As New Jersey’s science and technology university, NJIT focuses its academic programs on science, technology, engineering and mathematics – the STEM disciplines, offering the broadest concentration of STEM majors and graduate specialties in New Jersey as well as an array of continuing professional education courses and pre-college enrichment programs. The university also offers a deep, rich STEM educational experience with learning options including research, internships, service learning and travel. NJIT nurtures innovation among students and faculty alike.
New Educational Approaches

Vincent Oria (below left), associate professor of computer science, is leading an NSF-funded project to integrate multimedia teaching materials for information security courses based on a security ontology. The semantic linking of multimedia course materials allows students to search and compose multimedia and interactive course materials, enabling flexible personalized learning and making course materials more accessible. Reza Curtmola (above right), associate professor, and James Geller (above center), professor, are co-principal investigators on the project.

With the demand for online programs growing rapidly, NJIT’s Division of Continuing Professional Education (CPE), led by Associate Vice President Gale Spak (left), launched an expanded partnership with EmbanetCompass to offer three additional online master’s degrees in fall 2013 – electrical engineering, MBA, and computer science, in addition to the master’s in civil engineering currently offered. The university plans to offer 10 or more online graduate degrees in high-demand STEM specialties.

Biophysics expanded its undergraduate offerings with a new course in Electric Biophysics focusing on electrical charges and their movements in living systems. Students carried out experiments on factors that change heart beats. (Above, standing from the left): Jency John, Ali Mustafa, Jennifer Jiang and Isla Katanani; (seated from the left): Noel Christian, Tanvir Bhullar, Karol Kalinowski, Philip Bartholomew and Stephanie Maruca. Associate Professor Camelia Prodan and Professor Gordon Thomas are co-directors of the biophysics program.

Regina Collins (above), doctoral student in information systems, is collaborating with Provost Fadi Deek (right) on a project to develop a hybrid framework that integrates learning theories and technologies that support individual learning with those that support communal knowledge building. Their paper, describing preliminary foundations for the hybrid framework, was presented at the International Conference on Information Systems.

Assistant Professor Brooks Atwood (right) built on the experiences of his students in the design, branding, marketing, fabrication and publication of an installation during the Mercedes-Benz Fashion Week in New York City in “An Open Approach for Teaching Innovation,” a paper presented at the Industrial Designers Association of America. Starting with the question “What Would Lady Gaga Do?” he encourages his students to think, to question and to challenge the very notion of both design and business in order to be a step ahead of their competition. He says that “thinking BIG” can both inspire and transform design education, generating results that tap into imagination, push boundaries, challenge existing norms and inspire unadulterated creativity with a real life direct connection to entrepreneurial business.
Honors College students are gaining recognition for their inventions through the Interdisciplinary Design Studio, a unique, multi-year experience in entrepreneurship in which students take their ideas of design to commercialization. The Painless Needle team, led by biology major Isaac Daudelin (above right), took first prize in the Capital One Bank Cross Campus Innovator Challenge competition. He and teammates Brian Taylor, Jeremy Jen, and William Heberling, each received $3,000 and a laptop computer. The AutisMind team (right, left to right) – Kamran Asif, Amira Esseghir, and Livia Kuruvilla – took first prize in the Campus CEO Challenge for their innovative products to stimulate the minds of children with autism.

Entrepreneurship courses taught by Assistant Professor Cesar Bandera (below center) in the School of Management are attracting students from throughout the university interested in forming their own startup companies. History major Lorretta Urban-Critchett (below left) opened Bubbles Laundromat in Clifton, NJ, just before Hurricane Sandy left the city without power for a week. Fortunately, her block retained power and she secured enough new clients to fund an expansion. Mechanical engineering student Thomas Clifton (below right) invented an articulated sun visor for the automobile aftermarket. He launched NJIT’s first Kickstarter crowdfunding campaign using prototypes created on a 3-D printer.

Biomedical engineering students Dung Le (above front) and George Ulsh (above back) were part of a team that developed a hemostatic wound dressing, Chit02-Clot, a cost-effective dressing that facilitates clot formation while providing oxygen to the wound. The invention took first place in TechQuest/Innovation Day and honorable mention for promising technological innovation in the 2013 BMEidea Competition. Maxwell McDermott and Jennifer Moy were also members of the team.
Promoting Faculty Entrepreneurship

Three faculty inventors received NSF Innovation Corps grants designed to foster commercialization of technology developed in NSF-funded research.

Michael Jaffe (above), research professor of biomedical engineering, received I-Corps support for his work with corn derivatives to replace potentially harmful chemicals in manufacturing. The isosorbide compounds he develops will replace polyethylene glycol in products for pharmaceuticals, personal care products, paints and inks, cosmetics and perfumes.

