



# THE GROVE SCHOOL OF ENGINEERING

12/13 ANNUAL REPORT

The Future is Engineered Here



# Mission

To be an institution of national preeminence among schools of engineering and computer science schools, recognized for the excellence of its research and instructional programs;

To provide readily accessible graduate and undergraduate education in a broad range of fields to a highly diverse student body, including traditionally under-represented minorities, women, working adults and immigrants;

To maintain and expand a program of fundamental and applied research in areas of national interest, particularly in technologies with relevance to New York City, its metropolitan area and New York State;

To provide public service and continuing professional education to our local community, New York City and State, the engineering and computer science professions, and society at large.

# Table of Contents

<b>From the Dean</b>	<b>1</b>
<b>Alumni Spotlight</b>	<b>3</b>
<b>Entrepreneurship</b>	<b>7</b>
<b>Student Facts</b>	<b>11</b>
<b>Exceptional Student Achievements</b>	<b>12</b>
<b>Undergraduate Student Profiles</b>	<b>17</b>
<b>Graduate Student Profiles</b>	<b>21</b>
<b>Outstanding Faculty</b>	<b>23</b>
<b>New Faculty</b>	<b>28</b>
<b>External Funding</b>	<b>33</b>
<b>Overview of Engineering at City College</b>	<b>41</b>
<b>Donors</b>	<b>43</b>
<b>Wall of Honor</b>	<b>44</b>
<b>Advisory Boards</b>	<b>45</b>
<b>Directory</b>	<b>Inside Back Cover</b>

## From the Dean



*Each year when I write this letter to the Grove School of Engineering community, it seems that the news I have to report is better and more exciting, because the school keeps getting stronger.*

*Education is, above all, about students, and 2012-2013 has been a banner year. Three members of the Class of '13 and five Grove School recent graduates have received the prestigious National Science Foundation Graduate Research Fellowship, which will support them as they pursue their graduate studies at some of the nation's finest universities. Alla Zamarayeva, Class of '14 of chemical engineering has been named a Goldwater Scholar, one of America's most prestigious awards for undergraduates majoring in math, science and engineering. And Jan Stepinski of Environmental Engineering was chosen as the CCNY Valedictorian. In terms of faculty, we congratulate Professor Zhigang Zhu on receiving the CCNY President's Award for Excellence in its inaugural year, and Professor Ilona Kretschmar on receiving the CCNY Mentoring Award in Architecture, Biomedical Education, Engineering, and Science. This is the second year in a row that the Mentoring Award has gone to a Grove School faculty member. We also commend Assistant Professor of Computer Science Nelly Fazio on her NSF CAREER award. Two of our most revered faculty members have added to their long list of honors. Distinguished Professor of Biomedical and Mechanical Engineering Emeritus, Dr. Sheldon Weinbaum, has been elected to the American Academy of Arts and Sciences, and Distinguished Professor of Mathematics and Computer Science Emeritus, Dr. Gilbert Baumslag, has been elected to the inaugural class of the Fellows of the American Mathematical Society.*

*Not only do our current faculty members go from strength to strength, we have also added a record ten new members, including three full professors. No matter where they are in their careers, they are eminently qualified and subscribe to the CCNY philosophy of excelling at both teaching and research.*

*The Grove School's surge in entrepreneurship continues. We owe this important new dimension to two remarkable alumni, Harvey Kaylie '60 EE and Irwin Zahn '48 ME. The Zahn Center for Entrepreneurship is up and running, providing us with our very own incubator, where students and faculty can work on developing, testing and marketing their ideas. Two prizes for excellence in entrepreneurship, the Zahn, in its first year, and the Kaylie, now in its third, have inspired our students towards remarkable innovation. CCNY students have also taken top honors in the CUNY-wide Third Entrepreneurial Concept Competition.*

*As always, we have cause to be proud of our alumni. John M. Dionisio '71 CE, a CCNY stalwart, was awarded the Townsend Harris Medal, and Miles Lewitt '73 CS received the Engineering School Alumni Career Achievement Award for his pioneering role in technology. Alumni support is crucial to our continued success, and I would like to thank Paul Slysh '49 ME, a ground-breaker in aircraft and aerospace engineering, for his \$1.5 million bequest. Such gifts are transformative.*

*As the Dean, it is with great satisfaction that I send this message of accomplishment to the Grove School community and beyond. As an alumnus, it is a pleasure to be able to say, in a paraphrase of the Townsend Harris medal citation, "In you, our alma mater, we have particular reason to rejoice."*

*Sincerely,*



*Dr. Joseph Barba, Dean*



The GesTherapy Team, Owais Naeem (L1), Luis Disla (L2), Tanjin Panna (L4), with Mr. Kaylie (L3), Dean Barba (R2), and BME Professor Bikson (R1).

# Alumni Spotlight

## A Townsend Harris Medal for John M. Dionisio '71 CE



The Townsend Harris Medal, which recognizes CCNY Alumni for outstanding postgraduate achievement in their chosen fields, is the latest in John M. Dionisio's string of CCNY honors. He holds the Milton Pikarsky Distinguished Leadership Award in Engineering, the Career Achievement Award of the CCNY Engineering Alumni Association, and the CCNY Presidential Award. A devoted alumnus, Mr. Dionisio serves on CCNY's 21st Century Foundation Board and the Grove School Department of Civil Engineering Advisory Committee.

Upon receiving the 2006 Engineering Alumni Association award, Mr. Dionisio said, "Whatever success I may have achieved is founded on the training and education that I received at CCNY." And, his achievements have been extraordinary. During over 40 years at AECOM Technology Corporation, where he was named president and CEO in 2005 and then chairman and CEO in 2010, Mr. Dionisio has become one of the most influential leaders in his profession. AECOM is an \$8.3 billion worldwide provider of professional-technical and management-support services to a broad range of markets, including transportation, facilities, environmental, energy, water, and government. It has 45,000 employees, including architects, engineers, designers, planners, scientists, and construction services personnel. Additionally, it operates in over 140 countries. AECOM is dedicated to delivering solutions that create, enhance, and sustain the world's built, natural, and social environments.

Under Mr. Dionisio's leadership, AECOM has tripled its revenue and doubled its workforce, while considerably expanding its service offerings and geographic reach. During 2007, Mr. Dionisio oversaw the company's initial public offering on the New York Stock Exchange, one of the largest engineering industry IPOs ever. Earlier, as President and CEO of the AECOM legacy operating company, DMJM Harris, Mr. Dionisio was involved in advancing such notable projects as New York's Second Avenue Subway, the Tren Urbano transit rail system in San Juan, Puerto Rico, and the new World Trade Center PATH Terminal in Lower Manhattan.

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In 2012, Mr. Dionisio was named chairman of the New York Building Congress. His many honors include the Lifetime Achievement Award of the American Society of Civil Engineers, of which he is a fellow. He holds an MS in civil engineering from Polytechnic Institute of New York, and he is a licensed professional engineer in four states.

In the words of the Townsend Harris Medal citation, "In you, John M. Dionisio, your Alma Mater has particular reason to rejoice."

# Dr. Leonard Kleinrock '57 EE and Dr. Robert Kahn '60 EE

## Two Fathers of the Internet Return to City College



Though City College cannot claim that the Internet was invented on its campus, two of its alumni were of paramount importance to its creation.

In the early 1960's Dr. Leonard Kleinrock, then an MIT doctoral student, developed the mathematical theory of packet networks, the technology underpinning the Internet. In September, 1969 the host computer in his UCLA laboratory became the Internet's first node, and a month later Dr. Kleinrock directed the transmission of the first message to pass over the Internet. Today, Dr. Kleinrock is Distinguished Professor of Computer Science at UCLA. In 2011, his historic laboratory, restored to its 1969 condition, was opened to the public as The Kleinrock Internet Heritage Site and Archive. Dr. Kleinrock received the National Medal of Science "For his fundamental contributions to the mathematical theory of modern data networks, and for the functional specification of packet switching, which is the foundation of Internet technology." When Dr. Kleinrock returned to City in March, he discussed his pivotal role in the creation of the Internet and also the impact of City College on his life and career. His moving and inspirational comments gave the students in the audience a vision of what they can achieve if they work hard and take advantage of all that CCNY has to offer.



Dr. Robert Kahn, who earned his PhD at Princeton in 1964, is the co-inventor of the TCP/IP protocols, the fundamental protocols at the basis of the Internet. He conceived the idea of open-architecture networking and coined the term National Information Infrastructure, later known as the Information Super Highway. During 13 years at DARPA (U.S. Defense Advanced Research Projects Agency), he originated the agency's Internet program. He is the founder and president of the Corporation for National Research Initiatives (CNRI), a non-profit which performs research in the public interest on strategic development of network-based information technologies.

Dr. Kahn and his TCP/IP collaborator, Dr. Vinton Cerf, were awarded the Presidential Medal Of Freedom in recognition that their work put them "at the forefront of a digital revolution that has transformed global commerce, communication, and entertainment." Last May, Dr. Kahn delivered the inaugural lecture in the Robert E. Kahn and Patrice Lyons Lecture Series, which he and his wife established at the Grove School along with the PhD Fellowship which also bears their names. In his talk, he discussed emerging futures of the Internet, in particular, The Digital Object Architecture Project on which he is currently focused.

The events were organized by CCNY's Center for Algorithms and Interactive Scientific Software (CAISS). While at City, Dr. Kleinrock and Dr. Kahn met with CAISS director Dr. Rosario Gennaro, the center's faculty, and its students to discuss the research being done at CAISS. "To have the constructive advice of two such luminaries was bracing for us all," says Dr. Gennaro. "It was also very validating. At CAISS what we do is theoretical in nature but motivated by real-world applications. Drs. Kleinrock and Kahn confirmed that the problems we are tackling are important and that solving them will be very valuable."

# Technology Pioneer Miles Lewitt '73 CS Receives the Engineering School Alumni Career Achievement Award

While still in high school, Miles Lewitt took college level computer science courses sponsored by the NSF at NYU and CCNY. He ultimately chose CCNY because its affordability made it possible for him to go to college and because it offered a computer science major, not a given in 1969, when computing was in its infancy. Mr. Lewitt graduated from the School of Engineering summa cum laude. Despite all of his later achievements, he is still proud that he received the highest score to that date on the killer final of Introductory Physics, the rigorous course taught on the basis of Sears and Zemansky's University Physics.

From CCNY, Mr. Lewitt went into Honeywell's Advanced Engineering Program (AEP), a three-year boot camp for future company leaders. Only fifteen people a year entered the program, and, for admission, they had to be first or second in their graduating class. "My CCNY training stood up very well," says Mr. Lewitt. "I never felt that I was at an educational disadvantage." At the same time, he earned his master's in Mathematics and Computer Science at Arizona State University.



Following AEP, there were more challenges and accomplishments. Honeywell had acquired Xerox Data Systems, and Mr. Lewitt served as the hardware architecture expert on the CP6 operating system, which made it possible to implement Xerox software on top of Honeywell hardware. Early on, he saw the potential of Silicon Valley. At that point in 1978, microprocessors (e.g. the 8086) had about a tenth of the performance of the available minicomputers (e.g. the PDP 11/60), but he wanted to be part of a future enabled by the projected rate of density increase for semiconductor technology. He joined Intel, where he found a mentor in fellow CCNY alumni, Andy Grove. During the next decade, Mr. Lewitt was one of three architects of the microprocessor which was the basis of the 386, 486 and Pentium, putting him on the cutting edge of technological innovation, where he would remain for the rest of his career. He also made the decision to go into management.

Over the following decades, Mr. Lewitt provided dynamic, transformative leadership to development groups for Intel, Cadre Technologies, ADP, and Intuit, a roster of companies which reads like a who's who of his industry. "I loved being an engineer. I always kept my technical skills current, and I was determined to be the type of manager an engineer would want, someone who, like Andy Grove, was passionate about teaching," he says. Mr. Lewitt's management philosophy was to attract and retain the best people by providing a great place to work with opportunities for growth. On his team, excellence was the only acceptable quality of work. He tasked himself with setting clear priorities and communicating them effectively, and he always encouraged innovation. "You need an environment that takes advantage of collective intelligence," he says. "Great people deliver great products, and enabling innovation by engineers produces good business returns." His philosophy worked. As a computer, semiconductor, software, and Internet pioneer, his leadership inspired stellar engineering performance, making him one of the most respected people in technology.

# Paul Slysh '49 ME

## The Inventor of the Isogrid Concept Makes a Major Gift to the Grove School



Throughout his career, Paul Slysh has been an innovator in a rapidly moving field. Equipped with his BME from City and master's degrees from Brooklyn Polytechnic Institute in mechanical and electrical engineering, he has pioneered advanced structures in the aircraft and aerospace industries from the 1950s to this day. Much of that work has had wide-ranging commercial applications.

Starting in 1960, Mr. Slysh spent 28 years as a design specialist at General Dynamics, in data systems and the Convair Division, which pioneered aircraft and rocket design. He spearheaded groundbreaking projects, many at the core of the nation's space program, and was awarded 18 patents. One of those projects stands out because it made so many other innovations possible. Mr. Slysh was the principal internal research and development investigator on isogrid, a "super-light panel based on triangular reinforcement elements." The isogrid panel was conceived as "a one-piece structure in which a network of load-bearing ribs and a protective skin are whittled out of a solid aluminum plate." It was designed for "greatest possible strength with least possible weight," and as such was essential to the dramatic developments in aircraft and aerospace engineering which took place in the second half of the twentieth century.

In 1977, while still at General Dynamics, Mr. Slysh founded his own engineering consulting company, PS Associates, Inc. The company has provided design support to an impressive roster of clients including Boeing, Martin Marietta and Fermilab.

