Service is also the motivation behind the C2PRISM program that partners doctoral student researchers with Newark high school teachers to bring the excitement of breakthrough science and technology into the classroom. Now in its fifth year under the direction of Bruce Bukiet, professor of mathematics, C2PRISM this year launched its Tech Envoy Program to bring presentations to students beyond the program partners.

Continuing Professional Education blended marketplace demand with cutting edge technology, launching certificate programs including in the hottest new applications — CloudMaster and CloudGuru, iPhone, iPad and Android app development, and Drupal. CPE also partnered with New Jersey G.I. Go in a program to help veterans returning from Afghanistan and Iraq to get the training they need to transition back into civilian jobs.

The opportunity to participate in research projects, particularly for undergraduates, is a distinguishing characteristic of education at NJIT. The Provost’s Summer Undergraduate Research Program offers undergraduates a comprehensive experience of research in the academic setting. A pilot group of 11 students successfully competed for the opportunity to design their own project and write a proposal explaining why the research is important. Students in the program took on such cutting-edge projects as medical devices, space weather, and privacy in cloud computing. Chemical engineering major and Honors scholar Elaine Gomez (above) worked on developing a system for using ammonia scrubbing to remove CO$_2$ from combustion or process exhaust gas. Robert Barat, professor of chemical engineering, is her advisor.

“Digital Everyware” is NJIT’s name for the ubiquitous computing that has changed everything about life in the 21st century, from the way we work and learn to the way we interact with each other. NJIT researchers are working to create the tools to help the digital world function and to evaluate the impact of new technologies on society. They represent virtually every discipline and study every conceivable application:

- Faculty and students at the School of Management have been using the school’s new Bloomberg Terminal to study up-to-the-minute financial data on nearly every market in the world. Assistant Professor of Management Michael Ehrlich has been looking at evidence of financial bubbles, while Assistant Professor Ron Sverdlow has been studying credit default swaps to determine market estimates of default probabilities. Assistant Professor Alan Yan has introduced the technology to his students, and more than 30 have become “Bloomberg Certified,” an important credential in the workforce.

- Sergei Adamovich, associate professor of biomedical engineering, leads a research team that is helping stroke patients regain use of their hands and arms through innovative robotic and virtual reality-based video game therapies. His team’s work was featured in 2011 in the Journal of the American Medical Association.

- NJIT’s ADVANCE Project, led by Nancy Steffen-Fluhr, associate professor of humanities, is pioneering the use of social network mapping to help female faculty advance in their careers. With funding from the National Science Foundation, the project is developing network mapping tools to help women researchers locate potential research collaborators.

- Mathematics Professor Eliza Michalopoulou uses mathematical modeling and signal processing to help the Navy detect submarines in coastal areas. With colleagues from the Scripps Institution of Oceanography, she developed new methods for localization of sound sources and estimation of properties of the ocean seabed. The study appeared in the IEEE Journal of Oceanic Engineering.

- Yeheskel Bar-Ness, distinguished professor of electrical and computer engineering and director of NJIT’s Center for Communications and Signal Processing, leads a research team that is developing the infrastructure to enable the next generation of wireless telecommunications. The group addresses such issues as privacy and security, interference and jamming, ever-heavier user traffic, and rapid transmission of data through wireless networks. He gained three new patents in 2010-2011.
Digital ‘Everyware’ in Teaching and Learning

Computing has long been an intrinsic part of the academic program at NJIT. This year, the School of Art + Design launched a unique fine arts program that blends the traditional study of the fine arts with the most advanced technologies, including computerized design software, fabrication labs and digital methodologies. Also new are master’s programs at the College of Computing Sciences in Cyber Security and Privacy, and in Web Systems. In addition, Continuing Professional Education offered certificate programs in some of the latest applications — CloudMaster and CloudGuru, iPhone, iPad and Android app development, and Drupal. Students also have the opportunity to learn through active participation in research:

- Julia Mayer, a doctoral candidate specializing in human-centered computing, works on innovative mobile social computing applications, such as iPhone and Android, and studies how they can better support social activity coordination. The goal is to develop applications that can make valuable recommendations about people and activities while protecting the user’s privacy. Her advisor is Quentin Jones, associate professor of information systems.

- Quentin Jones, associate professor of information systems, and doctoral student Richard Schuler, partnered with Sukeshini Grandhi of RWTH Aachen University to develop Telling Calls, a prototype application for cell phone users to provide and receive call-related information to help users decide whether to answer a call.

- NJIT is assisting healthcare providers to employ health information technology and facilitate use of an electronic health record by every person by the year 2014. With a grant of more than $23 million from the American Recovery and Reinvestment Act of 2009, the university created the New Jersey Health Information Technology Extension Center, directed by William O’Byrne to provide outreach, consultation and user support for the state’s primary care providers serving at-risk populations.
Digital ‘Everyware’
in Teaching and Learning

Doctoral student in computer science Tian Tian (below, left) focuses her research on ways to make the Web more usable. Working with James Geller, professor of computer science, she published two papers on Web searching – one proposing a method for well organized and visually separated search term completions using ontologies and a second presenting an approach of hits for a given set of query terms.

