cable

The Alumni Magazine of the NYU Polytechnic School of Engineering
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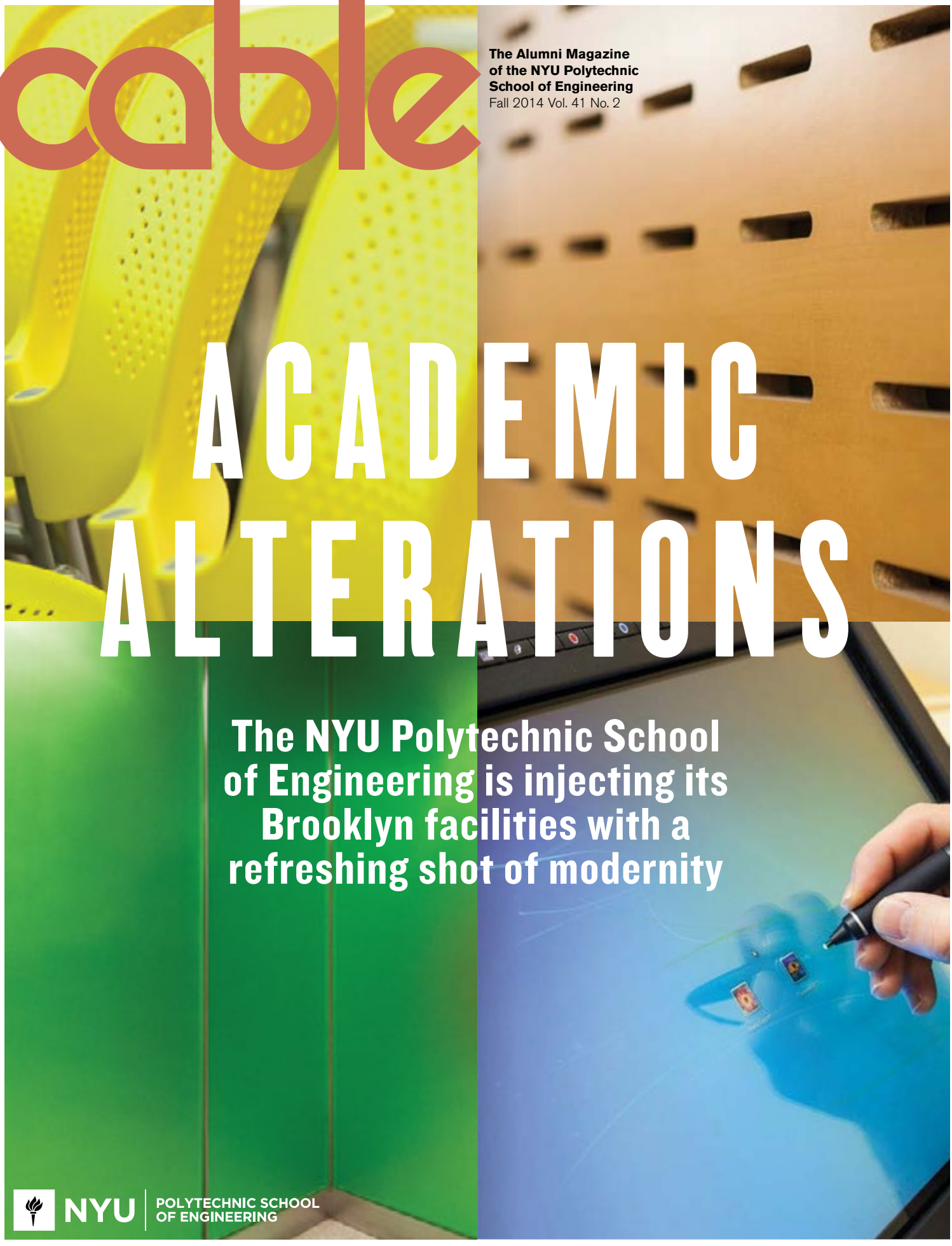


ACADEMIC ALTERATIONS

The NYU Polytechnic School of Engineering is injecting its Brooklyn facilities with a refreshing shot of modernity

NYU | POLYTECHNIC SCHOOL OF ENGINEERING

Call for Nominations

Polytechnic Institute Alumni Association Seeking Nominations for Officers and for International Board of Directors (5 seats)

Polytechnic Institute Alumni Association Seeking Nominations for the following Officers for term 2015–2017:

PRESIDENT
EXECUTIVE VICE PRESIDENT
VICE PRESIDENT
TREASURER
SECRETARY

(5) Seats for the International Board of Directors for the term 2015–18

Potential nominees should have demonstrated service and leadership and display a strong understanding and commitment to the mission of the Alumni Association and the advancement of NYU Polytechnic School of Engineering.

Nomination deadline for the 2015 election is February 23. Make nominations in writing to engineering.nyu.edu/alumni/nominate or by mail to the Office of Alumni Relations, 15 MetroTech Center, Brooklyn, NY 11201

Learn more about the PIAA by visiting http:engineering.nyu.edu/alumni or http:engineering.nyu.edu/PIAA.

Back to School Day

The Office of Alumni Relations and the Polytechnic Institute Alumni Association are pleased to invite you to return to Brooklyn and your alma mater for our annual Back to School Day event, being held on Saturday, April 25, 2015.

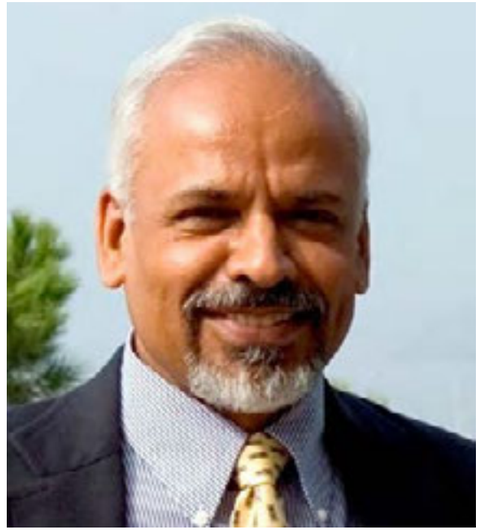
We would like to extend a special invitation to the Class of 1965, as we celebrate the **50-YEAR ANNIVERSARY OF YOUR GRADUATION**. If you are a member of the Class of 1965 and are interested in helping us plan a memorable event, contact Valerie Cabral, director of alumni relations at vjc1@nyu.edu.

Looking forward to seeing you on Saturday, April 25, 2015.

Come celebrate, reconnect with fellow alumni and revisit all your great Poly memories!

On the Cover:
New classrooms, a revamped library, and energy-efficient windows are all a part of the modern face of the NYU Polytechnic School of Engineering.