Mr. Slysh considers the software ISOGRID-SST™ (Shell Structures Tools) to be his crowning achievement. It enables rapid, reliable and comprehensive shell structures and isogrid design, by integrating CAE/CAD/CAM and concurrent engineering functionality in structures synthesis, analysis and optimization. "SST creates design definition based on requirements with precision, accuracy and fidelity," he says. Among its many unique features is SUPERTRACE™, a function which defines and validates all SST analysis methodologies and margin values.

Now, Mr. Slysh has made a gift of the ISOGRID-SST™ software and license to the Grove School. He hopes that Grove School students will use this remarkable tool to advance their training in structural design and develop their own ground-breaking ideas. The software could also serve as a source of income for the School. In addition, Mr. Slysh has made a \$1.5 million bequest to support the use of the software at the Grove School and provide scholarships for students.



# Entrepreneurship - The Surge Continues

## Irwin Zahn '48 ME Fueling Entrepreneurship at CCNY with Moxie

Irwin Zahn's story is the American Dream writ large. It began in New York with two of this country's legendary portals to opportunity, Stuyvesant High School and City College. Armed with his degree in mechanical engineering, Mr. Zahn went to work in a garment district company called General Staple. In 1954, he bought the one-man operation, and as a jack-of-all trades, he learned lessons about business, which he paired with his remarkable ability to identify needs for products, devise solutions and anticipate trends in engineering. As he is fond of saying, "Opportunities disguised as problems are everywhere. Take a chance and solve the problem." Over the next 57 years, adding new products and locations in every decade and rapidly adapting to new technologies, he transformed tiny General Staple into Autosplice, Inc., a custom electronic interconnect solutions provider, operating in the global industrial, consumer, transportation, medical, automotive, and telecom markets, with facilities in the US and around the world.

Mr. Zahn sold Autosplice in 2011. He then generously funded the Moxie Foundation, which he founded in 1998 to address pressing issues in the areas of education, entrepreneurship, and health, and to which he now devotes all his energy. "Moxie," which Webster's dictionary defines as "courage, pluck and perseverance," perfectly describes Mr. Zahn's attitude towards business and towards life. It is the quality which he and his foundation wish to cultivate in young engineering entrepreneurs. "There are so many creative people, who, if just given the opportunity and a little guidance, will change the world," he says.

In 2012, the Zahn Center for Entrepreneurship opened in the Grove School. It is a startup incubator, available to students, faculty and alumni entrepreneurs, for the purpose of developing concepts and collaborating to build new ventures that make physical products. It also provides instruction, mentoring and assistance with prototype development. It is supported by a \$1 million gift from the Moxie Foundation, a \$440,000 grant from the Office of Manhattan Borough President Scott Stringer, and CCNY. The Center is the third incubator Mr. Zahn has founded. It was preceded by the Zahn Center for Technological Innovation at San Diego State University and the Moxie Center at University of California San Diego. Mr. Zahn makes his home in San Diego, where Autosplice is headquartered.



**"There are so many creative people, who, if just given the opportunity and a little guidance, will change the world."**

**Irwin Zahn**

**Dr. Haytham Elhawary, Zahn Prize winners Will Senisi, Jeremy Neiman and Greg Knoll, Mr. Irwin Zahn and Dean Joe Barba**

# CCNY's Zahn Center at Year One: A Dynamic Director and the First Zahn Prize for Excellence in Entrepreneurship



The Zahn Center's executive director, Dr. Haytham Elhawary, is an engineer and an entrepreneur. He has done research in medical robotics as a post-doc at Harvard Medical School and a senior scientist at Philips Electronics. He co-founded a start-up venture to commercialize a novel organ transplant technology, and he performed due diligence on deals for a medtech investment firm. "My two great passions are technology and entrepreneurship," he says. "I'm working to establish the Zahn Center as the place where New York City's hardware community comes together to build the next big innovation." An integral member of that community, Dr. Elhawary founded the NY Hardware Start-Up meetup, which he explains, "brings together folks eager to build businesses with physical products." He is program director of the NY chapter of the Startup Leadership Program, a non-profit organization dedicated to grooming the next generation of startup CEOs, through a curriculum heavily based on the input of successful entrepreneurs. And, he serves on the board of the Business Incubator Association of New York State (BIA/NYS). Dr. Elhawary holds a PhD in Mechanical/Biomedical Engineering from Imperial College London and a degree in Mechanical Engineering from the University of Navarra in Spain.

At the Zahn Center, Dr. Elhawary is developing a program, with a focus on hardware startups, which covers prototype development, product design and manufacturing and also provides aspiring entrepreneurs with the mentorship, business skills, and community connections which they need to make their products a marketable reality.

Dr. Elhawary oversees the Zahn Prize for Excellence in Entrepreneurship, a CCNY student competition, which has a different theme each year. The inaugural theme was "Internet of Things" or IoT, a term which defines smart interconnected devices that can enhance user experience. The challenge was for teams of CCNY students to devise new uses for everyday objects, using Internet connectivity. "I was impressed with not just the ingenuity of the projects but with the breadth of the technology involved," says Irwin Zahn.

Four finalist teams were given eight weeks to design their engineering devices and produce prototypes. "Deadbeat Drums," consisting of computer engineer Greg Knoll, computer scientist Jeremy Neiman, and electrical engineer Will Senisi, was chosen as the winner. The three Grove School seniors designed an electronic system to teach drumming, based on a low cost drum kit connected to an online progress-tracking and analysis tool. Expected to retail for \$100, it provides an inexpensive alternative to private drumming lessons and has a well-defined niche market. The team received \$20,000 to develop their product, access to the Zahn Center's technology incubator space, and assistance in launching their product on a crowdfunding site such as Kickstarter.

The other finalists were:

**Blue Canary**, an inexpensive electronic device-tagging platform to help people find their lost items and offer rewards to those who help them. Team members: Sammy Kupfer, Edwin Mak and Dawi Shen of biomedical engineering; Irving Derin, computer engineering; and Crae Sosa, chemical engineering.

**SensingWater**, a device that promotes water conservation by measuring usage at the faucet and reporting the cost to a website. Team members: Mohammed Islam and James Fallon of electrical engineering; Arafat Chowdhury, chemical engineering; and Shamim Ahmed, biology and chemistry.

**Style Me Mirror**, a smart mirror with embedded electronics to keep an inventory of the user's clothing online and make visual outfit suggestions based on the weather forecast and fashion trends. Team members: Amal Afroz Alam, Vaishali Patel, Ayman Khan, Rakshya Bista and Kamran Nazim, all of biomedical engineering.

For further information go to [www.zahncenternyc.com/](http://www.zahncenternyc.com/)

# Dr. Marom Bikson Assumes the Director of the Kaylie Prize for Entrepreneurship



**“Our goal is to establish the Kaylie Prize as the most prestigious and effective entrepreneurial prize for undergraduates in New York City.”**

**Marom Bikson**

to designated mentors, the competing teams have access to media specialists, who assist with presentation skills, and workshops conducted by experts in regulatory issues and sales. These activities, held in the Zahn Center, are open to all students and faculty so that, as Dr. Bikson explains, the Kaylie prize benefits the entire CCNY community, not just the winning team. “The Zahn Center,” he says “offers resources and advice on other ways to fund projects and is a spring-board like no other in NYC to launch companies.”

This year’s winner was NextQ, made up of Mohammod Arafat, Joenard Camarista and Bhaskar Paneri of biomedical engineering, Waqas Iqbal of electrical engineering, and Kunal Paneri of computer science. They devised virtual queuing software with a novel feature. It allows users to check into a line virtually, telling them their estimated waiting time and notifying them as their turn approaches. In addition, when the user checks in, the software asks questions related to the purpose of the line (e.g., speaking to the DMV or the bursar’s office). On the basis of the answers, when possible, it guides the user towards speedier on-line ways of solving the problem, ideally allowing the user to leave the line. Hence the team’s tag line, “The Best Way to Beat the Line is to Walk Away.” Mr. Kaylie said of the team, “They are addressing a problem we all have, and that’s the best way to be successful in business.”

The Dean’s Prize went to **GesTherapy** for software that uses motion sensing technologies to enable patients to practice physical therapy or rehabilitation at home, while providing feedback to the patient’s therapist. Team members: Luis Disla, Shaofeng Liu and Owais Naeem, computer engineering, and Tanjin Panna, biomedical engineering; mentor: Professor of Computer Engineering Zhigang Zhu.

The other Kaylie finalists were:

**UnPrint:** A printer which can print and un-print through laser ablation techniques, which leave the page clean and undamaged. It provides a faster, greener, and more cost effective alternative to paper recycling. Team members: Amy Leidner, Farjana Miah and Surya Sanjiv, mechanical engineering, and Sammy Kupfer, biomedical engineering; mentor: James Scholtz, MS ’11, a development engineer at Chromation and a 2011 Kaylie Prize winner.

**The Plateau Mouse Surgical Platform:** An ergonomically designed platform for surgery on mice used in research. Team members: Dinely Colon, Dionne Dawkins, Nigel Gebodh, Mohammad Hasan and Rinosha Majeed, biomedical engineering; mentor: Dr. Prasad Adusumilli, Memorial Sloan-Kettering.

“Our goal is to establish the Kaylie Prize as the most prestigious and effective entrepreneurial prize for undergraduates in New York City,” says Dr. Marom Bikson, Catell Associate Professor of Biomedical Engineering at the Grove School. And, the prize is well on its way. It was established three years ago by a \$3 million gift to GSOE from Harvey Kaylie EE ’60, president and founder of Mini-Circuits, a Brooklyn-based RF and microwave electronic components design, manufacture, and distribution company. Originally, the winning team took away \$20,000 towards commercializing its product. Mr. Kaylie was so impressed by the submissions that, in the second year, he upped the value of the prize to \$60,000, including mentorship support. The competition also awards every finalist free incubator space at the Zahn Center with access to production and rapid-prototyping facilities.

Dr. Bikson is himself an entrepreneur. In addition to working with dozens of technology companies, he founded two medical device start-ups including Soterix Medical, which has pioneered a “cap with electrodes” that delivers low-intensity therapeutic electricity to the brain to treat neuropsychiatric disorders ranging from depression, to pain, to epilepsy. Dr. Bikson describes the device, now in trials at over 40 hospitals including Harvard Medical School, as “a crash kit for the brain.”

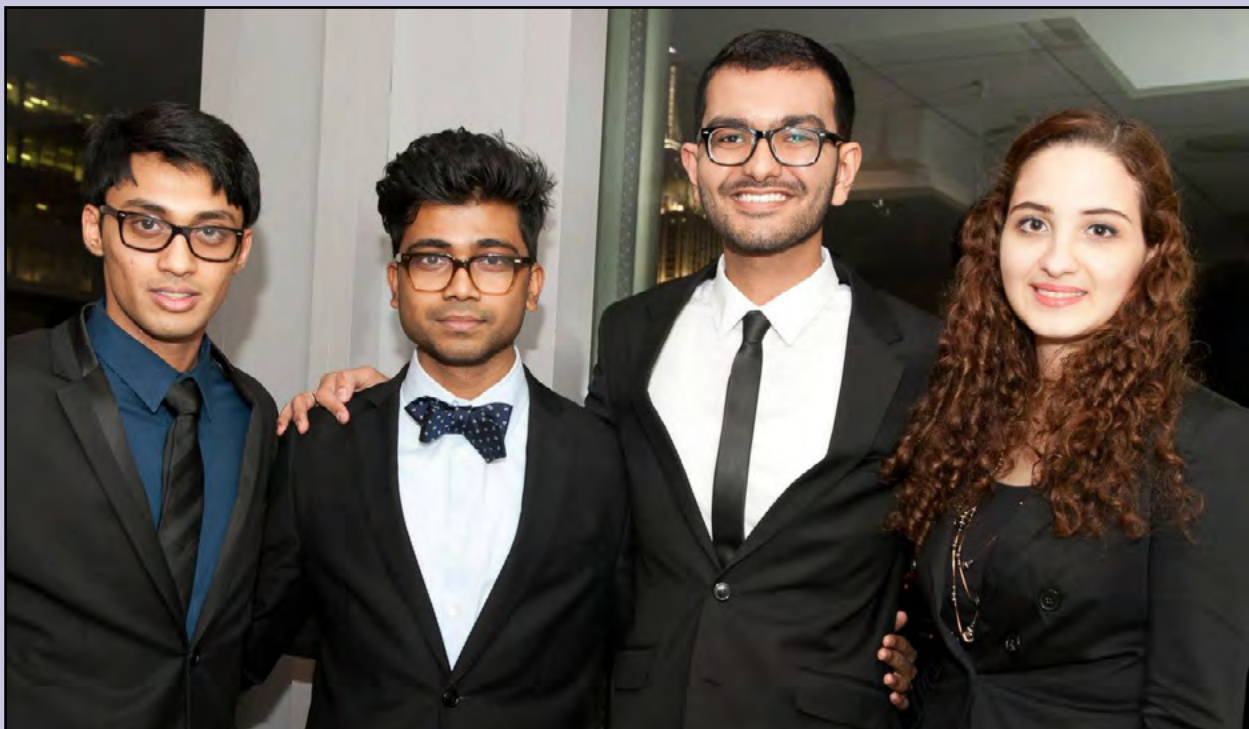
“The Kaylie competition,” says Dr. Bikson “has been crucial in encouraging Grove School students and faculty to launch companies and in promoting entrepreneurial skills.” In addition

## CCNY Team Aces CUNY Third Entrepreneurial Concept Competition (ECC)

Three CCNY undergraduates took first prize in the 2012 CUNY Annual Entrepreneurial Concept Competition (ECC) for their biomass and coal gasification project. Nishith Mamtora, an environmental engineering major with an economics minor, Ashfaqr Mahdy of economics and Abhinav Chintakunta of biomedical engineering bested 57 teams from across CUNY, some including graduate students. The project earned them the honor of participating in the International Impact Investing Challenge (I3C), held at the World Bank in Washington, DC, for which they were joined by Amali Nassereddine and Yunhai Zhang, both of economics. I3C is usually limited to prestigious graduate schools of business, and the CCNY students were the first undergraduates invited to compete.

