bring our College community and those closest to it: showcasing entrepreneurship and innovation during our fifth annual IST Startup Week; introducing new ideas and challenging pre-conceived notions during the annual IST-supported TEDxPSU conference; supporting our IST students and all Penn Staters fighting for a cure for pediatric cancer by dancing in the Penn State Dance Marathon; and introducing the newest members of your Penn State Alumni Association as the Class of 2016 completes their academic journey and prepares to make their mark on the world beyond these walls. My message to those graduates will be the same as it has been the last two years: take in the moment, look around, and then take that first step into the unknown, knowing that Penn Staters past and present stand beside and behind you as you carry forth the torch of achievement into whichever communities your degree will take you.

And yet, one can’t look forward without taking a glance behind as well. I made an unexpected trip to Happy Valley in January to pay tribute to a man who was a pillar of our IST and Penn State community for many years. David L. Hall was the third dean of our College, an accomplished researcher, a beloved professor, and a man I was blessed to consider a friend during the few years I knew him. The outpouring of love and support from all corners of the Penn State community for his wife, Beth, and their family was at times overwhelming. But more important than the words left in remembrance will be how Dave’s legacy is carried forward. He was remembered as “the people’s Dean.” Let’s all strive, as Dave did, to look to serve one another as members of our communities.

It’s been a privilege to serve this alumni community as your president; I’m grateful to the support I’ve received from Erin Pursel and Maureen Killian and their team in IST’s Development and Alumni Relations office, Bob Morgan and the entire IST Advisory Board, your IST Alumni Society Board of Directors past and present, and incoming president Kelsey Bailey. With their dedicated leadership and passion, I’m looking forward to what the future brings for our Society!

For the Glory,
Mark Poblete ’07
President
IST Alumni Society

Stay connected with the IST Alumni Society!

The IST Alumni Society is the official group within the Penn State Alumni Association for graduates of the College of Information Sciences and Technology.

Visit ist.psu.edu/alumni to become a member.
Maureen Kilian has been named director of development and alumni relations for Penn State’s College of Information Sciences and Technology (IST). Kilian, who served for eight years as director of major gifts for IST, accepted the position in December, bringing more than 20 years of technology and fundraising experience to her new role.

Kilian succeeds Joyce Matthews, now senior director of development for Penn State’s Eberly College of Science, who said Kilian is a significant asset to IST in such a leadership role.

“She not only has strong fundraising knowledge and skills, but also brings a diverse background from the technology field and a genuine passion for the unique role of IST,” Matthews said of Kilian. “She is well-respected by members of the dean’s advisory board and has long-standing relationships with IST’s most loyal donors. All of this will serve the college well as the University approaches an ambitious and impactful campaign.”

Kilian, who obtained a bachelor of science degree from Eberly, established her career working with technology businesses and small entrepreneurial organizations before joining IST’s Office of Development and Alumni Relations. She credits her success in development with the ability to understand what’s happening within the technology world and make it relatable to people at any level, to better connect them to IST and its mission.

Kilian is enthusiastic about the timing of her new position, as she takes a leadership role only months after the appointment of IST’s new dean, Andrew Sears. Her first order of business, she said, is to build a team that will work toward the dean’s goals and second to learn about IST’s new fundraising campaign.

“The timing for this change was really prescient because of the new dean, and because we’re embarking on a new campaign that will be built upon a new strategic plan,” said Kilian. “It’s really a blank slate for what we want to make our key goals for IST fundraising, based on what we bring to the table and what kind of initiatives we want to raise money for.

“In development, people are more responsive when you can articulate what the needs of the students and the college are, and how it helps to advance Penn State,” Kilian continued. “For us, it’s easy—IST is needed everywhere, and the fact that our students are educated in technology, business, and human aspects really makes them relevant anywhere.”