On the Web:
Access the Fall 2014 digital issue of *Cable* at engineering.nyu.edu/cable!



Dear Alumni and Friends,

The one constant in engineering is change. While we take pride in being the school that educated James Wood (1879)—responsible for the machinery that produced the distinctive cables of the iconic Brooklyn Bridge—and Jasper Kane ('28)—who discovered a process to mass-produce penicillin, thereby saving more than a million lives during World War II alone—we take equal pride in our engineers who helped develop the world's first integrated circuits, made enormous strides in biotechnology, and those who are at the forefront today of information technology and the much needed clean-energy solutions.

Everyone now knows engineers to be not merely the people who design bridges and skyscrapers but also the ones who make possible wireless communication, protein engineering, big data analysis, and a host of medical marvels that would have been inconceivable not long ago. Thanks to our Institute for Engineered Interfaces, Center for Advanced Technology in Telecommunications, Center for Interdisciplinary Studies in Security and Privacy, NYU WIRELESS, and Media and Games Network and the Games Innovation Laboratory, we are at the forefront of those fields and more.

But the face of engineering is changing in many other ways as well.

In this issue you will read more about Professor Jin Montclare, who is not only engineering protein microfibers but making it her mission to mentor aspiring women scientists and technologists. Thanks to her efforts, and efforts like hers, the face of engineering is sometimes a female one. You'll read about our Center for K12 STEM Education, which is creating innovative educational programs for middle schools and high schools around the city and around the world. Thanks to the Center, the face of engineering is now sometimes also a young one.

Elsewhere in *Cable* you'll read about the new Governance Lab, located at 2 MetroTech Center. You may never have thought that engineering and public policy shared a deep connection, but GovLab, as it is known, brings together those who design, implement, and study technology-enabled ways to increase civic engagement and solve public problems. The face of engineering can now be the face of every proactive and engaged citizen who seeks openness in governance.

As we celebrate the changes taking place in engineering, we can also celebrate the changes taking place right here at your alma mater. I encourage you to review the photo essay on the ongoing improvements being made to our facilities: classrooms renovated, well-equipped labs created, public areas made increasingly inviting, and more. But, of course, an institution is made up not only of its bricks and mortar but of its people, and I am thus happy to announce that a large and impressive new group of faculty members has joined us this year. Read about them in this issue and visit us to meet them in person when you have the opportunity. Your old professors will also, no doubt, be gratified to see you.

Our doors are always open to you, our dedicated alumni and friends. I am delighted that you have remained part of the changing face of the NYU Polytechnic School of Engineering.

Sincerely,

K. R. Sreenivasan

Katepalli Sreenivasan

cable

Katepalli Sreenivasan
DEAN OF ENGINEERING AT NYU

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Dear Fellow Alumni,

The issue of *Cable* that you're now reading is packed with news about what's going on at the NYU Polytechnic School of Engineering, and I hope it inspires a great deal of pride in you to read about such cutting-edge research and so many accomplished students. I hope, however, that it inspires more than mere pride (no matter how justifiable); I hope it also inspires action on your part.

I realize, of course, that a call to action is futile without practical suggestions for what form that action might take. To that end, here are just a few suggestions.

- Give our students a glimpse of future career possibilities by arranging for them to visit your company or shadow you at work.
- Recruit a talented student for an internship or hire a graduate seeking employment.
- Participate in collaborative research. Our professors are making discoveries that could directly benefit your company.
- Need a respected expert? One of our faculty members could fit the bill.
- If you are an industry expert, consider volunteering to give a guest lecture. Our students could benefit from your wisdom.
- Take part in your employers' matching-donation programs, which double the impact of your gifts.
- Fund a scholarship or fellowship in order to help deserving students attain their educational goals.
- Serve as a much-needed mentor.
- Move your own career forward by taking part in our many executive education programs.
- Network and reconnect with fellow graduates at one of our alumni events. The Office of Alumni Relations is working hard to plan fun and enlightening activities.

As you can see from this list, staying involved with your alma mater is far from a one-way street. If you're advancing your career with executive education, having fun at an alumni event, or finding a bright student to hire, you are enjoying some of the benefits that go along with being an alum of our fine school. (And speaking of benefits, are you taking advantage of the many discounts and facilities to which you're entitled? See nyualumni.com/benefits for more information.) Please remember that the theme of my tenure as President of your Alumni Association is "Engagement" and the examples provided are just a few ways in which you can become engaged.

Feel free to contact the Alumni Relations Office at engineering.alumni@nyu.edu or call 718.260.3885 for other suggestions about how to become more involved—or to make your own creative suggestions. Valerie Cabral and her staff are always thrilled to hear from you. Drive to be innovators, inventors and entrepreneurs. Just as previous generations of devoted alumni extended their support to us, we must do the same for them.

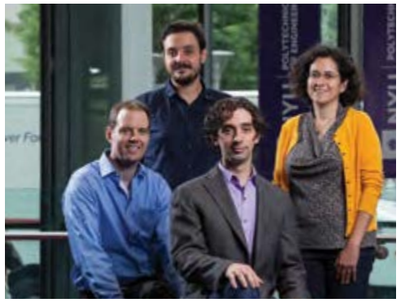
Warm Regards,

Gerald W. Dawes

Gerald W. Dawes
'84EE '89EE
PIAA President

BRILLIANTLY BATTY

Alum Nicole Abaid Lands on the "Brilliant 10" List for Her Research on How Bats Communicate



CLOCKWISE FROM FAR LEFT: ABAID WITH HER MENTOR, PROFESSOR MAURIZIO PORFIRI; ABAID'S FATHER, DOUGLAS ABAID, WHO IS AN ALUM OF NYU'S DENTAL SCHOOL; THE BRILLIANT 10 (CLOCKWISE FROM FAR LEFT): JUSTIN CAPPOS, MAURIZIO PORFIRI, NICOLE ABAID, AND JONATHAN VIVENTI

A bat-filled cave in the mountains of Jinan, China, hardly seems like the right milieu for a Brooklyn-educated mechanical engineer-mathematician. "It really feels more like Indiana Jones territory," Nicole Abaid, a 2012 PhD recipient of the school, says. Abaid traveled to that far-flung and colorful locale not to retrieve valuable coins or biblical artifacts but to leave infrared cameras and ultrasonic microphones. The goal: to gather data that would confirm her mathematical model of how the furry, flying mammals share information with one another. Her work—which is expected to one day help engineers manipulate engineered systems, like underwater vehicles that rely on sonar—earned her a spot on the 2014 edition of *Popular Science*'s prestigious "Brilliant 10" list, comprised of young scientists who are poised to revolutionize their fields.