The project, explains team leader Nishith Mamtora, entails converting biomass, in the form of wood and agricultural waste, to electricity through gasification while the debris from that process turns to charcoal. It was devised to meet the needs of small-scale factories in India for low cost electricity and of rural villagers for cooking charcoal. The charcoal can also be turned into activated carbon, which is widely used in gas filtration and for medical purposes. The concept, which Nishith intends to implement in the Indian state of Gujarat, could ultimately benefit millions of people across the Third World.

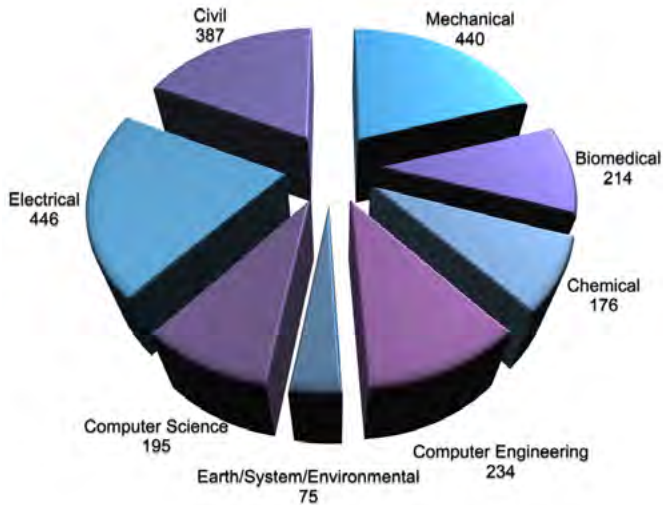
Originally a chemistry major, Nishith switched to environmental engineering because he felt that it would give him greater scope to improve society. "Renewable energy," he says, "is critical for our future as a planet and as a human race." Under the mentorship of Drs. Ian Howe and Punit Arora of the Economics Department, Nishith is in the process of registering his own power company and of securing funding. He hopes to set the project in motion by the end of 2014. Because of its green nature, the project is eligible for carbon credits from the Indian government, as well 10 years of tax cuts and subsidies.



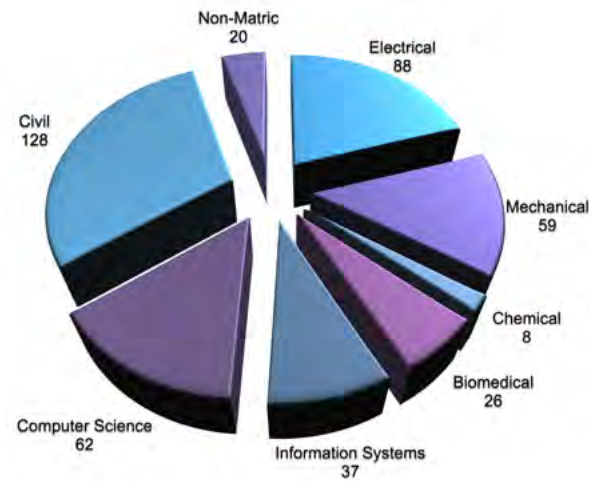
At the I3C Competition: Abhinav Chintakunta, Ashfaqr Mahdy, Nishith Mamtora, and Amali Nassereddine.

# Student Facts

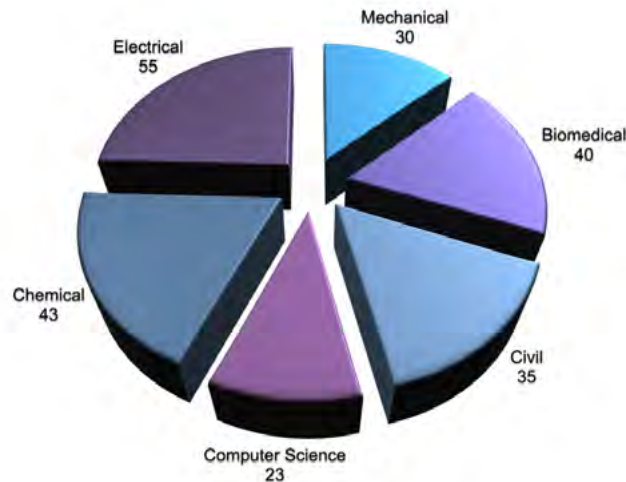
**Undergraduate Enrollment Fall 2012**  
Total: 2167



**Master's Enrollment Fall 2012**  
Total: 428



**Doctoral Enrollment Fall 2012**  
Total: 226



Degrees Granted 2012-2013		
Bachelor's	Master's	Doctoral
296	156	29

Tuition and Fee Schedule, Fall 2012			
Undergraduate	Full-time	New York City & State Residents	Out-of-State Residents *
	Part-time	\$ 2715 per semester	\$ 485 per credit
Master's	Full-time	\$ 230 per credit	\$ 485 per credit
	Part-time	\$ 5090 per semester	\$ 750 per credit
Doctoral	Level 1 Full-time	\$ 430 per credit	\$ 750 per credit
	Level 1 Part-time	\$ 3885 per semester	\$ 755 per credit
	Level 2 all students	\$ 440 per credit	\$ 755 per credit
	Level 3 all students	\$ 2435 per semester	\$ 5410 per semester
		\$ 965 per semester	\$ 1925 per semester

\* Includes international students who have lived in New York State for less than one year

# Exceptional Student Achievements

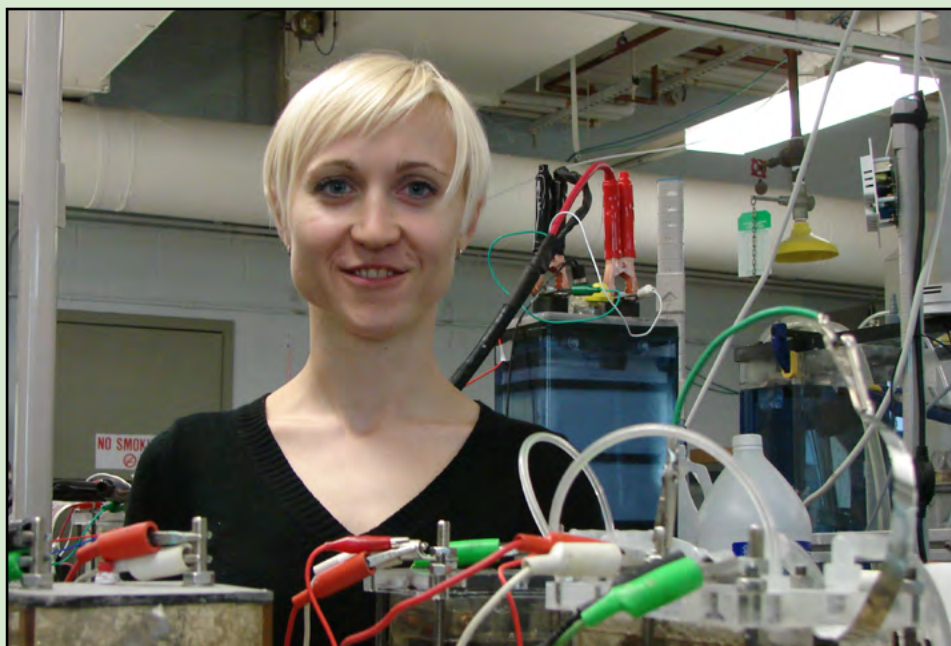
## A Goldwater Scholarship for Alla Zamarayeva

Grove School Chemical Engineering student, Alla Zamarayeva, is part of a select group of the nation's top students who received the 2013 Goldwater Scholarship, America's most prestigious award for undergraduates majoring in math, science and engineering. Alla came to the United States from Ukraine with a degree in business administration. Once here, she was able to turn her attention to engineering. "CCNY," she says, "has amazingly talented professors and all the lab resources one could wish for." For Alla, this has proved a winning combination. She is doing research of critical importance on batteries and is developing her command of other aspects of engineering.

Alla's Goldwater proposal focused on a structural 3D battery for NASA aircraft applications, which she is continuing to work on under Dr. Daniel Steingart, one of her CUNY Energy Institute mentors, who is now at Princeton University. She has optimized the composition of a carbon-based anodic coating, which when applied to a substrate of carbon fibers creates an anode material with high stress tolerance and electrochemical performance.

Nuclear energy is another of Alla's interests, and under Dr. Masahiro Kawaji, she has visited nuclear power plants and attended a conference of the American Nuclear Society at MIT. She is also doing research in rheology in Dr. Jeffrey Morris's group at the Levich Institute, studying the effect of capillary forces on suspension rheology. "Rheology has applications in a broad spectrum of engineering phenomena," she says. "It will serve me well no matter what I do."

In the best Grove School tradition, Alla finds time to give back to the community. She is an organizer of the Engineering Educational Outreach Project, which encourages middle school students to pursue higher education in STEM fields, and she serves as president of the CCNY chapter of Omega Chi Epsilon, the National Chemical Engineering Honors Society. When asked about the future, she responds, "I want my career to have purpose." Long-term, she is thinking of implementing engineering projects in developing countries.



# A Record Number of Grove School Students Receive National Science Foundation Graduate Research Fellowships

Last year, the Grove School was thrilled to announce that four graduating seniors and recent alumni had been honored with the National Science Foundation Graduate Research Fellowship (NSF GRF). This year that number has doubled. Three members of the Class of '13 and five GSOE graduates, already pursuing their doctorates, have been selected for the prestigious award. They will receive up to \$121,500 in funding over three years, giving them flexibility in their choice of research topic and the possibility to do research abroad. Six of the eight honorees majored in chemical engineering at the Grove School and three, Philip Liu, Aleksey Ruditskiy and Jan Stepinski, were students in CCNY's Macaulay Honors College. Below are thumbnail sketches of this diverse and brilliant group of students, along with their PhD fields and the prestigious institutions they are attending. Be prepared to be blown away!



**Ru Chen '13**

PhD Program of Chemical Engineering  
University of Delaware

"I want to do something meaningful for society," says Ru Chen, and for her that means fighting cancer. Following an internship at Merck, Ru formulated her NSF GRF proposal. It entails designing a novel lab on a chip to analyze the separation of glycoproteins and binding of antibodies to targeted glycoproteins for cancer diagnosis. She did research at GSOE with Drs. Raymond Tu and Ilona Kretzschmar and in the CCNY Chemistry Department with Dr. Teresa Bandosz. After graduation, she went to Sweden's Royal Institute of Technology to participate in the IRES program, which Dr. Kretzschmar heads, working on chemical recycling of PHB, a natural polyester produced by microorganisms. Only four years ago, Ru came to the US alone, knowing no English, and put herself through the Grove School. "It was very hard work," she says, "but now it has all paid off." Ru, who graduated with a 3.90 GPA, was president of CCNY's AIChE chapter and workshop and tutoring coordinator for the Peer-Led Team Learning chemistry program.



**Arash Nowbahar '12**

PhD Program of Chemical Engineering  
University of California, Santa Barbara

Arash Nowbahar is pursuing his passion for rheology in the research group of Dr. Todd Squires at UC Santa Barbara. The group is dedicated to micro-scale fluid mechanics and transport science, and Arash's focus is on interfacial microrheology of surfactant monolayers. He is studying the soap scum which forms when seawater meets oil in the pumping process, clogging the machinery and making it harder to push out the oil. Ultimately, his work could make ocean drilling more efficient. A graduate of CCNY's Honors Program, Arash worked with Dr. Raymond Tu on how surfactants come together to form crystals. Thanks to the Levich Institute's Dr. Jeffrey Morris, he spent a summer at the University of Chicago's MRSEC, where he modeled ice shelf vibrations. He also took part in Dr. Ilona Kretzschmar's IRES program at the Royal Institute of Technology in Stockholm. The work he did there with Professor Luca Brandt on turbulent channel flow of a polymeric solution with inertial particles is soon to be published.



**Jake Vaynshteyn '09**  
PhD Program of Neuroscience  
Albert Einstein College of Medicine

Jake Vaynshteyn calls his PhD “a continuation in a trek to achieve understanding of the intricate workings of the brain.” For him, preventing and treating mental illness is a social responsibility. This massive task will, he says, take a combination of neuroscience, genetics and psychology, but mastering the basic science of the brain is the essential first step. Jake’s GRF project uses optogenetics, a technique for genetically modifying neurons with flashes of light, to study how the cerebral cortex controls deeper structures of the brain. His passion for neuroscience began when he was a biomedical engineering major, studying electrophysiology with Dr. Marom Bikson. After the Grove School, Jake joined Rockefeller University’s Friedman Laboratory of Molecular Genetics, where he assisted Dr. Ana Domingos with her innovative research. All those years, he worked 30 hours a week in a restaurant to support his young family. He credits his wife, Wendy, also a Grove School biomedical engineer, with making him the scientist he is and will become.



**Dane Christie '13**  
PhD Program of Chemical Engineering  
Princeton University

Dane Christie thought that he would be a baseball player. But, even while he was with the Toronto Bluejays, his mother urged him to go to college. Dane was released from the team, and worked in construction before entering Hostos Community College. Dr. Yoel Rodriguez, Engineering Co-ordinator of the Hostos-CCNY dual-degree program, recognized Dane’s tremendous ability. “If not for CUNY,” Dane says, “I might still be working construction.” Instead, he began what he calls his “beautiful relationship with scientific research.” At City, his mentors were Dr. John Lombardi of Chemistry and Dr. Ilona Kretschmar of Chemical Engineering. Using the expertise in surface enhanced Raman spectroscopy he acquired from Dr. Lombardi and the skills he developed in Dr. Ketzchmar’s Laboratory for Nanoparticle Modification and Assembly, Dane formulated his GRF research proposal. It entails an experimental protocol for fabricating the active layer in bulk hetero-junction solar cells, which will increase their energy conversion efficiency. Since his Hostos days, Dane has been passionate about mentoring middle and high school students. He encourages them to follow the advice which his mother gave him and go to college.



