

ABSTRACTS



PHOTO: JED MEDINA

On the podium with Governor Christie: NJIT President Joel S. Bloom, Secretary of Higher Education Rochelle Hendricks and NJIT Trustee Stephen P. DePalma '72.

A VISIT FROM THE GOVERNOR

New Jersey Governor Christopher J. Christie visited the NJIT campus on September 3 to spotlight the ongoing renovation of NJIT's Central King Building (formerly Newark's Central High) into a leading-edge center for education and research.

Funding for the project – \$86 million – was made available by passage last November of New Jersey's largest-ever bond issue to benefit higher education. NJIT President Joel S. Bloom and NJIT Trustee and alumnus Stephen P. DePalma spoke briefly before New Jersey Secretary of Higher Education Rochelle Hendricks introduced the governor.

Christie then highlighted his commitment to spending for higher education as one of the best ways to encourage New Jersey's high school students to study at colleges in the state and to build a

prosperous future for all. He cited the Central King renovation as the largest single project supported by funds from the Building Our Future Bond Act.

The historic building will serve NJIT and the community with much-needed space dedicated to the STEM disciplines – science, technology, engineering and mathematics. Christie emphasized that a workforce educated in these fields, especially as they pertain to the life sciences, is vital to the state's economic growth and security. ■

MORE RECOGNITION FOR NJIT VALUE

NJIT continues to be recognized for the value of its educational offerings in science, technology, engineering and mathematics. The 2013 PayScale college rankings for return on investment (ROI) placed NJIT sixth (top one percent) among 437 public universities and 27th (top two percent) among 1,511 public and private institutions in the United States. The new ranking marks steady improvement in this metric for the university. Last year, NJIT ranked ninth among public universities and 59th overall. PayScale also continues to single out NJIT as eighth in the nation among public universities for salary potential.



PHOTO COURTESY OF NASA

Results from related research on the space station promise to be important for key space technologies...

HEADING HIGHER

Professor Boris Khusid, Department of Chemical, Biological and Pharmaceutical Engineering, has already taken experiments to high places accompanied by NJIT graduate students and undergraduates. This summer, as well as in 2004, they conducted research during brief periods of weightlessness aboard a NASA jet flying a parabolic path that has earned the aircraft the nickname the “vomit comet.”

But Khusid’s research is heading even higher. One of eight projects in the nation to be funded by NASA’s Physical Science Research Program, experiments he has designed to study the behavior of complex

fluids and macromolecules in microgravity will be part of the science agenda on the International Space Station.

Khusid is an expert in the field of electro-hydrodynamics, or electro-fluid-dynamics, the study of the motion of ionized particles or molecules and their interactions with electric fields and surrounding fluid. Results from related research on the space station promise to be important for key space technologies ranging from electrolytic oxygen generators to liquid pumps and volumetric techniques for sampling liquids. ■

For more about microgravity research at NJIT, see “Research in High Places” in the spring 2004 issue at <http://magazine.njit.edu>. <http://chemicaleng.njit.edu>



PHOTO: FABIO OLMOS

Possibly at risk: the Rufous-backed Antvireo

EXTINCTION REASSESSED

Many species of birds inhabiting Brazil's Atlantic Forest may be at much greater risk of extinction than previously thought. That's what a team led by Associate Professor of Biological Sciences Gareth Russell concluded after studying forest-dependent bird populations in the region, where deforestation has been accelerating. They have determined that fragmentation of the birds' remaining forest habitat is an additional significant threat to species sustainability, not just the decrease in the total amount of forest coverage.

Out of 58 species in the area that have severely fragmented habitat, 28 are not currently considered to be endangered according to the latest list published by the International Union for the Conservation of Nature. Russell and his colleagues recommend that the classification of these species be reexamined. They also believe that their efforts can contribute to identifying a wide range of other at-risk species in many different regions of the planet. ■

<http://biology.njit.edu>



PHOTOS: JOHN SCHURING

TWO WINNING TEAMS

NJIT's Steel Bridge and Concrete Canoe Teams have continued their upward trajectory in both regional and national contests. For the first time, an NJIT team took top honors in a category at the National Steel Bridge Competition, held at the University of Washington in Seattle. In addition to placing 12th overall in the nation among 25 contenders, the team took first place in the stiffness category. This award is given for the bridge with the lowest deflection, which is the sag or stretch of a bridge under the weight of a load.

Earlier in the year, the team won the Metropolitan Regional Conference competition at the Polytechnic Institute of New York University, taking first place overall and placing first in the categories of economy, display, stiffness, efficiency and oral presentation. It was the eighth year in a row that NJIT won the metropolitan regional contest, organized by the American Society of Civil Engineers (ASCE).

Parsippany-based Acrow Corporation of America and Schiavone Construction Co. of Secaucus provided support as the team's Gold Corporate Partners.

In the spring, the Concrete Canoe Team took first place in the ASCE regional contest held once again at Cook's Pond in Denville. The win helped the team to secure a spot in the national competition at the University of Illinois-Champaign, where they placed 15th in the country in a field of 23. ■

<http://civil.njit.edu/>

AN INSPIRING OATH – AND A MYSTERY

"As an engineer, I have a deep, abiding respect and faith in the ideals of my chosen profession; I believe that membership in it entails the most solemn obligations." That's the opening of the "Engineer's Oath," administered at commencement to all graduating NCE students from 1920 to 1947.

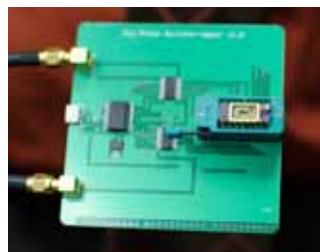
"What we think is unique is how we measure the electrical properties or patterns of cells and how those properties differ between cell types."