The road from Brooklyn to Jinan was far from direct—one might even say Abaid's journey started in Syria, where her paternal great-grandparents lived. Shortly after they moved to Manhattan, her grandfather, George, was born; George Abaid earned a bachelor's degree in 1934 from NYU, back when the school's engineering program was located in the Heights section of the city. He worked for much of his career at Northrup-Grumman, on Long Island, helping design fighter jets and lunar modules, and returned to school decades later to earn a master's degree in electrical engineering.

Her Brooklyn-born father, Douglas, was also drawn to NYU, graduating from the dental school in 1966. (He subsequently joined the military, served as a medical officer during the Vietnam War, and currently still practices dentistry.) Nicole Abaid gave little thought to following in the footsteps of either of the men. "I grew up hearing my father discuss the difficulties of medical bureaucracy," she recalls, "so I knew I didn't want to do that. And as far as engineering, I didn't know well what engineers actually did, despite hearing my grandfather speak about his work from time to time."

Abaid settled on mathematics, earning a bachelor's degree in 2003 from the University of North Carolina at Chapel Hill and a master's in 2008 from the University of Kansas. When it came time to decide her next move, however, she had something of an epiphany: engineering represented the intersection of math and real-world experience, and the NYU School of Engineering would be a great place to study it.

"I was very lucky," Abaid says. "Maurizio Porfiri, in the Department of Mechanical and Aerospace Engineering, was doing math-oriented research, and when I got the chance to work with him, it proved life-changing. I was able to learn about the hugely diverse range of problems engineers tackle every day, which was really exciting." Porfiri (see sidebar) was doing groundbreaking work designing underwater robots that emulate real animal behavior, and it was, as Abaid calls it, "a rare experience" to work with him on mathematically modeling how fish move.

Abaid earned her doctorate in mechanical engineering in Porfiri's lab in 2012 and is now an assistant professor of engineering science and mechanics at Virginia Tech. Deeply involved in a K-12 education program called AMPS (Applying Mechatronics to Promote Science) while in graduate school, she remains committed to spreading a love of engineering to young people and currently organizes a LEGO robotics team made up of girls aged 9 to 12 from Blacksburg, where Virginia Tech is located.

It might pay to keep your eyes on the "Brilliant 10" list about 20 years from now; one of those girls could be making an appearance if Abaid has anything to do with it. ■

A Protégé Makes Four

Abaid's inclusion in the 2014 "Brilliant 10" marks an historic circumstance: one of the very few times a "Brilliant" has been taught by a "Brilliant" from a previous list. In 2010, Maurizio Porfiri was dubbed the "Water Wizard" by the editors of *Popular Science*, who wrote, "The waters that cover about 70 percent of the Earth's surface are basically unexplored. But underwater vehicle systems lag behind their surface counterparts in power (solar can't be used in the deep) and communications systems (Wi-Fi doesn't exactly crank through 300 feet of liquid). Porfiri's lab could close that gap."

If that wasn't coincidence and connection enough, Abaid is joined on the 2014 list by Jonathan Viventi, an NYU Polytechnic School of Engineering assistant professor of electrical and computer engineering. Viventi was honored as a pioneer in a field of biomedical engineering that utilizes flexible electronics and for his design of implantable devices that allow active circuitry to sit directly on the surface of the brain with no tissue damage.

The School of Engineering's inclusion on the list goes even deeper, however. Last year, Justin Cappos, an assistant professor of computer science and engineering, was dubbed a "Brilliant" for his creation of Seattle, an open-source cloud computing system that allows anyone to experience the Internet from the perspective of any location around the globe. For example, a student living under a repressive political regime that limits Internet access could use Seattle to circumvent censorship and view the same content that a student in New York City is seeing. Cappos has said that he'd like to see the system used to surf the Web from the International Space Station one day.

Although that idea might appear at first to be unlikely, Cappos is not prone to flights of fancy. The astonishing fact that three professors from a school as small as the School of Engineering have been named to the "Brilliant 10," he asserts, is testament to the university's focus on real-world problems. "There's a common theme here that many of our faculty are addressing practical issues," he says. "We're rewarded for solving problems."

AN ELECTRIFYING DEVELOPMENT

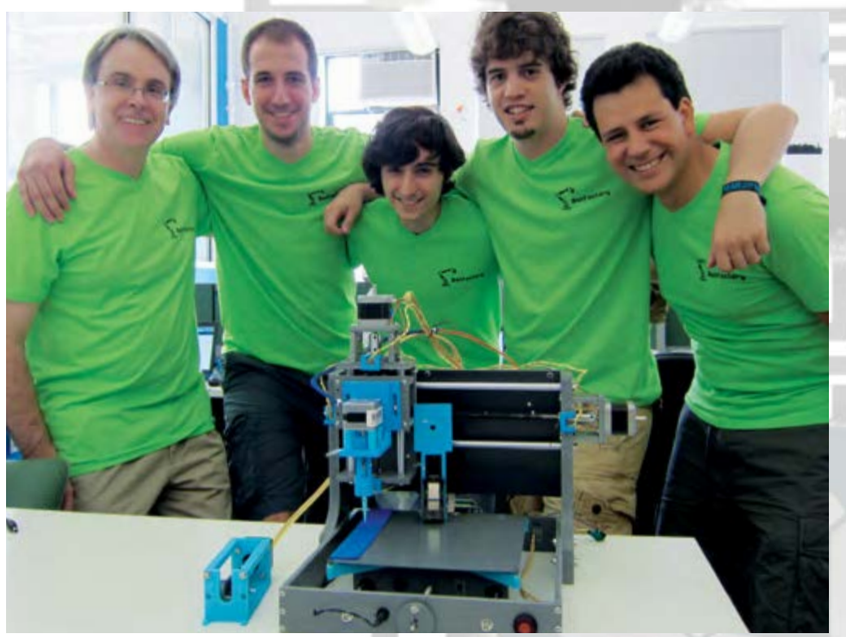
BotFactory Is Changing the Face of Circuit Boards

Modern technology is arguably spoiling us. Streaming allows us to see almost any film we want with just a couple of clicks; Amazon, Fresh Direct, and a plethora of other companies deliver goods right to our doors; and we can snap, edit, and send photos with a few swipes on our smartphones.

So in this day and age, why should an electrical engineer wait 10 days and pay $250 to create a prototype circuit board?

BotFactory is a startup devoted to revolutionizing the process with a product they call Squink—the name is an amalgam of "squeeze" and "ink"— a personal electronic circuit factory that can produce a prototype board in about 30 minutes for under $5. Squink can be used by experienced designers to accelerate their development cycle and also empowers communities with limited access to fabrication services. (Because components are glued, rather than soldered, even children can produce a working prototype.)