**Jan Stepinski '13**  
PhD Program of Applied Mathematics  
Stanford University

Jan Stepinski, the 2013 CCNY valedictorian (see page 17), combines a deep love of nature with a brilliant mathematical mind and a social scientist’s desire to understand how society works. Hence his major in environmental engineering with minors in mathematics and economics. Jan is bound for Stanford’s Institute for Computational and Mathematical Engineering, which works at the intersection of mathematics, computing and applications in engineering and the applied sciences. He has already spent a summer at Stanford implementing probabilistic inversion techniques in parallel programs to expedite hydraulic tomography. His GFR project entails studying inversion problems in radar remote sensing. At City, Jan studied oceanic remote sensing and worked on the inversion of the radiative transfer equation with Dr. Alexander Gilerson. He did earth science research with Dr. Jeffrey Steiner, and studied remote sensing of land and hydrology with Dr. Marouane Temimi. In addition, he pursued his interest in economics with Dr. Peter Chow. Jan was a regional finalist in the Federal Reserve’s Fed Challenge and traveled to Poland and Germany to hone his command of international economics.

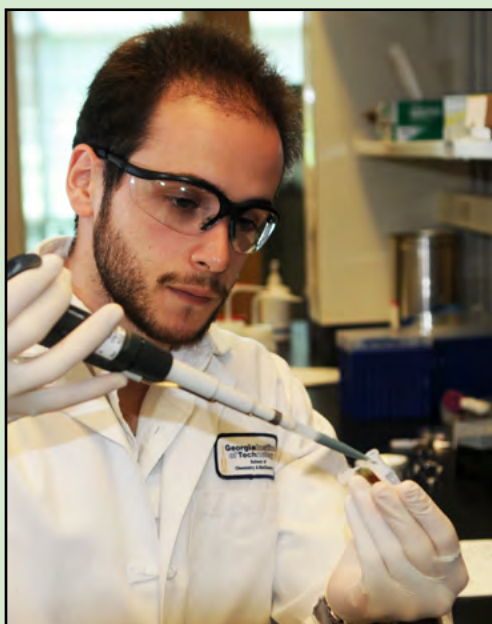




### **Julius A. Edson '12**

PhD Program of Chemical Engineering  
University of California, Irvine

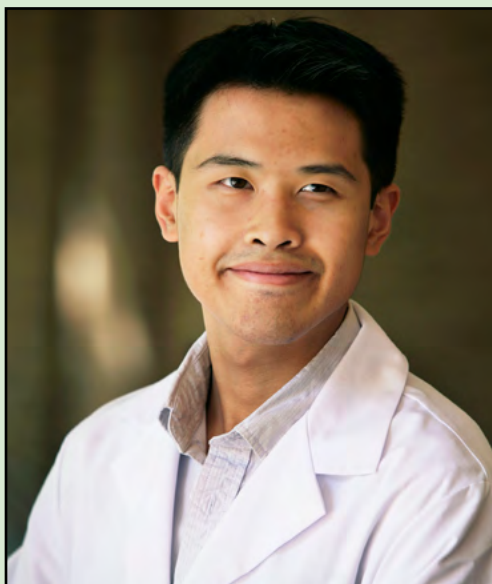
By studying the synthesis and characterization of nano-antibiotics that also act as gene carriers, Julius Edson is confronting one of medicine's most intractable problems, the growing resistance of microbes to antibiotics, and contributing to one of its newest frontiers, gene therapy. Julius is working on nano-carriers based on chitosan, a naturally occurring polymer. Chitosan nanoparticles can breach the bacterial cell membrane, hence their potential for drug delivery, and they have unique anti-microbial properties. Chitosan is also a nontoxic alternative to other cationic polymers in non-viral gene delivery. At the Grove School, Julius worked with Dr. Ilona Kretzschmar. He is applying lessons learned in her lab to biology in order to help others through medicine, a goal born of his childhood in Nigeria, where he survived a series of illnesses. At the Grove School, Julius took every opportunity to work internationally. With the encouragement of LSAMP Director, Dr. Claude Brathwaite, he did research in Cartagena, Columbia and Graz, Austria. He also took part in Dr. Ilona Kretzschmar's International Research Experience for Students (IRES) program at the Royal Institute of Technology in Stockholm, Sweden.



### **Aleksey Ruditskiy '12**

PhD Program of Chemistry  
Georgia Institute of Technology

At the Grove School, under the mentorship of Dr. Ilona Kretzschmar, Aleksey Ruditskiy, who majored in chemical engineering, did research on multi-functional Janus particles for use in smart materials. "I benefited from Dr. Kretzschmar's commitment to undergraduate research, her patience and her encouragement," he says. At Georgia Tech, Aleksey is applying his expertise to the synthesis of multi-metal nanoparticles and their assembly by chromonics, which are liquid crystals whose aggregate structure and aggregation process give them potential in many fields. Optical applications, for example, range from screens for laptops to futuristic armor, which the wearer could render invisible by triggering the rearrangement of its constituent nanoparticles. As an undergraduate, Aleksey also worked at Sweden's Royal Institute of Technology on the development of semiconducting nanopowders for use in thermoelectric applications, and at the University of Chicago on the synthesis and characterization semiconductor nanocrystals for use in thin-film Field Effect Transistors. He plans a career in academia, where he feels there will be fewer restraints on his research than in industry.



### **Philip Liu '12**

PhD Program of Chemical Engineering  
University of Texas at Austin

"My research goal," says Philip Liu "is to design materials for novel technologies that will bring our society to a new scientific era." Philip is working on boron nitride nanotubes for use in the packing material of integrated circuits. Boron nitride combines electrical insulating properties with high thermal conductivity which promotes efficient heat dissipation without disrupting electrical communication between components. Philip hopes to stop integrated circuits from overheating, so that researchers can continue to increase the density of transistors. At UT Austin, Philip's mentors are Dr. Brian A. Korgel, an expert in nanomaterials synthesis and Dr. C. Grant Willson, a specialist in polymeric materials for microelectronics. He is guiding Philip in developing the polymer matrix for the boron nitride nanotubes. At the Grove School, Philip worked on zinc oxide batteries in the CUNY Energy Institute, and interned at Columbia University and Lawrence Livermore National Laboratory. A dedicated volunteer, he was a docent at the New York Aquarium, taught the elderly to use computers, and was president of the engineering honor society, Tau Beta Pi.

# The Grove School and the US Navy Partner in the First Annual Greater New York SeaPerch Challenge



Lt. Cmdr. Michael Fourte, U.S. Navy City Outreach Officer for the Northeast Region, has nothing but praise for the SeaPerch Challenge, held at CCNY in March, 2013. "The Navy," says Lt. Cmdr. Fourte "is committed to STEM and to diversity, just like CCNY. That makes the College an ideal partner." SeaPerch is an underwater robotics competition, sponsored by the Navy, its Office of Naval Research, and the Association of Unmanned Vehicle Systems International (AUVSI) Foundation, to encourage young people to pursue careers in science, technology, engineering and mathematics (STEM). The Navy hopes that it will inspire students to become the next generation of naval engineers and architects and marine and ocean engineers.

SeaPerch brought about one hundred middle and high school students, from twenty schools in the Greater New York city and over two hundred teachers and parents to CCNY's Mahoney Pool. It was the culmination of an educational experience in which the students, mentored by their teachers, had worked in teams to build aquatic robots from SeaPerch kits, often modifying the original design for better performance. Each team built a propulsion system, developed an electronic controller, and learned about weight and buoyancy. SeaPerch is flexible and can be integrated into the school curriculum. It includes teacher training and teaching modules. At City, the robots competed in an underwater obstacle course and an underwater salvage operation. In addition, students gave poster presentations to demonstrate their understanding of the principles underlying their work.

The Grove School's Dean Joe Barba and the Director of Student Research and Scholarship, Dr. Yuying Gosser, partnered with Lt. Cmdr. Fourte in organizing the event. They trained over 20 Engineering and Science students to serve as judges through evening briefings and workshops conducted by Navy reserve and active officers. They ran the competition in collaboration with representatives of Navy Operational Support Center at New York City, SUNY Maritime NROTC, and Navy Recruiting District New York. For the Grove School judges, the event was exhilarating. "I volunteered in order to learn how these competitions are judged," says chemical engineering major Evgeniya Rubin. "Like the other judges, I also wanted to give back to the community. The students were very knowledgeable. We hope that we inspired them to major in science and engineering and come to City College."



# Undergraduate Student Profiles

## Jan Stepinski of Environmental Engineering Is the 2013 CCNY Valedictorian



**“When you go off now, into professions, into the specialized fields of graduate schools, or into the vast fields of the world, do not lock yourselves in the cells of specialization or solitude.”**

It is a signal honor to be chosen from among the best and the brightest in CCNY’s many disciplines to address the College community as Valedictorian. And, it is a source of great pride for the Grove School of Engineering when that distinction falls to one of its own.

Jan Stepinski, a graduate of Hunter College High School and a University Scholar in the Macaulay Honors College, is part of a rare breed in the current age of specialization. He is a Renaissance man, who combines a remarkable aptitude for science and mathematics with a keen interest in social science and the humanities, and a passion for nature. His accomplishments in engineering and mathematics include three research assistantships in environmental engineering and earth science and one in mathematics, three publications, numerous prizes, and most recently the coveted National Science Foundation Graduate Research Fellowship (see page 16). His next step is a doctoral program at Stanford University, where he will study mathematics applied to remote sensing, which he terms “one of the most objective ways in which we can understand our environment.” Jan came to CCNY having aced AP exams in the sciences and in Latin Poetry, European History, Logic and Composition, and Micro- and Macroeconomics. As an undergraduate, he continued his study of economics. “Understanding how society works and how it affects science is part of my commitment to protecting nature through my studies,” he says. In 2010, he was a regional finalist in the Federal Reserve’s Fed Challenge, a competition in which teams of students propose monetary policy in hypothetical Federal Open Market Committee meetings.

In his highly philosophical valedictory speech, Jan spoke of how society must provide the “urgency” to focus the skills of an engineer like himself on the projects it deems important. He emphasized striking an equilibrium between individuality and being “drawn into the chemical reactions of the world” and the crucial role of education in helping us find that balance. Pointing to his own journey from economics to mathematics and his discovery of remote sensing, he enjoined the audience to turn the flood of information which surrounds us from “noise” into a “symphony” of intellectual possibilities. And, spoken like a true Renaissance man, he closed with this message: “When you go off now, into professions, into the specialized fields of graduate schools, or into the vast fields of the world, do not lock yourselves in the cells of specialization or solitude.”

### **Abhinav Chintakunta**

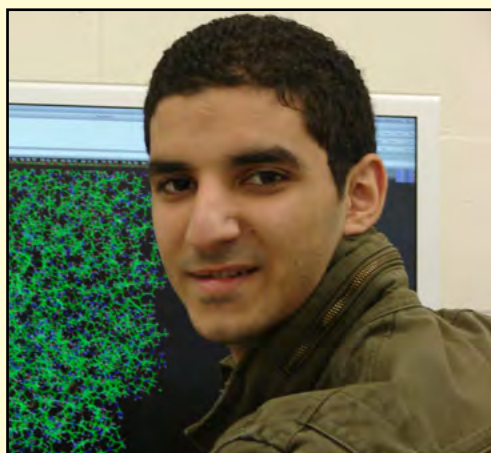
Biomedical Engineering



Abhinav Chintakunta discovered biomedical engineering while working in the pathology lab at Bellevue Hospital Center. “I enjoy both solving the theoretical problems and building the devices,” he says. At the Grove School, Drs. Marom Bikson and Simon Kelly have fueled his interest in the translational aspects of neuroscience. He spent the summer of 2013 as a quality assurance intern for the biomaterials company, Tishcon Corporation. Abhinav’s other interests range far and wide. He was part of an interdisciplinary team which took first prize in the 2013 CUNY Annual Entrepreneurial Concept Competition (ECC). The plan to convert wood and agricultural waste to electricity through gasification and to use the debris from that process to make charcoal was so compelling that they were invited to compete in the prestigious International Impact Investing Challenge (I3C), the first undergraduates to be so honored. Abhinav is the incoming CCNY Undergraduate Student Government treasurer, the campus ambassador for the Bloomberg Aptitude Test, and an intern at the J. Luce Foundation, which supports NGO best practices worldwide.

### **Moustafa ElShaabiny**

Computer Engineering



“My goal is to help make the world a better place,” says Moustafa ElShaabiny, and he plans to use engineering for the public good. He is applying his computer engineering skills to biochemistry, working in the lab of Chemistry Professor Ranajeet Ghose. “I am learning as much as I can about biochemistry, so that I can make my programming an effective and targeted research tool,” he says. He hopes that furthering biochemistry research through computer engineering will ultimately impact public health, helping to fight disease and develop new vaccines. Moustafa’s passion for the good of others has earned him a Dobrich Scholarship in the Colin Powell Program in Leadership and Public Service. While still in high school, he cofounded an NGO to benefit children in his native Egypt. “The most satisfying thing,” he says, “is to know you were the reason for the smile on a child’s face.” Now, he will join other outstanding CCNY undergraduates in developing their understanding of pressing policy concerns and public problems and building the leadership skills to address them.