Maureen Kilian is uniquely qualified to spread awareness of IST through the Office of Development’s new mission. Whatever the future brings for IST, Kilian is well positioned and enthusiastic for that challenge. —Jennifer Cifelli
Since graduating from IST in 2006, Sean Cooney's unique career path has led him to some interesting places—including a luxury yacht. In honor of his accomplishments in the information technology field, he was presented the 2015 Penn State Outstanding IST Alumni Award.

“I am honored to have been selected for this award given how many successful IST alums there are in the workforce today,” Cooney said.

The award recognizes graduates who have reached exceptional levels of professional achievement, and is one of the highest honors bestowed by the College of IST.

Cooney began his career at BAE Systems in McLean, Virginia, as an associate systems engineer. Wanting more from his career, he set sail around the Caribbean and Europe with a well-known American business magnate and philanthropist aboard a 180-foot yacht. On board, he was responsible for the maintenance and security of three satellite systems, two navigation systems, six servers, 10 guest laptops, and all employee technology tools. After 18 months of working on the yacht, he was invited by the owner's family to join their firm as an IT specialist in their New York City office. Cooney’s duties at the firm include working with chief information officers (CIOs) of portfolio companies on large-scale projects.

“Many of the college’s graduates have leveraged their education and the experiences they gained here at Penn State to build noteworthy careers,” said Andrew Sears, dean of IST. “Sean is a wonderful example of an IST graduate who, through hard work, has found great success. We are honored to have him as an alumnus and look forward to watching his already thriving career blossom.”

Cooney, whose future goals include attaining a senior IT management position in a top-tier enterprise, said that he advises current IST students not to be afraid to take unexpected turns in their careers. After all, he never expected to work on a yacht, but that stint led to a high-profile position in a prestigious company.

“Do not be afraid to follow your passions and take the road less traveled,” he said.

—Stephanie Koons
Fortifying Freddie Mac

IST alum safeguards national mortgage lender’s security networks

The Federal Home Loan Mortgage Corporation (FHLMC), known as Freddie Mac, was chartered by Congress in 1970 with a mission to expand opportunities for homeownership and affordable rental housing. Since Freddie Mac provides a constant source of mortgage funding for the nation’s housing markets, ensuring the security of the company’s information is vitally important. Caroline McKenna, a 2012 graduate of the College of Information Sciences and Technology (IST), takes a leading role in safeguarding sensitive data as a cybersecurity analyst for Freddie Mac.

“Potentially, our entire network could be compromised,” said McKenna, who works at the company’s headquarters in McLean, Va. “If we didn’t recognize that there was a vulnerability out there, hackers could come from the outside and exploit our system.”

McKenna’s main role is to monitor network logs for different platforms, “making sure there is no suspicious activity that needs to be investigated further.” She also manages Freddie Mac’s vulnerability management process—when a new vulnerability is uncovered, she tries to determine whether it has the potential to undermine the company.

McKenna, who majored in security and risk analysis (SRA) at IST, began her employment with Freddie Mac shortly after graduation. She was originally hired as a business analyst for the company’s architecture services organization, but from the start she had her heart set on working in cybersecurity.

“When a position opened in cybersecurity, I was able to leverage the knowledge I learned as a business analyst,” she said.

The most challenging aspect of her job, McKenna said, is trying to stay current with the latest technology in order to keep increasingly sophisticated hackers at bay.

“Trying to figure out hackers’ next moves is the most challenging part of the job.”

The emphasis on teamwork and collaboration in the SRA curriculum, McKenna said, helped prepare her for the strong collaborative element in her current role.

“I don’t do anything without the help of my teammates,” she said. “That was the most helpful [aspect of IST classes]—the collaboration and analysis.”

In her free time, McKenna said that she likes to travel and enjoys the company of quite a few of her old classmates who have moved to the Washington, D.C. area to take cybersecurity jobs. She has also taken advantage of the volunteer opportunities that Freddie Mac offers, particularly helping build homes for Habitat for Humanity and assisting in inner city schools, and would like to do more in the future.