Nicolas Vansnick (POLY-ENG '13), co-founder and CEO, and Carlos Ospina (POLY-ENG '14), co-founder and CTO, are graduates of the NYU Polytechnic School of Engineering, and the pair met their third co-founder, Professor Mike Knox, back when they were students. Knox—part of a program called Faculty Engineers in Residence, which connects budding entrepreneurs to teachers with business experience—had mentored the two when they entered the initial version of Squink in the school's Inno/Vention contest, where it placed in the hardware category, and decided to join them in their enterprise. BotFactory's connections to NYU run even deeper, however: it is housed at the DUMBO incubator, one of three such facilities maintained by the School of Engineering.



THE TEAM BEHIND BOTFACTORY WITH THEIR PROTOTYPE, A PERSONAL ELECTRONIC CIRCUIT FACTORY CALLED SQUINK

Hoping to begin manufacturing units on a larger scale, the company recently mounted a Kickstarter campaign that raised more than $100,000 in pledges with the help of 260 backers. While a handful had pledged $9,999 or more, the vast majority had promised $50 or less, probable evidence that the project enjoyed widespread support among students and amateur inventors—the very audience of consumers they're addressing with Squink. ■

LIKE FATHER, LIKE SON

Bill Schmidt and His Father, William C. Schmidt ('37EE), Are Both Exemplars of Hard Work and Generosity

Bill Schmidt can speak with authority on any number of interesting topics—from industrial and financial history (he has amassed a museum-quality collection of antique stock certificates) to protein crystallography (he focused on the area while earning his PhD from the University of Virginia Medical School in 1975). He speaks with special passion about one particular topic, however: his parents. "They were saints," he says emphatically.

His father, William C. Schmidt, had lost his own father early on. "He was just 14 at the time," Bill Schmidt relates, "so he didn't get to have much of a childhood, and he worked hard as a bag boy at a local market to help support his family." Those responsibilities did not prevent him from focusing on his high-school studies, and after graduating in 1927, the elder Schmidt got a job in the mail room of AT&T, thanks to a sister who already worked at the company. Following a full day of sorting and ferrying mail, he attended evening classes at what was known at the time as the Polytechnic Institute of Brooklyn and then took the long train ride home to Carlstadt, New Jersey. "His days started well before 7 a.m.," Bill Schmidt says, "and he had an incredible work ethic in the face of grueling demands."

After earning a BS degree in electrical engineering in 1937, William Schmidt remained at AT&T, where he focused on increasingly miniaturizing circuit boards. An inveterate researcher, he held several patents and had little interest in moving into a management spot. "By the mid-1970s, when he retired, he was probably making no more than $25,000 a year," Bill Schmidt recalls. "But he made sure we had everything we needed and more." In addition to being a good provider, Schmidt was a devoted husband and father, who delighted in restoring antique automobiles and building a scale model live steam locomotive with his son.

WILLIAM C. SCHMIDT, A 1937 GRADUATE AND FATHER TO BILL SCHMIDT, WITH HIS WIFE

He also never forgot his alma mater and how the degree he worked so hard to earn had enriched his life. He thus became a member of the Samuel B. Duryea Society, which recognizes those who have named the School of Engineering as a beneficiary when planning their estates. Bill Schmidt, wanting to honor the bonds his father had forged, has also made generous provisions for the school and is himself a member of the NYU Society of the Torch.

And although he maintains a hectic schedule writing articles for such publications as *Financial History* and *Manuscripts*, sitting on various boards, conducting historical research, and organizing his impressive collection, Bill Schmidt is never too busy to extoll the virtues of one of the men he admires most in the world. "My father led an exemplary life and had very solid values," he says. "Wanting to give back to his alma mater was very typical of him."

For more information about planned giving or joining the Samuel B. Duryea Society, please contact Judy Sager, Associate Dean for Development and Alumni Relations at jsager@nyu.edu. ■

REACHING FOR THE STARS

A Trio of Astronaut Alums Come to Brooklyn for NYU's Annual Speakers on the Square Series

LEFT TO RIGHT: PAULO NESPOLI (POLY-ENG '88 '89), CHARLES CAMARDA (POLY-ENG '72), DEAN KATEPALLI SREENIVASAN, LEE MORIN (GSAS '78, MED '81 '82)

"It's definitely the blue jumpsuits," Lee Morin joked. "If we took these off, we'd fade into anonymity." Morin was speaking while shaking hands, signing autographs, and posing for cell-phone photos with excited fans who had come out to hear him speak, along with fellow astronauts Charles Camarda and Paolo Nespoli, at "Speakers on the Square…Astronauts in Brooklyn," an event sponsored by the NYU Polytechnic School of Engineering and the NYU Alumni Association.

It was something of a homecoming for the three, since each is an NYU graduate. Camarda earned his undergraduate degree in aerospace engineering in 1974; Morin's NYU degrees include a master's in biochemistry (1978) and a doctorate of both medicine and microbiology ('81 and '82); and Nespoli holds a B.S. in aerospace engineering ('88) and an M.S. in aeronautics and astronautics ('89).

"We're feeling a lot of pride tonight," Gerry Dawes (POLY-ENG '84 '89), the president of the Polytechnic Institute Alumni Association (PIAA), asserted, unable to resist quipping, "It feels out of this world." Frank Namad (POLY-ENG '68), a fellow PIAA officer sitting next to him, added, "This just goes to prove how far an NYU education can take you—even all the way into space."

Collectively, Camarda, Morin, and Nespoli—who were joined on stage by Lockheed Martin aerospace engineer Nicholas Mitchell (POLY-ENG '92) as discussion moderator—have logged 200 days in space during a variety of missions, which have included, in the case of Nespoli, a 159-day stay at the International Space Station.

The group was introduced to the audience by Dean Katepalli Sreenivasan, who, despite his own accomplishments as a renowned physicist, admitted that he never dreamed as a child that he could become an astronaut. "I knew I could be a scientist, diplomat, or even poet, but astronaut was out of the realm of possibility," he said. "These men are living proof that we can reach for the stars both literally and figuratively."