### **Mandeep Kaur**

Earth System Science & Environmental Engineering



For Mandeep Kaur, CCNY has been a voyage of discovery. She originally came to the College as a liberal arts student, but her classes in math and science convinced her that she wanted to be an engineer. While studying fluid mechanics and heat transfer, she became interested in energy. Her studies are now on the cusp of mechanical and environmental engineering, and she is looking forward to expanding her knowledge of thermodynamics and nuclear energy. In fact, she is hoping to take part in the Department of Energy’s Science Undergraduate Laboratory Internships (SULI) program, which would give her the opportunity to do research in one of 15 participating DOE laboratories. Mandeep has already garnered significant industrial experience during two summer internships at GE Transportation. She has been invited to return to the company for a third internship, this time at GE Energy. Mandeep, who is fluent in Punjabi, Hindi and Urdu, has worked at the South Asian Youth Association in Queens, helping students develop learning skills.



**Sashary Marte**  
Mechanical Engineering

As a child, Sashary Marte spent many Saturday mornings at CCNY with her father Otto '90 EE, Senior Director of OIT Business Services and Assistant Director of the STEM Institute. As a student at the Grove School, her mentor Dr. Latif Jiji's rigorous teaching inspired her interest in heat transfer and the many design projects she has brought to fruition. These include a floor heating panel, systems for fruit refrigeration, dryer energy recovery and emergency cooling, as well as a time-measuring device based on heat variation. She also designed and optimized the thermodynamic cycle for a steam turbine plant. Her senior design project entails designing and manufacturing a product to prevent the waste of cold water during showering. During a product engineering co-op at Trane Commercial Systems in Wisconsin, Sashary applied lean product development techniques to improving product quality of the CTV chiller and led the heat transfer analysis in a technical tube project. Like her father, she is a committed mentor and serves as a teaching assistant at the STEM Institute, communicating her own love of learning to other students.



**Jeremy Neiman**  
Computer Science

Jeremy Neiman capped his senior year at the Grove School as part of the three-man team which won the first Zahn Prize for Excellence in Entrepreneurship. As such, he once again demonstrated the talent which earned him a coveted spot in Extreme Blue, IBM's premier internship program for top-notch students pursuing software development and MBA degrees. Jeremy worked in the Emerging Technologies Group, where he led a team in the design and development of a tool to help IBM's customers quickly create mobile applications. Among the CCNY experiences which prepared him for these major accomplishments, Jeremy cites being a CREST Fellow in Dr. Michael Grossberg's Graphics, Learning, and Smart Sensors Lab (CCNY-GLASSLAB) and working with Dr. Zhigang Zhu on a 3D camera and an algorithm to convert its images into an obstacle detection tool for the blind. Post-graduation, Jeremy is returning to IBM to work on Smarter Cities, a major data analysis initiative aimed at arming decision-makers and responders with the information necessary to make their cities run more efficiently.



**Yanil Rosario**  
Civil Engineering

Civil engineering runs in Yanil Rosario's family. Having completed the pre-engineering program at Newtown High School in Queens, she arrived at the Grove School where she has been an avid, hands-on student and a remarkable organizational leader. Two summer internships at Turner Construction, which she describes as "my dream company," have given her a wealth of hard hat and office experience. Her preparation for the workforce was further enhanced by Management Leadership for Tomorrow's prestigious, intensive, 18-month career development program. Through its case studies, monthly assignments and quarterly conferences, she learned how to build relationships with companies and gained an understanding of the business side of engineering. On campus, she has been president of Chi Epsilon, the civil engineering honor society, the Dominican Students Association and LAESA-SHPE, the Latin American students' engineering association, where she tirelessly promoted engineering to high school students. Yanil is interested in sustainability in construction and how buildings affect the community. Not surprisingly, her future plans include more field experience, a master's in engineering and an MBA.



**Evgeniya Rubin**  
Chemical Engineering

The daughter of a physicist and a civil engineer, Evgeniya Rubin was always fascinated by science. In her native Russia, she was studying management, but in the US, she says, "I was able to revive my passion for science." She graduated from Borough of Manhattan Community College with a 4.0 GPA. At City, her stellar performance continues. "Chemical engineering brings together my interests in chemistry, physics and lab work," she says. "My mentor, Dr. Ilona Kretzschmar, took a little girl who was excited about science and led me through all the difficulties. Thanks to her, I feel secure in what I am doing." That includes research in colloidal chemistry with Dr. Kretzschmar, and internships at Brookhaven National Laboratory, where she worked with Dr. Vivian Stojanoff on protein crystallization, learned how to operate Brookhaven's synchrotron equipment, and then participated in building the next generation of synchrotron. Her many extra-curricular activities include leading the GSOE team in the Chem-E car competition, being a judge in the SeaPerch event, and serving as president of the AIChE chapter on campus.



**Baruch Tabanpour**  
Electrical Engineering

"At City, I have had a richer experience than I could have imagined," says Baruch Tabanpour. He has pursued his interest in photonics and spintronics and benefitted from the varied offerings and strong support of the Macaulay Honors College. Baruch is majoring in electrical engineering and physics. He has appreciated the ease with which he has been able to take courses in both departments and the access to prestigious internships. He has spent summers at NASA Goddard Institute for Space Studies, the National Institute for Standards in Technology (NIST) Electromagnetics Division, and Queens College, doing research in nanophotonics through CUNY's Summer Undergraduate Research Program (C-SURP). "The Macaulay Honors College's financial support allowed me to concentrate on school without having a job," he says. In addition, Macaulay provided cultural activities in New York and the opportunity to travel abroad. A trip to China included a class in Asian business, and on a visit to the Galapagos, Baruch learned about evolutionary biology and how engineering impacts the environment.



**Graham Hill**  
Mechanical Engineering

Graham Hill is a mechanical engineering Junior. He began as a carpenter, gained valuable skill sets such as design, construction and problem solving. Currently, he is the President of the CCNY Aerospace Club and a robotics instructor for the Research Foundation of the City University of New York. Through the CCNY Aerospace Club, I has been able to make professional connections, which led him to be the robotics instructor. When he applied to the Grove School of Engineering, he wanted to challenge himself to study for something difficult and innovative. By the end of his first year he fell in love with mechanics. He realized that it was the act of taking things apart, learning how they worked and putting them back together that gave him pleasure. He is passionate about the CCNY Aerospace Club, which provides a means to physically apply his knowledge and skill set to real world applications. He has worked with a group of students and designed a CanSat robot to participate in national competition in 2013. In the future, he hopes to work for either NASA or Boston Dynamics, in developing robotic systems for interplanetary travel and study.

# Graduate Student Profiles



**Lina Cordero**  
Electrical Engineering

Originally from Ecuador, where she began her college education, Lina Cordero holds an AS in Computer Science from LaGuardia Community College and a BE in Computer Engineering from CCNY, Summa Cum Laude. She is finishing her PhD in Electrical Engineering, with six publications and many presentations to her credit. Lina's graduate experience has centered on NOAA-CREST, where she has been mentored by Drs. Barry Gross and Fred Moshary. The mastery she developed of the LIDAR system and its applications to remote sensing has been crucial to her doctoral research, which entails finding connections between fine particulate matter (PM<sub>2.5</sub>) and aerosol optical properties. Following her doctorate, Lina hopes to apply her expertise in remote sensing at NOAA or another government agency. She would also value the opportunity to work abroad. As a CCNY undergraduate, she spent time at Graz University of Technology in Austria, where she focused on the role of particulate matter (PM<sub>10</sub>) and its emissions from vehicular traffic in air pollution. This whetted her appetite for more international experience.



**Nima Ehsani**  
Civil Engineering

"The research funding and facilities available at CUNY are the stuff of dreams," says Nima Ehsani. "If I need something to advance my work, it just happens." Nima came to City from Iran with a BS in Civil Engineering and an MS in Water Resource Engineering. He joined NOAA-CREST and is currently part of the CUNY Environmental CrossRoads Initiative. Under Professor Charles Vörösmarty, Nima is working on the "Northeast Regional Earth System Model" funded by NSF, USDA and DOE. This project assembles an interdisciplinary research team from academia and government to build a model that improves understanding of the region's environment, ecosystem, energy and economy and the capacity to forecast the implications of planning decisions through the 21st century. Nima is using his extensive knowledge of hydrological modeling, optimization techniques, data analysis, and remote sensing to improve the capabilities of the water balance model. At the 2012 Fall Meeting of the American Geophysical Union, he presented the High Resolution Map of Water Supply and Demand for the Northeast United States, developed by the project.



**Natalia Maldonado**  
Biomedical Engineering

When she came to the US from Colombia, Natalia Maldonado, an electronics engineer with a master's in biomedical sciences from the Universidad de Los Andes, wanted to do cardiovascular research. Having met with Dr. Luis Cardoso and Dr. Sheldon Weinbaum, she was invited to work in the CCNY biomechanics lab. They suggested that she apply to the BME doctoral program, and she excelled, maintaining a 3.95/4.0 GPA. "Dr. Cardoso and Dr. Weinbaum trusted me and took my ideas into account," she says. One of her publications, in *AJP - Heart and Circulatory Physiology*, was chosen for a special podcast by the editors. Her thesis, on the role of calcifications in vulnerable plaque rupture, combined biomechanics with her background in electronics and image processing. "I like integrating techniques from different fields to look at a problem," she says. She is now a post-doc at Brigham & Women's Hospital/Harvard Medical School, using vascular biology to study the origins of calcification. Of City, she says "The extraordinary diversity was a huge life lesson. It made me a better person."



**Ehssan Nazockdast**  
Chemical Engineering

Ehssan Nazockdast came to CCNY's Levich Institute with an MSc in Polymer Engineering from Amirkabir University of Technology in Iran, where his father, also a polymer engineer, was his advisor. He earned his ME and PhD in Chemical Engineering at CCNY, where he received the Andreas Acrivos Fellowship, awarded to the most distinguished first year PhD student, and won the poster competition in fluid mechanics at two AIChE meetings. His doctoral work, under Dr. Jeffrey Morris, entailed developing first-principles theories for predicting the microstructure and non-Newtonian rheology of colloidal dispersions far from equilibrium and studying the dynamics of particulate systems using Stokesian Dynamics. "Working with Jeff Morris was thrilling," he says. "He brings a rigor to the research process which I learned to emulate and which will serve me well throughout my career." The cutting-edge nature of the work Ehssan did at Levich prepared him for his current challenge, a post-doc at NYU's Courant Institute under Dr. Michael Shelley. There, he is studying the interaction of flowing fluids with moving and flexible bodies in biological systems.



**Andi Toce**  
Computer Science

Newly-minted PhD Andi Toce's association with CUNY is two-fold. On the one hand, he is a doctoral student in Computer Science who holds an MA from Queens College. On the other, he is an adjunct lecturer in Mathematics and a program specialist in the Academic Peer Instruction Program at Laguardia Community College, where he completed his math and science credits after coming to the US from Albania. In addition to his eight conference papers on Computer Science, he co-authored a chapter in the book, *New Visions for Supplemental Instruction (SI) for the 21st Century*. Andi did his PhD research in Dynamic Distributed Networks with Drs. Abbe Mowshowitz and Akira Kawaguchi. Their work aims at improving the efficiency of communication and the quality of service in these networks. This includes improving communication between first responders and during military operations, by facilitating the establishment of networks on the spot with no infrastructure or centralized control. "CCNY has given me a great learning experience," says Andi. "My professors provided focus, helping me to narrow my interests and choose the right direction."



**Bruno Zamorano**  
Mechanical Engineering

Bruno Zamorano brought a wealth of experience to his PhD studies. For nine years, he worked in materials characterization and aerospace at Inasmet-Tecnalia, a research and development center in Spain, acquiring extensive testing experience. He holds master's degrees in physics and in technology and research management from Spanish universities. He was a reserve officer in the Spanish army and served as Spain's technical expert at the European Defense Agency, evaluating projects which addressed readiness for aerial threats. At City, he has been part of a high-powered team led by Dr. Feridun Delale and including Drs. Niell Elvin and Yannis Andreopoulos. Under a US Army grant, they are developing advanced lightweight multi-functional energy absorbing composites to provide enhanced protection for combat vehicles. They are also working on sensing techniques to detect damage to the composites in real time. Following his PhD, Bruno intends to start an R&D company which will act as a technological consultant and partner to inventors and companies lacking the expertise and facilities to turn their ideas into products.



# Outstanding Faculty

## Dr. Ilona Kretzschmar Professor of Chemical Engineering Receives the CCNY Mentoring Award



The CCNY Mentoring Award in Architecture, Biomedical Education, Engineering, and Science honors a faculty–student team whose mentoring relationship has resulted in extraordinary student achievement. The 2013 choices were Professor of Chemical Engineering Ilona Kretzschmar and her student Dane Christie '13. Dane is an NSF Graduate Research Fellow who is pursuing a doctorate in chemical engineering at Princeton, and Dr. Kretzschmar describes him as “the best undergraduate student I have ever worked with.” That is high praise from a faculty member who has mentored 46 undergraduates in her nine years at the Grove School, including eight who currently hold NSF Graduate Research Fellowships.

What is the secret of Dr. Kretzschmar’s remarkable ability to inspire undergraduates to become stellar researchers? First, she says, you have to put in the time. Her mentees can expect an hour-long individual conference each week. “I hold her opinions in high regard because I have excellent results from my conversations with her,” says Dane Christie. Thanks to those discussions, he says, “I developed the important skill of iterating between experiments, data analysis, and asking the right questions about the research in order to attain a desired result.” And, they were crucial in helping him choose a career in academia over one in industry. You also need, explains Dr. Kretzschmar, to see each student as an individual. “It is important,” she says “to remember what it was like to be young, and to emphasize the student’s strengths while dealing with the weaknesses. If students are motivated and willing to work hard, I see myself as an enabler.” The success of Dr. Kretzschmar’s mentees attracts other strong students to her lab, where she initially pairs them with graduate students and then encourages them to take ownership of projects related to her research. “The undergraduates learn how to do research, the grad students learn how to mentor, and I get to test out my ideas,” she explains.