McKenna recently completed a master’s degree in technology management at Georgetown University and aspires to take on a management position in cybersecurity.

“Cybersecurity is an ever-changing field,” she said. “There’s always work to do.” —Stephanie Koons
The College of IST mourns the passing of one of our great leaders, David Hall, former dean and professor. We are so grateful for his years of service, vision, kindness, friendship, and witty sense of humor. He will be missed.
IST mourns the loss of David Hall, professor and former dean

David L. Hall, professor and former dean of the College of Information Sciences and Technology (IST), died on Dec. 26, 2015, in State College. He was 69.

A celebration of life service and reception was held at the Penn Stater Conference Center and Hotel on Saturday, Jan. 9.

Hall joined IST in 2001, where he served as associate dean for research and graduate programs. He was appointed dean of IST in January 2010, and concluded his deanship in July 2014. He remained an IST faculty member until his death.

Hall was founding director of Penn State’s Center for Network-Centric Cognition and Information Fusion (NC2IF), chartered as a Penn State research center in 2008. NC2IF focuses on large-scale problems that provide opportunities for collaboration and encourages interdisciplinary research in computing systems and computer users. The center hosts the Extreme Events Laboratory and the Red Cell Analytics Lab at IST, and has been funded by many sources including the Department of Defense, the Department of Homeland Security, and the Defense Threat Reduction Agency.

As dean, Hall was committed to the growth of online education and oversaw efforts to provide online options for all IST degree programs. Under his leadership, the college recruited a new chaired professor focused on big data and medical informatics, established IST’s annual Startup Week to encourage the next generation of innovators in technology, and joined the intercollege entrepreneurship minor. Hall was instrumental in establishing the Center for Enterprise Architecture, and was one of the initial drivers to create the Center for Online Innovation in Learning (COIL), in collaboration with the College of Education and Penn State World Campus.

Prior to joining IST, Hall served as associate director and senior scientist at Penn State’s Applied Research Laboratory (ARL), where he oversaw the 150-person Information and Network Systems Office.

Hall graduated from Prairie High School in Cedar Rapids, Iowa, before joining the U.S. Air Force. He received his bachelor’s degree in math and physics from the University of Iowa, and his master’s degree and doctorate in astronomy from Penn State.

He is survived by his wife, Beth, his two daughters, Sonya and Cristin, and four grandchildren, Aaron, Allison, and twins Jonah and Sabrina.
Words from the community, in remembrance of David Hall

“A great man. I wouldn’t have gotten my Ph.D. without him. I thanked him with tears in my eyes after I had defended, and he simply winked, patted me on the back, and said, ‘I bet on a good horse.’ That was him in a nutshell—witty, understated, powerful, connected, caring, kind, wise, all crowned with a golden heart.”
—C. Frank Igwe, 2008 IST doctoral alumnus; President, Moravia Health

“Much like the character Ray Romano in ‘Everybody Loves Raymond,’ at Penn State, everyone loves Dave Hall. He was as comfortable discussing sunsets in Key West as he was matters of information technology. Dave was always the brightest person in the room, yet completely unassuming. Those of us affiliated with the College of IST owe Dave an unpayable debt of gratitude. He was our dean, and when we needed him most, he made significant sacrifices for our program. We’re all better people for having known and worked with Dave. I will miss him dearly.”
—David Reese, chairman and chief executive officer, API Systems, Inc.; IST Advisory Board member

“I had the privilege of working with Dave for eight years. We worked well together from the very beginning. Dave had many gifts. One of his greatest gifts was that of gently pushing people (faculty, staff, students, friends) to be all that they could be. Dave was filled with love and kindness for all people. He adored his family and his dog, Molly. Dave was a wonderful storyteller. He was funny. We had so much fun working together. Dave was a great listener and problem solver. He was brilliant. More than all of these, though, Dave was one of my dearest friends. I consider him and his wife, Beth, to be part of my extended family. To lose anyone is hard. To lose a friend whom I have grown to love over the past eight years has been almost unbearable at times. I consider myself blessed to have known Dave. I will carry his memory with me always and will honor his life and our friendship by paying forward all that I have received from him.”
—Karen Brewster, IST executive assistant, Office of the Dean