Mitchell kept the discussion lively, asking several compelling questions—including why we need an international presence in space. "We live in a global society, and we need to be able to work and communicate with others," Camarda replied. "Some technical problems are addressed differently by different people; there are no homogeneous solutions, and it's very important to realize that with diversity comes imagination and ingenuity." Gesturing to a slide of the International Space Station, Nespoli concurred, and added, "It gives me hope. If we can accomplish this in space, think of what we are capable of accomplishing on Earth." ■

BELL LABS FELLOW—THAT HAS A NICE RING TO IT

Alum Walter Honcharenko Is Accorded the Highest Honor Given to a Member of the Alcatel-Lucent Technical Community

BELOW (LEFT TO RIGHT): WALTER HONCHARENKO, NEWLY NAMED A BELL LABS FELLOW, IN HIS LAB; A SHOT FROM THE CEREMONY HELD IN PARIS LAST FALL

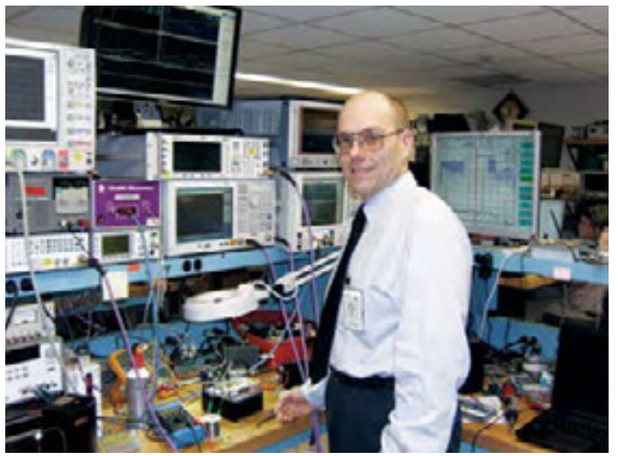
"In sixth grade, I ran an antenna wire around my classroom," Walter Honcharenko (POLY-ENG '89, '90, '93) recalls. "My teacher thought I was crazy, but we were able to receive an AM news broadcast on a crystal radio wound on an oatmeal container. Later, in high school, I was the one in the background at the one and only school radio station in NYC, WHIL Radio 680 on the AM dial, turning the knobs and fixing the turntables."

Honcharenko has moved well out of the background since then. In November 2013, he was front and center at the ceremony celebrating the new class of Bell Lab Fellows, being feted for his major contributions to the company's radio and power amplifier technology and architecture.

Being named a Bell Labs Fellow is a rare honor; only a handful are chosen each year, and the selection process is lengthy and exhaustive. The multi-page form submitted by his enthusiastic nominator includes the assertion that Honcharenko "is widely recognized as THE expert in the area of digital pre-distortion and radio signal processing not only in the company but in the industry at large" and concludes, "Perhaps the highest compliment one can pay Walter is that he is a 'blue-collar' PhD; that is, not only does he possess a brilliant theoretical technical background, but he also knows how to apply it in working with 'real-world' products."

His alma mater, Honcharenko acknowledges, provided the launch pad that allowed him to soar in his field. "I was accepted to many Ivy League schools, but ultimately decided on [what was then known as] Brooklyn Poly," he said during his acceptance speech. "It was close to home and low cost, and they had a reputation for post-WWII radar and radio research. Little did I know I would have Henry Bertoni, Bernard Cheo, Athanasois Papoulis, Leopold Felson, and Theodor Tamir as my professors … all those engineering textbooks on communication theory and electromagnetics were written by these guys!"

His fans at Alcatel-Lucent are awaiting Honcharenko's completion of a book on technical achievement and being a vital asset to one's company. ■



SUPERSTORM SANDY'S SALTY LEGACY

Alum Sal DePrisco's Company Is Helping the City on the Road to Recovery

CLOCKWISE FROM FAR LEFT: A RUNWAY AT JFK INTERNATIONAL AIRPORT; THE VIEW OF TOWER 1 OF THE WORLD TRADE CENTER FROM TOWER 4; THE TEAM ON THE 102ND FL OF TOWER 1

Sal DePrisco (POLY-ENG '82) knows full well the value of a degree in chemical engineering. Although he graduated during one of the worst economic recessions in recent memory, he immediately received multiple job offers. He settled on a position with General Foods, working as a Process Engineer in the Plant Engineering Department of Maxwell House Coffee, at the Hoboken, NJ, facility. "A million pounds a day were processed there," he says. "And as a typical kid of the Space Age, growing up fascinated by how things worked, I found it was a terrific place to work. Chemical engineers at Maxwell House are involved in every unit operation we ever learned about in school, and many more we didn't—filtration, mixing, distillation, reaction, you name it."

DePrisco, who later launched his own consulting company, Sensible Technical Solutions, is now focusing on a liquid much less beloved—and magnitudes more dangerous—than our morning cup of java: salt water. In early 2013, following Superstorm Sandy, which had devastated the area the previous year, DePrisco and his team were called upon to examine the facilities under the control of the Port Authority of New York and New Jersey (PANYNJ), inspecting and benchmarking the damage caused by contact with the salt water that churned during the storm, and to provide guidance as to future repairs and maintenance.

It was, inarguably, a daunting process. Among the structures they inspected were the Holland Tunnel, which includes numerous areas that motorists never see, such as vent buildings and pump rooms and beneath the roadway; PATH tunnels, passenger stations, electrical substations, and maintenance yards; every major airport in the region, including JFK International, Newark Liberty, and LaGuardia—from the busiest runways to the quietest nooks; Port Jersey, Port Newark, Port Elizabeth and the Brooklyn Piers, an assignment that included the massive gantry cranes used to offload cargo ships; and the entire World Trade Center site.

In all, they recorded almost 250,000 inspection points, taking some 18,000 photos. "These were not cursory inspections," DePrisco says. "We were on our hands and knees with magnifying glasses." Conducting an operation from the point of view of a chemical engineer, he explains, requires an eye for the minute. "After Sandy, anyone could see that entire piers had been washed away and that buildings had flooded. That kind of damage is obvious," he says. "But salt water is insidious. It's highly corrosive, and it doesn't matter if it's touched a surface for 30 seconds or 30 hours. The damage will lay latent, and can manifest months, or even years, later but it will occur."

By the end of the first phase of the project, Sensible Technical Solutions had uncovered hundreds of millions of dollars of hidden damage that PANYNJ and the Federal Emergency Management Agency (FEMA) had not found.

DePrisco is looking forward to a new phase of follow-up, which may lead, he strongly hopes, to standards for recovery from salt-water inundation that could be used on a national level. "It's important that our infrastructure not only get back to pre-catastrophe condition, but that it be even more resilient in the future," he asserts. ■

REMEMBERING A PROFESSOR'S PATIENCE, GUIDANCE, AND ACUMEN

A Former Student Pays Tribute to Phyllis Frankl with an Endowed Scholarship

Imagine arriving at the NYU Polytechnic School of Engineering as a newly minted doctoral student. You're eager to start down the road to earning your PhD, but there are a few significant obstacles in your path, like English being your second language and coming to Brooklyn with wife and child in tow.

It's a daunting prospect, but now imagine that you are lucky enough to have as your advisor Professor Phyllis Frankl. "From the very first day I got here, she was an enormous help," her former student, who prefers to remain anonymous, says. "It was important that I find scholarship money right away—if not, there would have been no way for me to undertake doctoral work—and she was instrumental in guiding me in that area."