Dr. Kretzschmar holds a doctorate from the Technical University of Berlin. She did a post doc in surface science at Harvard and another in molecular electronics/nanoscience at Yale. Her honors include the NSF CAREER award. The Nanoparticle Modification and Assembly Laboratory, which she heads, has established colloidal assembly and modification as areas of expertise at the Grove School. In addition, she has been responsible for expanding nanotechnology education at CCNY and other CUNY campuses. She has also developed international opportunities for Grove School students. With NSF support, she organized an exchange program with Sweden’s Royal Institute of Technology, which brings Swedish students to CCNY and has already provided summer research opportunities in Stockholm for 29 CCNY undergraduates, 16 of whom have gone on to PhD programs. Of these, 93% have been underrepresented minorities or women. This is due to the close collaboration and support of NYC LSAMP and its director, Dr. Claude Brathwaite. The LSAMP collaboration has also allowed Dr. Kretzschmar to establish a summer research exchange program with three Colombian universities.

# NSF CAREER Award for Dr. Nelly Fazio

## Professor of Computer Science

For the past five years, Dr. Nelly Fazio has played an essential role in making CCNY's Center for Algorithms and Interactive Scientific Software (CAISS) a hub of research in cryptography, and she has been instrumental in strengthening cryptography as a field of study in the Grove School's Department of Computer Science. Dr. Fazio joined the Grove School faculty from IBM, where she had been a postdoctoral fellow in the Content Protection group at the Almaden Research Center and a visiting researcher in the Cryptography Research group at the T.J. Watson Research Center.

Now, Dr. Fazio, who holds a PhD from New York University, has been honored with the NSF's most prestigious award for young faculty, the CAREER. She will use the five-year, \$460,000 grant to break new ground in the security of multi-recipient communication. Dr. Fazio points out that "existing security solutions for multi recipient communication, like broadcast encryption, focus mostly on the concerns of the content originator." In her project, "Anonymous and Robust Multi-Recipient Communication: Foundations and Applications," she will tackle privacy concerns of the recipients, designing cryptographic constructions to make them anonymous to outsiders and also to each other. Dr. Fazio will continue her pioneering work in broadcast steganography, extending to multi-recipient communications the possibility of hiding from outsiders not just the content of a message, but its very existence. She will also investigate applications like collaborative remote storage, with the aim of enabling a group of users to access shared information in the cloud, while hiding their access patterns and the content of the stored information.



Much of Dr. Fazio's prior work has been funded by NSF, the US Army Research Laboratory, and the UK Ministry of Defence. Her CAREER research also has applications for the military, as well as companies wishing to maintain secrecy, and could be of great use to groups which cannot communicate because their freedom of speech is curtailed. Like all CAREER awards, Dr. Fazio's includes an educational component. She will develop a seminar for graduate students and a capstone course for undergraduates. "I have always included students in my work," she says. Her most recent paper on broadcast steganography was written with PhD student Irippuge Milinda Perera.

## For Two CCNY Greats, the Honors Continue



Dr. Sheldon Weinbaum (pictured left), Distinguished Professor Biomedical and Mechanical Engineering Emeritus, has been elected to the American Academy of Arts and Sciences. This latest honor makes him one of only five living persons who hold membership in that Academy as well as the National Academy of Sciences, the National Academy of Engineering and the Institute of Medicine.

Early in his career, Dr. Weinbaum was widely recognized as an expert in reentry aerodynamics and basic studies in fluid mechanics. His interests later shifted to biomechanical phenomena in the human body. In 2002 he became the first engineer to be awarded a Guggenheim fellowship in molecular and cellular biology. He has posited revolutionary hypotheses on how organs and cells function. His breakthroughs, made with numerous collaborators in the biological sciences, have included the discovery of the pore through which LDL cholesterol crosses the endothelium, the role of cellular-size microcalcifications in the rupture of the fibrous caps of vulnerable plaque leading to thrombosis, and the Weinbaum-Jiji equation for bioheat transfer.

Dr. Weinbaum's passion for biomedical engineering translated into a new realm of expertise at City College. He worked with Dr. Stephen Cowin, Dr. John Tarbell and junior faculty to establish Biomedical Engineering in the university. These efforts have resulted in a full-fledged Department of Biomedical Engineering at the Grove School, a Ph.D. program in this field, and the New York Center for Biomedical Engineering of which CCNY is the linchpin.

Dr. Gilbert Baumslag, (picture on the right) Distinguished Professor Mathematics and Computer Science Emeritus, has been elected to the inaugural class of Fellows of the American Mathematical Society. The honor recognizes members who have made outstanding contributions to the creation, exposition, advancement, communication and utilization of mathematics. Dr. Baumslag is one of the most honored members of the CCNY faculty and one of the world's most respected mathematicians. Among his many distinctions, he has received two Special Creativity Awards from the National Science Foundation, served as referee for most of the research periodicals in his field, and published two books, two monographs and over 150 research papers.

Dr. Baumslag's research has always been on the cutting edge of group theory. He has given keynote addresses in most conferences in infinite group theory world-wide. He entered the field when it was new, and after decades of breakthroughs as a mathematician, he found his thinking taking him further and further into computer science. Dr. Baumslag is currently working on research into combinatorial group theory, interface design, zero learning curve software including a package for statistics, and new games based on group theory. He founded and for many years served as the director of CCNY's Center for Algorithms and Interactive Scientific Software (CAISS).



## Dr. Irina Gladkova: Computer Science Meets Remote Sensing in Sea Ice Research

Associate Professor of Computer Science Irina Gladkova has received a \$450,000, three year grant from the Office of Naval Research (ONR) to study sea ice. The Arctic landscape is evolving rapidly, particularly in the Beaufort and Chukchi Seas, which are both areas of interest to the Navy in terms of submarine and icebreaker navigation. There is an urgent need to keep abreast of the day to day changes in leads, which are narrow, linear cracks in the ice that form when ice floes diverge or shear as they move parallel to each other, and polynyas, which are areas of persistent open water, which contain varying thicknesses of crushed sea ice. Currently, the state of the ice cover is monitored at the NOAA-NAVY National Ice Center by technicians who mark-up maps manually on the basis of satellite imagery.

Dr. Gladkova proposes to make that job easier. She and her colleagues, Dr. Michael Grossberg of the CCNY Computer Science Department and Dr. Peter Romanov of NOAA/STAR, Visiting Professor of Electrical Engineering, are combining remote sensing, electrical engineering and mathematics to improve the characterization of sea ice. Their goal is to develop a new, real-time, high spatial resolution satellite-based ice cover product for use by the National Ice Center and the Navy. It will be based on combined VIIRS NPP and MODIS EOS satellite data. Once the product is proved efficient, it will be used to generate daily ice cover maps of the Arctic and Antarctic basins. “The algorithms we are developing,” says Dr. Gladkova, “should reduce the burden of marking-up maps manually.” These automatic maps will also provide technicians with useful counterpoints to their visual observations.

Dr. Gladkova holds a PhD in physical/mathematical sciences from the Institute of Applied Mathematics and Mechanics of the National Academy of Sciences of Ukraine and a PhD in mathematics from The Graduate Center of CUNY. Her main present interests are radar waveform design, satellite data analysis/compression and numerical methods. She enjoys the collaborative process and bringing a project to fruition. Part of her project for the ONR entails translating her work on sea ice into online learning modules for use in the courses she teaches, including Satellite Image Processing. Students will be included in the research, and their projects will lead to presentations at scientific conferences.



Dr. Michael Grossberg, Dr. Irina Gladkova, Dr. Peter Romanov

# Dr. Zhigang Zhu, Herbert Kayser Professor of Computer Science, Receives the CCNY President's Award for Excellence

Professor Zhu, received the inaugural CCNY President's Award in May 2013. He was "recognized by both students and colleagues for his sustained commitment to scholarly work, his multidisciplinary research in Assistive Technologies for the Blind, his effective integration of research innovation and undergraduate teaching, his engagement of underrepresented students in research and education, and his creation of innovative learning opportunities for students outside the classroom."

Professor Zhu embarked on a mission to aid the blind with multidisciplinary research in Assistive Technologies for the Blind. After winning a CCNY seed grant in 2010 in collaboration with Professor Tony Ro (Psychology) and Professor YingLi Tian (Electrical Engineering), the multidisciplinary team won a large NSF grant in September 2011 on the topic of Man, Machine and Motor Control (M3C) of the Emerging Frontier and Research Innovation (EFRI) program.



Professor Zhu believes that learning must connect research to the real world and not to be confined to lectures in the classrooms. He developed a joint senior design course among four programs: Computer Science, Computer Engineering, Electrical Engineering and Neuroscience. This innovative approach attracted two grants from the National Collegiate Inventors and Inventors Alliance (NCIIA). Additionally, his team was awarded the NSF GARDE grant with Dr. Jizhong Xiao (EE) as the PI for their work to develop a pedagogical facet of teaching and designs on assistive technologies for the blind. He is the faculty mentor of two winning teams at the CCNY Kaylie Entrepreneurship Competition (KEP). Team VISTA (Vibrotactile Intelligent System for Travel Aid), a group of five students in his research projects and the senior design course, won first place of KEP 2012, and Team GesTherapy, that was not in any of his projects and classes, won second place of KEP 2013. According to Professor Zhu, "All the participating students have accomplished an invaluable enterprise; realizing ideas into concrete product, refining and enhancing their device, and marketing their work to the public." Ranging from high schoolers to PhD students, Professor Zhu's pipeline mentoring approach has been a huge success. For example, Dr. Hao Tang, a recent graduate from Professor Zhu's lab is now an assistant professor at BMCC. Dr. Tao Wang became a Senior Software Engineer at BAE Systems after graduation. Edgardo Molina, a PhD candidate in Dr. Zhu's lab and a CCNY Macaulay Honors College graduate, started a small business with other PhD and undergraduate students in developing wearable technology for the blind. Molina stated, "Under Dr. Zhu's mentorship, CCNY students and I have had the opportunity to participate in research at the Air Force, in Industry labs, in entrepreneurship workshops and competitions, and in other academic activities. In all of these interactions I have always seen Dr. Zhu attribute success to students work first rather than himself, ensuring that his students are kept in his mind when job and internship opportunities arise."

Professor Zhu earned his PhD in CS (with honor) from the prestigious Tsinghua University, China and did his post-doctorial research in the University of Massachusetts at Amherst. Professor Zhu joined the CCNY Computer Science faculty in 2002 that same year he founded the City College Visual Computing Laboratory (Cvcl).

# New Faculty

2012-2013 was a bumper year for new faculty. The ten highly talented engineers and computer scientists portrayed below include three full professors, three associate professors, and four assistant professors. They all have top-notch credentials, and, wherever they are in their careers, remarkable achievements to their credit. It is a tribute to the Grove School's growing strength and reputation that they have chosen it as the place to continue their careers.

## **Debra T. Auguste**

Associate Professor of Biomedical Engineering  
PhD, Princeton University

Dr. Debra Auguste has received two of the ultimate accolades for young faculty members, the NSF CAREER Award and the NIH Director's New Innovator Award. She began her CAREER project, "Molecular Diversity in Drug Delivery Design: An Integrated Approach to Research and Education," while on the faculty of the Harvard University School of Engineering and Applied Science. She is continuing that work at the Grove School. The more recent NIH award provides \$1.5 million over five years to fund "exceptionally creative new investigators who propose highly innovative projects that have the potential for unusually high impact." Dr. Auguste is investigating personalized therapies to inhibit breast cancer metastasis.

"I am committed," says Dr. Auguste, "to academic excellence and to helping students succeed. Grove School students are engaged, insightful and respectful. My objective is for them to become so knowledgeable and self-confident that they challenge and question what I say." Among her many honors, in 2010, Dr. Auguste was elected to the 50 Most Influential African Americans in Technology List. "At CCNY, I have the opportunity to be a role model as an African American and a woman in science," she says. Under her CAREER award, she will develop educational modules to share concepts in bioengineering with students in Harlem high schools. And, she says, "CCNY is very supportive of women. It is important that young women in science be able to succeed in academia while raising a family, as I have."



## **Elizabeth J. Biddinger**

Assistant Professor of Chemical Engineering  
PhD, The Ohio State University

"I was looking for an institution and a department that valued both research and teaching and were supportive of new faculty members. That is what I have found at the Grove School," says Dr. Elizabeth Biddinger. Dr. Biddinger's experience in catalysis, electrochemistry, alternative solvents, green chemistry and sustainable engineering brings new depth to those areas at the Grove School, and are a source of collaborations with other faculty members. These include working with Dr. Marco Castaldi on catalysis and with Dr. Ilona Kretzschmar on ionic liquids. This is a rapidly growing field in which Dr. Biddinger's research could lead to significant advances in green chemistry, such as development of efficient and environmentally friendly manufacturing processes for fine chemicals. Dr. Biddinger is also active in the CUNY Energy Institute. Under an NRC Faculty Development Grant, she is researching electrochemical recovery of fission products for nuclear fuel reprocessing and waste management. During the Spring 2013 semester, Dr. Biddinger taught a graduate elective on ionic liquids and collaborated with a group of colleagues on her department's senior design course.



## Marco J. Castaldi

Associate Professor of Chemical Engineering  
PhD, University of California, Los Angeles

"I'm a classical engineer who likes to get his hands dirty," says Dr. Marco Castaldi. A classical engineer, that is, who is breaking new ground in catalysis, combustion, gasification, and waste to energy. He is widely published and holds 11 patents in these fields.