Web more usable. Working with James Geller, professor of computer science, she published two papers on Web searching – one proposing a method for well organized and visually separated search term completions using ontologies and a second presenting an approach of hits for a given set of query terms.

Daniel Boston, a graduate student in computer science, works with Associate Professor Cristian Borcea to design methods of finding communities from records of meetings between people over time. The goal is to find correct communities without directly asking members to declare their membership. Boston also partnered with PhD student Manoop Talasila to develop Mobi-Crops, a smartphone and social medial application to teach and enable farmers worldwide to communicate better, improving their efficiency for planning and producing crops. The application received an honorable mention in the Microsoft 2011 Imagine Cup.

Reza Curtmola, assistant professor of computer science (above, standing), with members of his research team, graduate student Bo Chen (center), and Dorman Honors scholar Julian Raymar, a recipient of the Provost’s Summer Research Award.

Bo Chen, a Digital Design student and Dorman Honors scholar Benjamin Gross won the Cover Design Competition for the 12th Annual VALE/ NJ ACRU/NJLA user’s conference. VALE is the Virtual Academic Library Environment. Gross’ digitally-generated design featured an image of gently undulation planes with repeating perturbations.

Integrity of data stored remotely at a cloud storage provider is the research focus of Reza Curtmola, assistant professor of computer science. He received a CAREER grant from the NSF to develop a practical remote data checking (RDC) framework to ensure long-term integrity and reliability for remotely stored data. His research team includes graduate student Bo Chen and Dorman Honors scholar Julian Raymar, a recipient of the Provost’s Summer Research Award.

Ali Akansu, professor of electrical engineering, has established NJIT’s Laboratory for High Performance Digital Signal Processing Research, a computer cluster with the power and speed to take on advanced computing problems. He and his team of graduate students Sambit Mishra, Yuewen Wang, Mustafa Torun, Boyan Zhang, Pritish Mishra, and Yanjia Sun use the lab to study data intensive discovery, high frequency trading algorithms and technology development. He and Mustafa co-authored a paper entitled “On Basic Price Model and Volatility in Multiple Frequencies,” presented at the IEEE Statistical Signal Processing Workshop in Nice, France. He also gave an invited plenary talk entitled “Electronic Trading: A Data Intensive Discovery” at the International Conference on Mathematical Finance and Economics in Istanbul, Turkey.

Nirwan Ansari, professor of electrical and computer engineering, directs the Advanced Networking Laboratory. He and his team of graduate students – Ehsan Haghan, Apoorv Ranjan Khare, Chun-Hao Lo, Chao Zhang, and Pitipatana Sakarindr – conduct research on various aspects of broadband networks, multimedia communications, information and network security, and computational intelligence. He was awarded six new patents in 2010-2011 for various improvements in wireless and networking technology, and he was the recipient of the Thomas Alva Edison Patent Award presented by the Research and Development Council of New Jersey. The team is currently investigating powering wireless access networks with renewable energy.

Distinguished Professor of Physics John Federici studies terahertz radiation – the far-infrared region of the electromagnetic spectrum – for applications in spectroscopy and imaging as well as wireless telecommunications. His team is currently studying the effects of atmospheric humidity, airborne particulates – such as rain, fog and smoke – and refractive index fluctuations (scintillations) on wireless THz communication links.
Digital data forensics and information assurance are the research goals of Yun-Qing Shi, professor of electrical and computer engineering, shown above left, with doctoral student Haifeng Xiao. In 2010-11, he gained eight new patents for inventions related to data hiding, watermarking and steganography. His work was recognized by the New Jersey Inventors Hall of Fame with an Innovator Award, and by the Research and Development Council of New Jersey with a Thomas Alva Edison Patent Award.

William Rapp (above right, top photo), professor of management and NJIT’s first Henry J. Leir Professor of International Trade and Business, directs the newly-established Leir Center for Financial Bubble Research. With funding from the Ridgefield Foundation, the center’s research team uses quantitative and qualitative research to study how a financial bubble can be identified, its stages of development, and what policies can best manage its impact. Assistant Professor of Management Michael Ehrlich is associate director.

Ali Abdi, associate professor of electrical and computer engineering (above right, bottom photo), researches several areas of digital communication – digital communication in underwater and terrestrial channels, estimation and characterization of wireless channels, blind modulation recognition, and molecular networks. Together with Shuangquan Wang, ’06, his former doctoral student, he received a patent for a new method of estimating the status of multiple-input multiple-output (MIMO) communication channels. The new technique enables accurate estimation of the unknown channel taps in multipath propagation environments to have a reliable MIMO communication link.