Founding the Phyllis G. Frankl Scholarship Fund, which he's established in her name, he explains, is a way of paying tribute to his respected professor and ensuring that other students benefit from the wisdom and insight that she and her fellow School of Engineering faculty members provide. "Much of my professional success is due directly to the education I received there," he says, "and I hope this scholarship will allow others to gain those same advantages."

Frankl remembers the school's newest benefactor with special fondness. He was among the first PhD advisees of her career, and he arrived just as she received her first NSF grant. "He was bright, motivated, and hard-working," she recalls. "He was really everything a professor could wish for in a student."

For information on establishing an endowed scholarship, contact Judy Sager, Associate Dean of Development and Alumni Relations at jsager@nyu.edu. ■

A WINNING SPEAKER

John Trani Addresses the Engineering and Technology Forum

There are many ways to describe John Trani: alum, successful businessman, generous Promise Scholarship supporter, operating partner of the evocatively named private-equity firm Stonepeak, protégé of the legendary Jack Welch, former president and CEO of GE Medical Systems, and one-time chairman and CEO of The Stanley Works, among them. The descriptor that could arguably go at the very top of that list is, however, straight shooter.

On September 22, Trani (POLY-ENG '66 '69 '71, STERN '78) returned to the School of Engineering to address Professor David Lefer's Engineering and Technology Forum, which introduces new students to the core concepts of invention, innovation and entrepreneurship.

In the 1980s a straight-shooting Trani had famously rescued GE's ailing Mobile Communication Division, which had lost some $40 million in the years before his appointment; under his leadership the division quickly generated $42 million and was ultimately sold for $274 million—a turn-around that Jack Welch called, at the time, the most impressive in GE history. Trani opened his Forum lecture by succinctly outlining the three-pronged attack that made such a feat possible: simplify the business, restore operating effectiveness, and become competitive.

Those lucky enough to be in the audience received a primer on running a business in the real world. Among the lessons that should be gleaned from his time at GE, he explained: organizations are resilient and find people who can deliver, because while the brilliant idea is important, executing it is magnitudes more important.

Trani also gave "tips from the top," such as differentiate yourself; be an achiever not a talker; measurements matter, so know the score; learn from both failures and successes; be a team player; don't let money be your prime motivation, but don't sell yourself short either.

"If industry demand is high in your chosen field and you are very good at it, that's obviously a path you should pursue. If industry demand is low and you're a mediocre performer, stop right there and consider something else," Trani offered as career advice. And what if you're really good at something but industry demand happens to be low? "That's when you get creative," he asserted. "Maybe you should start your own business."

His closing piece of advice: Win! "Winning is fun," he exhorted. "Who would ever want to lose?" ■

MASS APPEAL

Primex Honors Alum John Farber with the Naming of Its Technology Center

Since graduating from what was then known as the Brooklyn Polytechnic Institute, John Farber (POLY-ENG'57) has enjoyed a long career in the chemicals industry. After joining his father-in-law at the Leslie Kleyman Corporation, a small import-export business, he formed a chemical trading division for the company, sourcing ingredients for the paints that his family once made in Romania. That company later became ICC Industries, parent to the Primex Plastics Corporation.

Farber has been honored frequently; in 2005, for example, he was given the Sesquicentennial Medal commemorating the school's 150th anniversary. Unlike that medal, his latest laurel is far too large to hang on a ribbon. It is, in fact, an entire building. Primex recently announced that they have named a new technology center in his honor. Company officials cited his business acumen, leadership skills, and devotion to science as pivotal factors in their decision. ■

THE NOSE KNOWS

A Master's Student from the NYU Polytechnic School of Engineering Devises a Better Method of Lie Detection

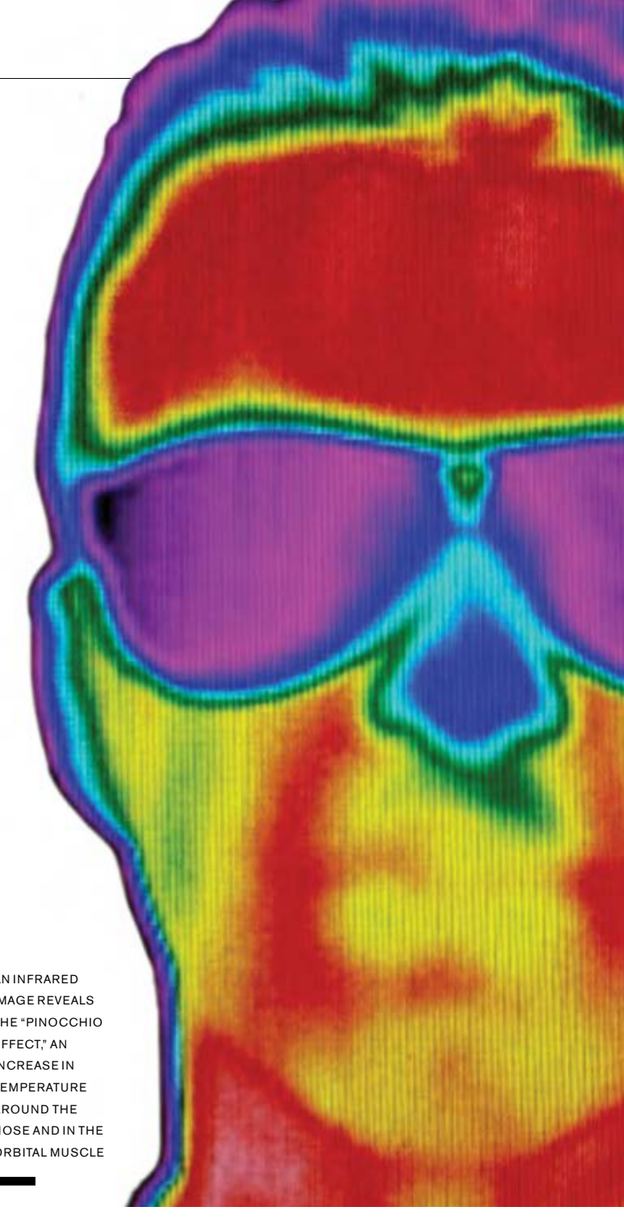
Cesare Lombroso, an Italian criminologist, created the world's first lie detection device at the end of the 19th century. Modifying an instrument called a hydrosphygmograph, which measured blood flow by means of a fluctuating column of water, he recorded the changes to pulse and blood pressure that occurred in a suspect during a police interrogation. While many of his views have since been discredited—he believed, for example, that jaw size directly correlated to criminal tendencies—his assertion that the physiological changes accompanying lying could be measured and used by law enforcement officials formed the backbone of contemporary lie detection.