For seven years, Dr. Castaldi oversaw fuel cell processor development at Precision Combustion Inc., in New Haven, CT. He then joined the Earth & Environmental Engineering department at Columbia University. He became interested in CCNY after meeting Chemical Engineering Professor Irven Rinard at an AIChE Research and New Technology Council meeting in 2006. Today, Dr. Castaldi heads the Combustion and Catalysis Lab at the Grove School. It houses the world's only catalytic shock tube, which was the basis of his NSF CAREER Award to further the study of fast heterogeneous reaction kinetics. The lab is making major strides in the thermal and catalytic conversion of carbon based material to desired products. For example, municipal solid waste and biomass to synthetic fuels, liquid fuels to hydrogen and carbon-based greenhouse gases to products.

A keen educator, Dr. Castaldi was invited to participate in The National Academy of Engineering's 2012 Frontiers of Engineering Education Symposium. He has brought graduate students from the Ecole des Mines in France and the Universita di Bolzano in Italy into his lab, and has recently been selected for the inaugural Laboratory of Excellence Visiting Professor Chair at CNRS/Ecole des Mines.



## Julio F. Davalos

Professor of Civil Engineering and the Department's New Chair  
PhD, Virginia Tech

Dr. Julio Davalos was the Benendum Distinguished Teaching Professor at West Virginia University (WVU), director of a multidisciplinary research center, and Professor in the Department of Civil and Environmental Engineering. After a highly successful tenure of 22 years at WVU, he is bringing his wealth of experience to the Grove School. His dual commitment to research and teaching is in perfect sync with CCNY's educational philosophy. And, he says, "I love New York."

Dr. Davalos received his doctorate from Virginia Tech. His expertise is in mechanics and structural engineering, and his research includes theoretical and experimental studies on advanced materials and systems. His work encompasses civil infrastructure rehabilitation, protection, and new construction, with particular emphasis on advanced materials for sustainable highway bridges, buildings and mass-transit tunnels. He has over 300 publications to his credit. The book, FRP Deck and Steel Girder Bridge Systems: Analysis and Design, which he co-authored, has been published since he came to City.

Dr. Davalos has been honored for his teaching as well as for his research. Among his accolades, he was named Professor of the Year in West Virginia, and for 17 years was chosen by students for the WVU Civil Engineering Excellence in Teaching Award. He is passionate about developing and implementing "active learning" teaching methods.

At CCNY, Dr. Davalos's goal is to strengthen research and educational collaborations both within the Department of Civil Engineering and with other academic and industrial entities. He has begun building experimental and computational facilities to develop multidisciplinary research collaborations on Sustainability for the Built Environment. To this end, he has received a \$1.5M Department of Energy grant, under which Grove School engineers will develop innovative energy-efficient roof sandwich panels in collaboration with the University of Idaho, Purdue University, and Missouri Structural Composites LLC.



### **Balázs M. Fekete**

Assistant Professor of Civil Engineering  
PhD, University of New Hampshire

Dr. Balázs M. Fekete brings over 20 years of research experience to his new role as a Grove School faculty member. “Teaching,” he says, “has been a life-changing experience. I wish that I had started earlier.” This past year, Dr. Fekete taught Fluid Dynamics and Engineering Hydrology, to which he brought his deep-seated expertise in hydraulics and hydrological analysis and modeling. At the University of New Hampshire, he worked with Dr. Charles Vörösmarty, now Director of the CUNY CrossRoads Initiative. His major focus was large-scale hydrological modeling, which sought to assess the future of water resources and changes in hydrography in the context of different climate scenarios.

Dr. Fekete is continuing his research at CrossRoads. “My overarching interest,” he says “is how to manage global resources, so that the 7 billion people now on this planet, and potentially over ten billion in the future, can live decent lives with access to clean water and sufficient energy.” He contributed the chapters “State of the World’s Water Resources” and “Biomass” to the massive study, *Climate Vulnerability: Understanding and Addressing Threats to Essential Resources*, published in April 2013. “Working in hydrological modeling,” he says, “I am acutely aware of the importance of underlying data. Thanks to new communications technologies, in addition to relying on remote sensing, we can expand information from in-situ networks. In working with my civil engineering students, I will seek to balance the two.”

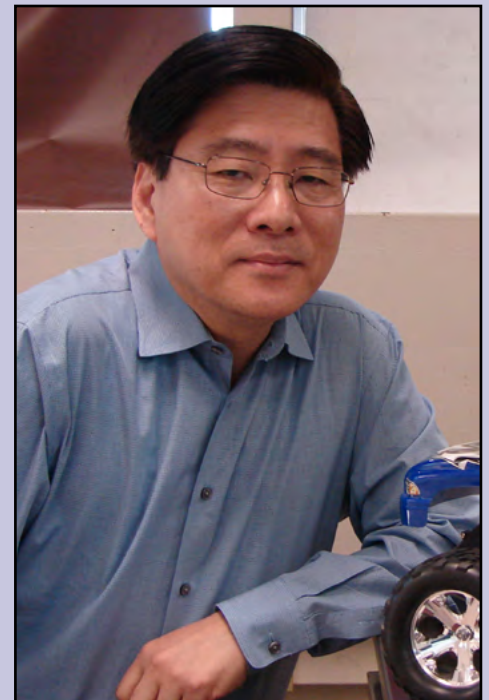


### **Bruce Kim**

Associate Professor of Electrical and Computer Engineering  
PhD, Georgia Institute of Technology

“My work requires interdisciplinary expertise,” says Dr. Bruce Kim. “Increasingly engineers are studying problems in which our discipline meets chemistry, materials science, biology, or medicine. At CCNY, the brain-power across the disciplines is impressive. I have wonderful colleagues to work with.” Dr. Kim’s area of expertise is microelectronics. Specifically, his research covers MEMS, nanotechnology, nanosensors, microelectronics packaging, biomedical neural sensors, biophotonics, and VLSI chip testing. In 1997, while an assistant professor at Tufts, Dr. Kim received the NSF’s CAREER Award to develop his discovery of a novel low-cost technique for testing the next generation Multichip Module (MCM) substrates. He joined the CCNY faculty from the University of Alabama, Tuscaloosa. As PI or co-PI, he has been responsible for over \$12 million in funding from NSF, DARPA, SRC, US Army, US Air Force, and various semiconductor companies.

Dr. Kim has published extensively. He is prominent in IEEE and a fellow of IMAPS (International Microelectronics and Packaging Society). In addition, he has served as a consultant and expert witness for highly ranked companies and law firms. And, he is a dedicated teacher. “What strikes me about students at the Grove School,” he says, “is that they do not have to be spoon-fed. They are tough and they are self-motivated.”





## Rosario Gennaro

Professor of Computer Science and Director of CAISS  
PhD, MIT

Following 16 years at IBM's Thomas J. Watson Research Center, Dr. Rosario Gennaro has made the leap into academia. Dr. Gennaro holds a doctorate in Electrical Engineering and Computer Science from MIT, where he was a member of the Theory of Computation group. His research focuses on cryptography, network security and theoretical computer science. His most recent work addresses the security of the cloud computing infrastructure, the issues of privacy and anonymity in electronic communication, and proactive security to minimize the effects of system break-ins.

This background perfectly fits Dr. Gennaro to be Director of CAISS (Center for Algorithms and Interactive Scientific Software). The Center's original scope was research at the intersection of group theory and theoretical computer science. Following some exciting work applying group theory to secure encryption, the Center's focus shifted to becoming a leading research institution in cryptography and network security. CAISS members do research in a variety of areas, from the theoretical foundations of cryptography to the design and implementation of cryptographic protocols.

"At CAISS," says Dr. Gennaro, "our work has a strong mathematical foundation but interfaces with concrete, real-world problems. We are all trained theoreticians, but CAISS is a practically-informed theoretical center, where we tackle issues such as cloud computing security. Individuals and companies are giving up control of their data. They need an efficient way to verify the result of the computations performed by a provider and the integrity of their stored data. Those are among the crucial problems we are addressing."

Dr. Gennaro is enjoying his new role as a professor and has already included two undergraduates in his research. "I am amazed by City College students," he says. "They are committed to learning and have the drive to get an education despite their financial struggles."



## Hanghang Tong

Assistant Professor of Computer Science  
PhD, Carnegie Mellon University

Following an exciting three years at IBM's T. J. Watson Research Center, Dr. Hanghang Tong has joined the Grove School. "In academia I will be able to take a longer view in my research," he says. "At IBM, I loved mentoring my interns, and as a teacher I will have more interactions with students." Dr. Tong's fall 2013 course in Big Data Analytics was oversubscribed very quickly. His research interest lies in large scale data mining and machine learning, especially for graph and multimedia data with applications to social networks analysis, healthcare, cyber-security and e-commerce. His more than 70 publications have earned him three best paper awards, and while at IBM he was PI or co-PI on proposals which garnered over \$15 million in funding. "Another advantage of coming to City is the opportunity for research collaborations," he says. "In addition to developing data mining algorithms, I am also interested in their applications. I am currently exploring opportunities to work with a faculty member in computational biology at Hunter College and with a Grove School colleague on a navigation system for the blind. Both are high impact applications."



## Leonid Gurvits

Professor of Computer Science  
PhD, Gorky State University, USSR

Dr. Leonid Gurvits has held posts at prestigious institutions such as Technion in Israel, Princeton's Institute for Advanced Study and Los Alamos National Laboratory. His work has had a substantial impact on mathematics. At Los Alamos, he settled several famous open problems and developed a powerful new approach to lower bounds in algebraic combinatorics and computational geometry, which is being popularized by leading mathematicians. He has done ground-breaking work in quantum information, in which he is responsible for a milestone in the theory of quantum entanglement; hybrid (or switched) systems, in which he developed a theory of positive switched systems, with important applications in chemistry and biology; and simulations and computational game theory, where his work resulted in new algorithms for accelerated molecular dynamics. Several of his 140 papers are taught around the world. His current research on classical simulation of quantum algorithms and approximation of permanents is supported by a \$400,000 NSF grant.

"In my field," says Dr. Gurvits, "the real art is to come up with proofs which are novel and can be understood by as wide an audience as possible. We also need to link the theoretical and the practical. It is our responsibility to transfer the vast amount of current knowledge to the next generation, and, in particular, to the many bright students who cannot go to Harvard or Princeton. I myself did not go to the most elite universities. I came to New York as a refugee and thought that I might be driving a cab, but I fell on my feet. I relate completely to the students in my classes."

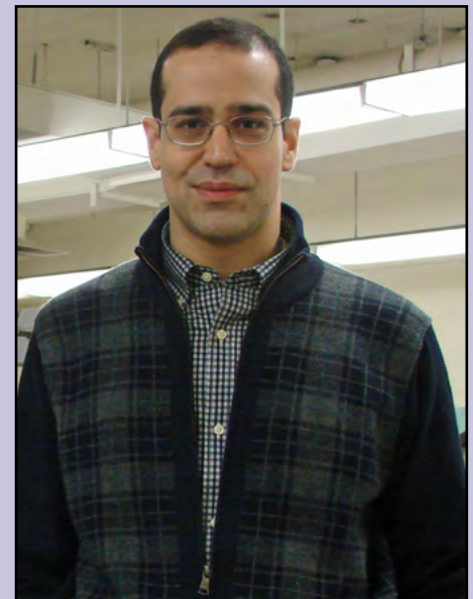
In addition to being a mathematician and computer scientist, Dr. Gurvits writes poetry in his native Russian under the pen name Bukoviner.



## Ardavan Yazdanbakhsh

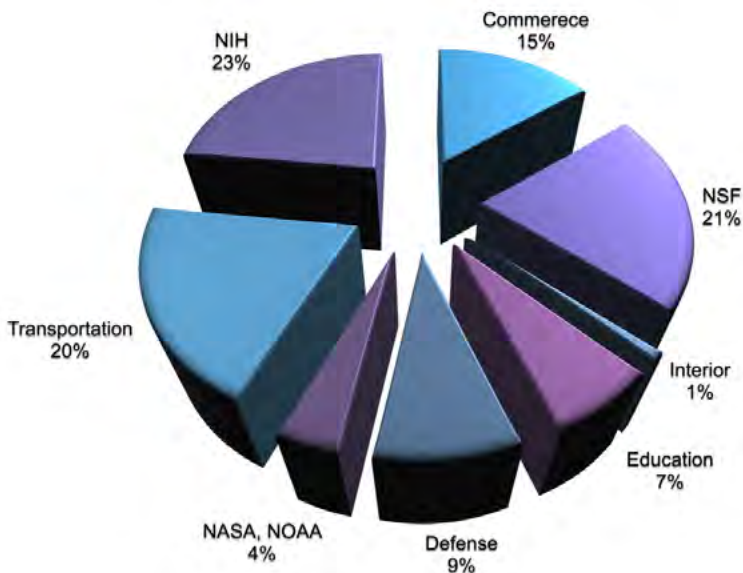
Assistant Professor of Civil Engineering  
PhD, Texas A&M University

Dr. Ardavan Yazdanbakhsh is an expert in development of durable cementitious composites and sustainable concrete. He has been engaged in research, funded by the Federal Highway Administration, on production, characterization, and mechanical/structural properties of cementitious nanocomposites. His doctoral work specifically addressed the effect of carbon nanofilaments on properties of concrete. His master's research, at the University of Sharjah in the United Arab Emirates (UAE), was on the structural properties of concrete reinforced by a new synthetic macro fiber. In addition to his research background, Dr. Yazdanbakhsh brings seven years of experience as a site and production engineer in Iran and the UAE to his Grove School teaching. "The experimental nature of my research gives me plenty of scope to engage students," he says. "I like the challenges of teaching and the feeling that what my students are learning will help them impact the future." Dr. Yazdanbakhsh has found the Department of Civil Engineering collegial and supportive. He is collaborating with Drs. Larry Bank, Michel Ghosn, and Julio Davalos on utilizing recycled aggregates for producing structural concrete.