Quentin Jones (above), associate professor of information systems, received I-Corps funding to develop a new type of location-aware mobile-social application designed to provide a new approach to event creation, discovery, and management among groups. It provides user-location and social-activity aware information to users. By leveraging its end-to-end social mobile platform, users initiate activities and manage real-world attendance. Associate Professor of Finance Michael Ehrlich (right) is co-PI.

Ali Abdi (below), associate professor of electrical and computer engineering, received an I-Corps grant to further develop high-rate underwater communication via acoustic velocity channels. The research team believes that widespread use of the technology would positively impact the offshore oil and gas industry, the fishing industry, and environmental and ocean monitoring systems to predict natural disasters. Michael Ehrlich (below), associate professor of finance, is also co-PI on this project. The team received a commendation from the I-Corps instructors for their superb performance on the project.
Learning experiences at NJIT often involve partners around the world.

Led by Richard Garber, NJIT associate professor of architecture and Team New Jersey faculty leader, students of the College of Architecture and Design traveled to Datong, China, to collaborate with Harbin Institute of Technology in the 2013 Solar Decathlon China. Team members (above, left to right) Stephen Polledri, Javier Fuentes, Brandon Warshofcky, Johnathan Terrero, Matthew Breau and Leon des Lauriers arrived in Datong to welcoming banners.

Interior design major Nora Hamade (below left) and industrial design student Jeff Groves (below right), were selected for the second consecutive year to participate in the Autodesk Student Expert program in Chicago. The program trains and promotes the next generation of engineering, architecture, and design students from around the country. The goal is to find the best and brightest students and support them as they take leadership roles on campus.

(Above) One of the student designs for the NEXUS house, demonstrating a new approach to courtyard space.
Faculty and students from the College of Architecture and Design traveled to India during Winter Break 2013 to foster cultural exchange between NJIT and India, and to study the technologies of Abellon Clean Energy, an Ahmedabad-based company that sponsored the trip. The students are part of a group that will be designing a project for a site in India using Abellon technology. (Above), at New Delhi’s Jantar Mantar Observatory with a student host from Delhi School of Planning and Architecture (second from right): Adjunct Instructor Nidhip Mehta; Darius Sollohub; director of SOA; and architecture students Kevin McIlmail, Lizza Medina, and Rafael De Carvalho.

In addition to its 126 degree programs in STEM disciplines, NJIT offers an array of programs designed to attract, recruit and retain students from underrepresented groups to careers in science, technology, engineering and math.
The Center for Pre-College Programs serves some 3,000 elementary and secondary school students each year and offers training programs in STEM for K-12 teachers. The university hosts a variety of competitions for middle and high school students. And the Ronald E. McNair Post-Baccalaureate Achievement program helps students from underserved groups prepare for graduate studies.

McNair Scholar and chemical engineering major Carmen Webb (above) is developing a new batch reactor experiment for teaching chemical engineering. To determine the kinetics of a reaction composed of egg white powder and bleach, she developed an analytical method using light scattering to measure the concentration of egg white particles. She is one of 170 scholars from underrepresented groups who have enrolled in the McNair program since its initiation in 1999. Of that number, 114 have enrolled in post-baccalaureate degree programs, and 70 of these students have already completed graduate degrees. The McNair program emphasizes undergraduate research as a means of preparing students for doctoral study and careers in research or academe. Some 98 percent of the McNair Scholars have completed research or other scholarly activities, exceeding the national targeted goal of 85 percent.

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High school science teachers from throughout New Jersey attended NJIT’s third annual materials science camp (below) to learn better approaches for teaching materials science. The one-week program was a partnership among NJIT’s College of Science and Liberal Arts, the Metro NY/NJ Chapter of the American Society of Materials (ASM) and the ASM Education Foundation. Program organizers included Edgardo Farinas, chair of the Department of Chemistry and Environmental Science, and Roumiana Petrova, senior university lecturer.

The Society of Women Engineers (SWE) received a grant from ExxonMobil to support an outreach program, “Innovation through Imagination,” aimed at promoting the interest of pre-college women in the STEM disciplines through various fun and thought-provoking projects. Graduate student Priya Santhanam (above), president of SWE, works with middle school students to build a homemade flashlight.

Wells Fargo has awarded a grant of $50,000 to the NJIT Center for Pre-College Programs to further the bank’s commitment to improving the teaching of mathematics in New Jersey middle schools. The grant will support a new professional development program to help middle school math teachers adopt the new common core state standards for mathematics. (Above) Senior Vice President, Northeast Region, Wells Fargo Bank, Stephanie Tonic, a member of the NJIT Board of Overseers, presents the gift to NJIT Associate Vice President for Development Jacquie Rhodes.

Allen Luke (below), adjunct professor of civil engineering, works with Laura Eckman of Mendham High School to build a boomilever — a cantilevered wooden structure that can remain in its intended upright position — at the 2013 Science Olympiad held at NJIT.