In 1921, about a decade after Lombroso's death, Canadian psychologist John Larson developed what is generally acknowledged to be the first modern polygraph instrument, adding the means to measure respiration in addition to blood pressure and pulse. Except for the introduction of computer components, little has changed since then.

Polygraph testing still not only requires expensive, non-portable hardware, its accuracy rate could unquestionably be better. (Research has shown an average of just 83% accuracy.) Add to that the fact that many people now know how to fake the results of their test by controlling their breathing and heart rate.

Yaniv Azar, studying for his master's degree in electrical engineering, turned his focus to the problem of better lie detection. He was excited to learn that the previous year, in 2012, Spanish researchers had found that when a person lied there was an increase in the temperature around the nose and in the orbital muscle, due to increased blood flow to an area of the brain called the insula, which is activated during periods of heightened emotion—the so-called "Pinocchio Effect."

Azar approached Professor Matthew Campisi, renowned for using a technique called thermography, which produces an infrared image that shows the patterns of heat and blood flow to tissue, for the early detection of breast cancer. "Professor Campisi was a terrific resource," Azar says. "We did a lot of brainstorming and planned an experiment in which we would seat our subjects in front of an infrared camera and take images while asking them a series of easily answered questions, for example, their names. Sometimes they were instructed to lie and sometimes to tell the truth."



AN INFRARED IMAGE REVEALS THE "PINOCCHIO EFFECT," AN INCREASE IN TEMPERATURE AROUND THE NOSE AND IN THE ORBITAL MUSCLE

Using a proprietary algorithm that he hopes to one day patent, Azar was able to correlate the infrared images and the incidents of lying with a high degree of accuracy—fully 95%. He points out, additionally, that infrared cameras are relatively cost efficient, portable because they require no wires, and non-invasive because a subject need never touch the camera or its operator.

Now readying himself for a stint in the military, Azar, who earned his master's degree in 2014, hopes to put together a team to continue his research and ultimately commercialize it. "It has enormous applicability in the areas of workplace safety, law enforcement, airport security, and other areas," he explains. "It could be the solution to a pressing problem." ■

ACADEMIC YEAR WELCOMES NEW FACES, AND NOT JUST STUDENTS

Introducing the Newest Members of Our Faculty

SOME OF THE NEW FACULTY OF THE NYU POLYTECHNIC SCHOOL OF ENGINEERING. TOP ROW, FROM LEFT: SERGIO BIANCHI, DEVORAH KLETENIK, TOM HELLING; MIDDLE ROW, FROM LEFT: MICHAEL D'EMIC, DAVOOD SHAHRJERDI, WEIQIANG CHEN; BOTTOM ROW, FROM LEFT: EMILIE DRESSAIRE, SIDDARTH GARG, MICHAEL O'NEIL

"Institutions are much more than bricks and mortar," Dean Katepalli Sreenivasan said on September 8, at a gathering in honor of the NYU Polytechnic School of Engineering's newest faculty members. "They are also made of people and ideas. Thanks in part to our new faculty members," Sreenivasan said, "we are going to be an even more vibrant, interesting, and exciting place."

Future issues of *Cable* are sure to have more in-depth coverage of the cutting-edge research, stimulating teaching, and valuable mentoring being done by those who joined us in the fall of 2014, but in the meantime, read on for a brief introduction.

Industry Professor Sergio Bianchi comes to the Department of Finance and Risk Engineering from the University of Cassino in Italy. His research interests mainly concern the modeling of stock markets by means of (multi)fractional stochastic processes. In this field, his specific contributions concern the dynamical estimation of the regularity exponent.

Assistant Professor Weiqiang Chen of the Department of Mechanical and Aerospace Engineering has been the recipient of American Heart Association and Baxter Young Investigator Awards. He is currently working to develop a new method of cultivating stem cells that is expected to open up myriad possibilities for regenerative therapies and drug treatments.

Lecturer Michael D'Emic of the Department of Technology Management and Innovation has decades of experience in financial management, having worked for the American Stock Exchange and International Monetary Fund.

Assistant Professor Emilie Dressaire, one of the newest members of the Department of Mechanical and Aerospace Engineering, is focused on understanding and manipulating systems in which particles, interfaces and fluids interact in fascinating and complex ways.

Assistant Professor Siddarth Garg of the Department of Electrical and Computer Engineering is doing exciting work on the safety, reliability, and efficiency of computing devices. He is particularly interested in how electronic components can be designed and manufactured securely and how power consumption can be better controlled.

Lecturer Tom Helling of the Department of Technology Management and Innovation has done pro bono work with a number of entrepreneurial ventures in the media and sustainability space. He is primarily interested in sustainability-oriented innovation and eco-innovation, in both for-profit and not-for-profit organizations.

Industry Associate Professor Devorah Kletenik, an alum of the School of Engineering, has joined the Department of Computer Science and Engineering to teach "Introduction to Programming and Problem Solving." Her own research, which focuses on machine learning, explores how to reduce the costs of using Boolean classifiers.

Assistant Professor Constantine Kontokosta has explained that new ways of collecting and analyzing urban data are helping advance a fundamental understanding of the science of cities—an area that requires an interdisciplinary focus bridging engineering, data science, and the social sciences. Kontokosta has been at the forefront of this field, serving as the Deputy Director of NYU's Center for Urban Science and Progress (CUSP) since its launch, and he now joins the Department of Civil and Urban Engineering.

Lecturer Peter Li works in the General Engineering program and is himself an alum of the school. He also advises the oSTEM @ NYU club, which is dedicated to educating and fostering leadership for Lesbian, Gay, Bisexual, Transgendered, Questioning, and Allied communities in the science, technology, engineering, and math (STEM) fields.

Assistant Professor Michael O'Neil is one of the newest members of the Department of Mathematics, with a joint appointment at the Courant Institute. His research focuses on the partial differential equations (PDEs) of classical physics, for example, those that arise when working with electromagnetics, acoustics, heat flow and other such areas.

Assistant Professor Davood Shahrjerdi, a new member of the Department of Electrical and Computer Engineering, is studying solid-state materials that are shrunk to extreme nanoscale with the aim of creating new paradigms in solid-state nanoelectronics for sensing, energy harvesting, and energy-efficient computing, among other areas. He was named an IBM Master Inventor in 2013 and has more than 100 publications and patents to his credit.

Industry Associate Professor Jim Wielaard of the Department of Mathematics focuses on information processing in early sensory pathways in mammals, particularly on its role in perception, cognition, and consciousness. Using detailed large-scale models and psychophysics, his work aims to contribute to our understanding of sensory decision-making in the brain.