“I could go to him with anything, any time, and he always had helpful advice to share. We had many great conversations, about everything from our shared love of dogs and whiskey to big-picture goals for the college and University. He was personally responsible for me moving into an administrative role, and working for him and with him was one of the most rewarding periods of my life.”
—Mary Beth Rosson, IST associate dean for graduate and undergraduate studies and professor

“Professor Hall encouraged me to keep working for myself when others were telling me to quit. You carry that kind of personal encouragement with you permanently and unforgettably. What a nice human being to have given so many people that gift; you just think about him and you instantly believe in yourself!”
—Joey Sommer, 2006 IST alumnus

“If you spent even a few minutes with Dave, you realized quickly that he had a brilliant mind—but it was coupled with a quiet modesty and a gentle manner that immediately put others at ease. He was a man of integrity who valued good ideas and creative thinking, and he demonstrated that by his example to his
colleagues and his students at IST. I often walked away from time with Dave and was struck later that—without noticing it at the time—I had learned something unexpected from him. He had a way of teaching without teaching, and it was a true gift. He was a gentleman in every sense of the word, and I was privileged to know him and work with him.”

—Joe Atkinson, U.S. Advisory Entertainment, Media & Communications Leader, PwC; IST Advisory Board member

Dave was my M.S. thesis adviser years ago and has remained a mentor and friend ever since. Throughout my career he has always been there to discuss new ideas and connect me to key people in data fusion; but most importantly, he just believed in me and always encouraged me to believe in myself. Dave always made time when I asked; but he also took an active interest and often reached out just to say ‘hi’ or ‘let’s get together and chat.’ I don’t think it was unique to me; Dave was just like that with people. He was truly a special person and will be missed by many.”

—Julia Erdley, research and development engineer at the Applied Research Laboratory, Penn State

“One memory of Dave sticks out in particular. In the first semester of my freshman year, I was studying in the IST Building with a group of friends when Dave walked over and asked how my classes were going. I introduced him to my friends, gave him a hug and didn’t think anything of it. To me, he was Dean Hall, the family friend I had known for years. To my friends, he was Dean Hall, THE dean of IST! As soon as he walked away my friends thought it was so cool that they met the dean and that he was so personable and interested in a bunch of freshmen. A few days later I had heard that Dave had told the same story, but in his version he thought that it was so cool that he had just met some new students. This memory has always made me smile. He will always be remembered by his kind heart and energetic glow that he brought to the halls of IST.”

—Victoria Bardusch, IST student

“Dave Hall was a modern Renaissance man effortlessly transitioning from data fusion to the latest movie to talking about enjoying his grand kids. Dave’s wisdom, humanity, and approachability made him a great mentor, colleague and friend. I will miss him and his standard, ‘Hey guy, how’s it going? Want to grab lunch?’”

—Pete Forster, IST associate dean for online and professional education; academic program coordinator, Homeland Security MPS

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—Donald A. Halie, IST Advisory Board member; Board director, North Carolina Capital Management Trust; Board director, Micro Electronics Center of North Carolina

“I worked with Dave when I was an ‘out-of-college engineer’ at HRB, then at ARL, and kept in touch when he went to IST. My heart aches with the loss of a great mentor, thesis co-adviser, project manager, boss and friend. Dave had a way of making his students and employees feel so special and empowering us. He made such a difference in so many of our lives—in our careers—but he also cared about us personally.”

—Kathy Smith McClintic, former colleague

“Dave Hall—scholar, gentleman, humble leader—it was a pleasure to work with Dave as he led IST to new heights. He made a huge difference in the college and was always a joy to interact with. He will be missed by his students, his college, Penn State and especially our Advisory Board.”

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