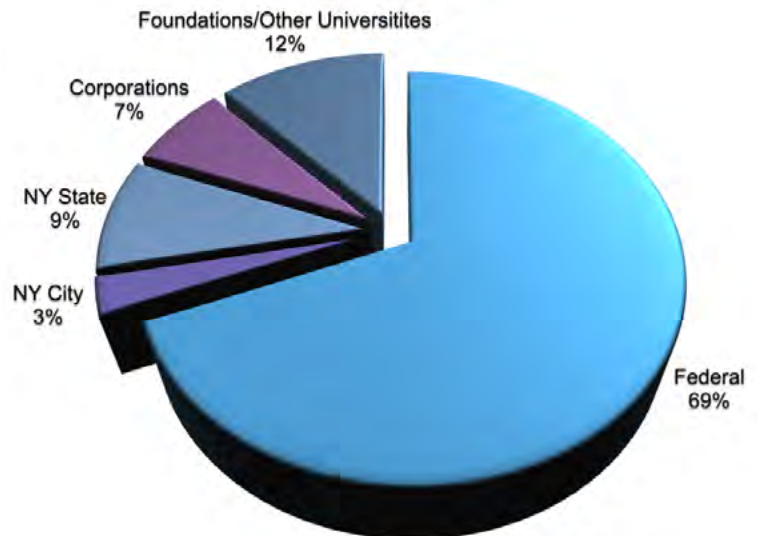


# External Funding

**Federal Funding by Agency**  
Total: \$17,185,351



**Funding Distribution by Sources**  
Total: \$24,845,486



## Centers and Institutes

The School of Engineering hosts a number of organized Centers and Institutes. Each of these serves as a focal point for concerted research efforts and competes for external research funding. In addition, GSOE faculty participate in the administration and research activities of two research centers housed in the CCNY Division of Science, the Institute for Ultrafast Spectroscopy and Lasers, and the Center for the Analysis of Structures and Interfaces.

Benjamin Levich Institute for Physicochemical Hydrodynamics

New York Center for Biomedical Engineering

Center for Algorithms and Interactive Scientific Software

Center for Information Networking and Telecommunications

CUNY Institute for Urban Systems

Zahn Center for Entrepreneurship

NOAA-CREST Center

CUNY Institute for Transportation Systems

CUNY Center for Advanced Technology

CUNY Energy Institute

Institute for Environmental Science and Engineering

Center for Advanced Engineering Design and Development

NSF Center for Metamaterials

# List of Active Grants in Fiscal Year 2012-2013

- Agrawal, Anil**, NYS DEPT OF TRANS, \$25,392, Verification/Development of Seismic Design Specifications for Downstate Zone
- Auguste, Debra**, NIH, \$2,295,000, Personalized Therapeutics for Inhibiting Breast Cancer Metastasis
- Banerjee, Sanjoy**, BATTELLE, \$25,000, Consortium for Advanced Simulation of Light Water Reactors (CASL)
- Banerjee, Sonjoy, U.S. Department of Energy, ARPA-E , \$1,075,401, Low-cost grid-scale electrical storage using a flow-assisted rechargeable zinc-manganese oxide battery
- Banerjee, Sanjoy**, BROOKHAVEN NAT'L LAB, \$65,000, Electrochemical Cell Development for Materials Characterization for Flow Assisted Zn/ NiOOH and Zn/MnO<sub>2</sub> Batteries
- Banerjee, Sanjoy**, BROOKHAVEN NAT'L LAB, \$42,000, Electrochemical Cell Development for Materials Characterization for Flow Assisted Zn/ NiOOH and Zn/MnO<sub>2</sub> Batteries
- Barba, Joseph**, CITY COLLEGE FUND, \$40,000, Mechanical Engineering Student Research Stipends
- Barba, Joseph**, NYS EDUCATION DEPT, \$11,670, CCNY/SCRIP Science and Technology Entry Program (STEP)
- Barba, Joseph**, NYS EDUCATION DEPT, \$122,540, CCNY/SCRIP Science and Technology Entry Program (STEP)
- Bikson, Marom**, SOTERIX MEDICAL INC, \$8,500, Targeted Transcranial Electro-Therapy Device to Accelerate Stroke Rehabilitation
- Bikson, Marom**, US AFOSR, \$271,027, Cellular Mechanisms of Transcranial Direct Current Stimulation
- Bikson, Marom**, COULTER FDN, \$130,000, Early Career Translational Research Award - Phase II
- Bobker, Michael**, IMT, \$3,870, CUNY Benchmarking Help Center
- Bobker, Michael**, IMT, \$5,370, CUNY Benchmarking Help Center
- Bobker, Michael**, DVIRC, \$15,000, Building Construction Technology Extension Program Pilot Project
- Cardoso, Luis**, NSF, \$312,900, MRI: Acquisition of a High Resolution in Vivo Micro-Imaging Ultrasound System for Research at The City College of New York
- Cardoso, Luis**, A. EINSTEIN COLL OF MED, \$20,000, Maintaining Cartilage Integrity in OA by Mechanical Intervention
- Castaldi, Marco**, SUNCOKE ENERGY INC, \$25,000, Project Luxx: Kinetic Rate Parameter Determination Utilizing a Netzsch Luxx 409 STA Thermogravimetric Analyzer (TGA)
- Castaldi, Marco**, NSF, \$147,073, CAREER: Environmentally Significant Reforming Reactions Studied Using a Novel Catalytic Shock Tube
- Castaldi, Marco**, CITY COLLEGE FUND, \$17,937, Student Research
- Conway, Alison**, US DEPT OF TRANS, \$10,000, The Dwight David Eisenhower Transportation Fellowship Program: 2012 Eisenhower Hispanic Serving Institutions Fellowship
- Conway, Alison**, US DEPT OF TRANS, \$7,500, The Dwight David Eisenhower Transportation Fellowship Program: 2012 Eisenhower Hispanic Serving Institutions Fellowship
- Conway, Alison**, US DEPT OF TRANS, \$5,000, The Dwight David Eisenhower Transportation Fellowship Program: 2012 Eisenhower Hispanic Serving Institutions Fellowship

**Conway, Alison**, NYSERDA, \$74,953, Freight-Tricycle Operations in New York City

**Crouse, David**, CORNING INC, \$10,000, Industry/University Cooperative Research Center

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**Crouse, David**, CORNING INC, \$10,000, Industry/University Cooperative Research Center

**Crouse, David**, CORNING INC, \$10,000, Industry/University Cooperative Research Center

**Crouse, David**, GOODRICH ISR SYSTEMS, \$40,000, Industry/University Cooperative Research Center

**Crouse, David**, NSF REV, Research Experience for Veterans via IUCRC, \$9,000, Fiber Optics

**Crouse, David**, National Science Foundation, Div of Industrial Innovation and Partnerships, \$93,000, Industry University Cooperative Research Center for Metamaterials

**Crouse, David**, Xerox via Industry University Cooperative Research Center for Metamaterials, \$40,000, Process Development of Composite Materials

**Crouse, David**, AFRL via Industry University Cooperative Research Center for Metamaterials, \$40,000, Rapid Prototyping and Printing of Tunable Metamaterials

**Crouse, David**, Army via Industry University Cooperative Research Center for Metamaterials, \$35,000, Process Development of Composite Materials

**Crouse, David**, AFRL via Industry University Cooperative Research Center for Metamaterials, \$40,000, Design and Fabrication of Composite Optical Metamaterials

**Crouse, David**, AFRL via Industry University Cooperative Research Center for Metamaterials, \$35,000, High-Resolution E-field Mapping for IR Metamaterials

**Crouse, David**, AFRL via Industry University Cooperative Research Center for Metamaterials, \$40,000, Design and Fabrication of Low-Loss Low-Index Optical Metamaterials

**Crouse, David**, AFRL via Industry University Cooperative Research Center for Metamaterials, \$5,000, Low-Loss Negative-Index THz Lens

**Crouse, David**, Raytheon via Industry University Cooperative Research Center for Metamaterials, \$50,000, Conformal Metamaterial Antennas

**Crouse, David**, PHOEBUS OPTOELECTRONICS, \$15,000, Industry/University Cooperative Research Center

**Crouse, David**, RAYTHEON CO, \$50,000, Industry/University Cooperative Research Center

**Crouse, David**, NYSTAR, \$921,200, CAT: Center for Advanced Technology

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**Davalos, Julio**, U OF IDAHO, \$121,172, Energy Efficient Integrated FRp - Confined Sandwich Roof System

**Diyamandoglu, Vasil**, NYC DEPT OF SANITATION, \$645,475, NYC Materials Exchange Development Program

**Diyamandoglu, Vasil**, NYC DEPT OF SANITATION, \$192,029, NY Wastematch Program

**Dorsinville, Roger**, CORNING INC, \$25,000, Characterization of Carbon Composites

**Dorsinville, Roger**, PHOEBUS OPTOELECTRONICS, \$15,000, Narrowband Perfect Absorber Using Metamaterials

**Dorsinville, Roger**, U OF VERMONT, \$49,999, Experimental Program to Stimulate Competitive Research  
- Minority Serving Institution Faculty Engagement Competition

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**Parker, Neville**, NSF, \$500,000, NYC Louis Stokes Alliance

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**Rossow, William**, JET PROPULSION LAB, \$25,000, NASA - Cloudsat Mission



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**Tarbell, John**, NIH, \$57,971, The Endothelial Glycocalyx: Its Structure and Function and as a Mechanotransducer

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**Temimi, Marouane**, U OF MARYLAND, \$75,000, CICS: Development of an Upgraded Southern Hemisphere Snow/Ice Product

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**Tian, YingLi**, IBM CORP, \$2,500, The 3rd Greater New York Multimedia and Vision Meeting

**Tian, YingLi**, OFFICE OF NAVAL RSH, \$137,045, Tracking and Predicting Fine Scale Sea Ice Motion by Constructing Super-Resolution Images and Fusing Multiple Satellite Sensors

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**Voiculescu, Ioana**, MIT, \$41,579, Exploration of MEMS-Based Detection of the Responses of Small Colonies of Cells

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**Wolberg, George**, NAT'L SECURITY TECH LLC, \$68,181, Feature-Based Data Fusion for 3D Photography

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**Zhu, Zhigang**, NSF, \$5,012, EFRI-M3C: Mobility Skill Acquisition and Learning through Alternative and Multimodal Perception for Visually Impaired People

**Zhu, Zhigang**, NSF, \$120,000, EFRI-M3C: Mobility Skill Acquisition and Learning through Alternative and Multimodal Perception for Visually Impaired People

**Zhu, Zhigang**, NSF, \$50,000, I-CORPS: 3D VIEWING EXPERIENCE

**Zhu, Zhigang**, NSF, \$19,250, IEEE Workshop on Multimodal and Alternative Perception for Visually Impaired People (MAP4VIP)

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# Overview of Engineering at City College



The Grove School of Engineering at The City College of New York is home to an exceptional publicly supported engineering program in the heart of New York City.

Situated on a 36-acre campus in northern Manhattan, distinguished by some of the country's earliest and still most beautiful university gothic architecture, the Grove School benefits from the proud heritage and high record of achievement of The City College – one of the single most powerful avenues of access to the American Dream in our nation.

CCNY's School of Engineering was one of the first public institutions of its kind, and is still the only public school of engineering in New York City. The School's ties to engineering go back to 1853, when City College was known as the Free Academy of New York, and a course in civil engineering was required for all students. In 1919, the College's Board of Trustees approved the creation of a separate School of Technology with its own dean and faculty, and in 1962 it formally became the School of Engineering and moved to its current home in Steinman Hall. In 2004, the name was again changed to the Grove School in recognition of Andrew Grove '60 ChE, cofounder of the Intel Corporation, and his \$26 million gift to his alma mater.

The Grove School of Engineering holds a position of national standing among public schools of engineering, and is recognized for the excellence of its instructional and research programs, particularly in technologies with relevance to New York City and New York State. It also leads in the breadth of its offerings, with bachelor's, master's, and doctoral degree programs in eight engineering fields – biomedical, chemical, civil, computer, electrical, environmental and mechanical engineering, and computer science.

Continuing in the tradition of the City College mission, access and excellence, the Grove School proudly takes its place as one of the most diverse schools in the nation, consistently graduating high numbers of women and other underrepresented populations, working adults, and immigrants.

Mirroring the renaissance that has spread across City College in recent years, the Grove School has experienced a period of dynamic growth. Over 40% of the students who are admitted to the CCNY Honors Programs plan to choose engineering as their major field of study. In addition, large numbers of graduates from the New York City special high schools, including Stuyvesant, Bronx Science, Brooklyn Tech, and City College's own High School for Math, Science, and Engineering, now make City College their first choice.

And, once students arrive on campus, they make the Grove School proud, piling up honors and awards and gaining admission to some of the country's most competitive graduate programs. . Three members of the Class of '13 and five recent GSOE graduates, already pursuing their doctorates, have been selected for the prestigious award National Science Foundation Graduate Research Fellowship. Chemical Engineering student, Alla Zamarayeva '14, is part of a select group of the nation's top students who received the 2013 Goldwater Scholarship. And Jan Stepinski of Environmental Engineering was chosen as the 2013 CCNY Valedictorian.

Alumni who return to the College comment on how they see themselves in today's students, who are as hardworking and ambitious as they were. This, in turn, is fueling the steadily increasing level of alumni involvement, which is having a huge impact on the Grove School's continuing forward momentum.



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