– Research Professor Reginald Farrow

DETECTING DISEASE IN A DROP

Known for his cutting-edge work with carbon nanotubes, Research Professor Reginald Farrow is overseeing development of a "lab-on-a-chip" that could detect disease using a minute sample of liquid, such as blood. Farrow, Alokik Kanwal, research assistant professor, and their team have created a carbon nanotube-based device that enables measurement of key electrical properties of cells in a tiny drop placed in the appropriate area of the device.

"Although we are not the only ones doing this kind of work, what we think is unique is how we measure the electrical properties or patterns of cells and how those properties differ between cell types," says Farrow, a member of the Physics Department and recipient of the 2012 NJIT Overseers Excellence in Research Prize.



The device utilizes standard complementary metal-oxide semiconductor (CMOS) technologies, allowing it to be easily scalable down to a few nanometers. Fabrication also involves Farrow's breakthrough method for bonding submicroscopic crystalline electrical connections to a specific loca-

tion on a substrate. It's a technique that opens the door to other significant advances, such as an artificial pancreas and nanoscale fuel cells with unparalleled energy density. ■

See "Making the World's Smallest Connections" in the Fall 2012 issue for more about Farrow's work, online at <http://magazine.njit.edu>.

<http://physics.njit.edu>

PHOTO: RICKY KHARAWALA



Albert Dorman '45, for whom NJIT's honors college is named and a member of the National Academy of Engineering (NAE), recently brought the tradition of the oath to the attention of the academy. Dorman contacted the NAE to widen the search for information about the oath's authorship and history after an unsuccessful check of archives at NJIT, with the same results reported by the NAE.

The full text of the oath is on page 77 of the summer 2013 issue of the NAE journal *The Bridge*, online at <http://www.nae.edu/Publications/Bridge.aspx>

Do you know more about the "Engineer's Oath"? If so, please contact the editor of *NJIT Magazine*. We'll be sure to share your information about words that are still meaningful in the 21st-century. ■

END NOTES

Balraj Subra Mani, university lecturer in the Department of Mechanical and Industrial Engineering, recently presented a paper co-authored with **Reggie Caudill**, professor and department chair, on reverse engineering at the Fifth Annual First Year Engineering Experience Conference in Pittsburgh. Reverse engineering is part of the curriculum for NJIT freshmen majoring in mechanical engineering. Courses in reverse engineering, which familiarize students with the role of a product design engineer from ideation to product release, have been adopted with successful outcomes at about thirty schools in the US. At the same conference, **Ashish Borgaonkar**, assistant dean of students for learning communities, chaired the session "Student Experiences: Living Learning Communities, Student Engagement, Identity and Leadership."

Michel Boufadel, professor in the Department of Civil and Environmental Engineering, is a co-author of a recent expert report on the effects of the disastrous 2010 oil spill in the Gulf of Mexico: *An Ecosystem Services Approach to Assessing the Impacts of the Deepwater Horizon Oil Spill in the Gulf of Mexico*. Published by the National Academy of Sciences, the report makes the case for why and how a more resilient ecosystem needs to be developed in the Gulf.

Zeynep Celik, distinguished professor of architecture, co-curated the exhibition *1001 Faces of Orientalism* at the Sakip Sabanci Museum in Istanbul, Turkey. The exhibition highlighted the far-reaching international influences of Orientalism in areas such as architecture, travel and fashion.

Atam Dhawan, distinguished professor of electrical and computer engineering and executive director for undergraduate research and innovation, is co-editor-in-chief of the *Journal of Translational Engineering in Health and Medicine* (JTEHM) recently launched by the IEEE Engineering in Medicine and Biology Society. The open-access journal was created to foster global conversation and interdisciplinary collaborations leading to the movement of biotechnological innovations from idea to clinical trials and ultimately to commercialization.

Mengchu Zhou, distinguished professor in the Department of Electrical and Computer Engineering, has been named a Fellow of the International Federation of Automatic Control for seminal contributions to the theory of Petri nets and their application in manufacturing, transportation and web services. The Thomson Reuters Web of Science® service has also ranked Zhou among the most frequently cited scholars in engineering.



PHOTO: COURTESY OF NORTHEAST PRECAST

FOR STRONGER STRUCTURES

NJIT's Concrete Industry Management Program and the New Jersey company Northeast Precast are partners in the introduction of a new precast flooring system as part of the ongoing effort to recover from Hurricane Sandy and lessen damage from future storms. The innovative flooring system, shown at a construction site in Sea Isle City, is significantly lighter and stronger than conventional systems. ■

<http://engineeringtech.njit.edu/academics/cim>

BROWNFIELD BASICS

NJIT joined environmental specialists from across the United States to share their expertise in managing brownfield projects at a national conference held in Atlanta. Colette Santasieri, director of strategic initiatives in the Department of Research and Development, and her assistant, environmental specialist Elizabeth Limbrick, outlined the Technical Assistance for Brownfields (TAB) Communities Program at NJIT. The program offers no-cost assistance to communities interested in assessing, cleaning up and redeveloping brownfield sites.

"We offer clients the opportunity to think things through with

professionals," says Santasieri, an urban planner and engineer. "We sit down and, in an easy-to-understand manner, walk them through the brownfields process, which for first-timers can be daunting."

Funded by a grant from the US Environmental Protection Agency, TAB services are available through NJIT as a regional provider for government departments, counties, municipalities, tribal nations and nonprofit organizations. The NJIT group is ready to serve clients throughout the Middle Atlantic and New England regions extending from Maine to West Virginia, as well as in Puerto Rico, the Virgin Islands and the District of Columbia. ■

<http://www.njit.edu/tab>