The NYU School of Engineering also welcomes a host of wonderful visiting faculty. They include Narges Mousavi, Simon Neidenthal, Zhigang Shen, and Beth Noveck, who is the Jerry Hultin Global Network Visiting Professor. ■

PEOPLE, PLACES, THINGS

What's been happening around the MetroTech Commons

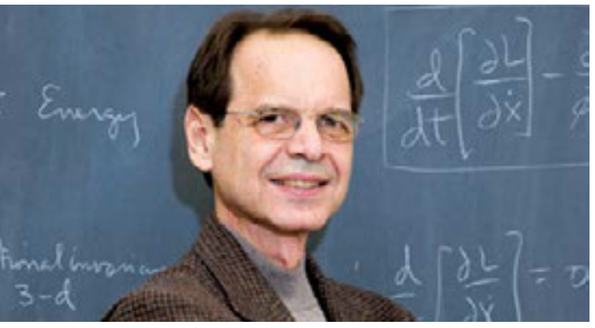
MAY 02

The SECOND ANNUAL RESEARCH EXPO on MAY 2 featured more than 40 hand-on exhibits and demonstrations; if exhibitors are right, in the future we could be wearing calorie-burning clothing, intuitively interacting with humanoid robots, and more.

EVOLVING AN ETHOS

Remembering Erich Kunhardt's Passion for Invention, Innovation, and Entrepreneurship and How it Changed the Face of the School

In 2006, when Erich Kunhardt was named provost and chief academic officer of what was then called Polytechnic University, a cover story in *Cable* trumpeted, "New Provost to Spur Innovation and Invention at Poly." Kunhardt, who had earned a



doctoral degree in Electrophysics from the school exactly three decades earlier, told the reporter, "I want to create a distinctive community of higher learning that values and nurtures creativity—in particular inventiveness and innovation."

Kunhardt was eminently qualified for the task. Before joining the school as a faculty member, he had served as institute professor and dean of the Arthur E. Imperatore School of Arts and Science at the Stevens Institute of Technology, in Hoboken, NJ. While at Stevens he and his colleague Kurt Becker (now Vice Dean for Academic Affairs at the School of Engineering) had invented and patented a method of generating and stabilizing cold atmospheric-pressure plasmas, an invention which was the basis for the formation of two start-up companies, the Plasmion Corporation and the PlasmaSol Corporation. Ultimately, Kunhardt and Becker would hold more than a dozen patents. PlasmaSol was soon winning major contracts for decontamination and sterilization applications from the U.S. Army, DARPA, and NASA and was eventually acquired by Stryker Instruments for $20 million.

Once he arrived back at the School of Engineering in 2006, Kunhardt, who had been born in the small town of Monte Cristi, in the Dominican Republic, in 1949, found a kindred spirit in then-President Jerry Hultin. Together, the two formulated a philosophy and motto that has been a hallmark of the school ever since: Invention, Innovation, and Entrepreneurship (or i²e, as it was generally known).

During his three-year tenure as provost, Kunhardt played a central role in the negotiations with NYU that resulted in the agreement that led to the recent merger of the two institutions. He spent his final years here doing what he arguably loved most—engaging in research and teaching bright, young people.

For Kunhardt, invention, innovation and entrepreneurship had a higher purpose. "I have always tried to join two very divergent perspectives," he said back in 2006. "One is touching God or understanding the basic elements of nature and the other is touching humanity or how to make life comfortable for humans."

Despite Kunhardt's death, on August 4, 2014, generations of students will continue to gain that duel perspective, thanks to the ethos he fostered and the lasting legacy he left. ■

POWER PLAY

First Year Dialogue Speaker Talks Inspiration, Determination

William Kamkwamba, who hails from a village in Malawi, spoke at the First Year Dialogue Talk on the 25th of September, 2014 at the NYU Polytechnic School of Engineering. The author of a memoir, *The Boy Who Harnessed the Wind,* Kamkwamba had been forced to drop out of school at the age of 14 because his family—coping with the serious drought and famine that had hit their country—could not afford the required annual fees (about $75). Determined to educate himself, he discovered a textbook called *Using Energy* and subsequently built a 5-meter windmill from scrap materials, which he used to power light bulbs and a radio for his family and charge his neighbors' mobile phones. Introduced to the Western world by the head of a Malawi NGO, Kamkwamba has since earned a degree from Dartmouth and been named to *Time* magazine's list of the "30 People under 30 Changing the World."

His inspiring story shows how engineering can change the world. ■

MAY 23 More than 1,600 fellow graduates watched during the MAY 23 commencement ceremony as PEDRO CRUZ III received his diploma and a surprise congratulatory video from his father, stationed with the U.S. Army in Kuwait and unable to attend.

DESAI AND FAYARD IN THE SCHOOL'S GREENHOUSE

HOW TO NURTURE A CULTURE OF INNOVATION AND ENTREPRENEURSHIP

New University Innovation Fellow Sarth Desai Is Focused on Constructing an NYU-Wide Community of Design Thinking and Venture Creation

When Sarth Desai was chosen by the National Center for Engineering Pathways to Innovation (Epicenter) as a University Innovation Fellow and attended his first gathering of Fellows from across the nation, he was understandably excited. "Students can make a difference—on our campuses and in the world," he says.

"The other Fellows and I shared our ideas about how to build a culture of innovation at our schools, and the enthusiasm was infectious. I want to infect everyone here at NYU with similar zeal, and if all the Fellows do the same, we can spread a real epidemic of innovation and entrepreneurship."

It's a fitting metaphor; Desai—who earned his undergraduate degree at the Vellore Institute of Technology, in India—is now on a dual biotech/entrepreneurship track here.

The University Innovation Fellows program is a national initiative that calls upon student thought leaders from 85 schools to increase campus engagement with entrepreneurship, innovation, and creativity. Desai—whose energy and intelligence impress everyone he encounters—was nominated by Professor Anne-Laure Fayard, his faculty advisor for the program, with the support of Professor EvgenyVulfson and Associate Dean for Special Projects Brad Penuel and the generous sponsorship of the Department of Technology Management and Innovation.

Among Desai's ideas are an innovation space, where students could collaborate and gain hands-on experience creating prototypes; an annual i²e showcase, where they could display their inventions and projects; and an interactive, shareable "map," which would include clubs, key people, and entrepreneurial opportunities across NYU.

If you're wondering why those things are so important, Humera Fasihuddin, leader of the University Innovation Fellows program for Epicenter, explains, "It is so critical for students to have an entrepreneurial mindset in today's economy. They need more than just technical skills to solve the big problems our world is facing." ■

ELI PEARCE: ROCK STAR

When the American Chemical Society (ACS) held its national meeting and exposition in Dallas in early 2014, one of the young attendees became very excited to spot Eli Pearce, a research professor at the NYU Polytechnic School of Engineering and a past president of the ACS. It was, he later said, like meeting a rock star. Thus was born the idea for a new ACS initiative, and in August, at a national meeting held in San Francisco, the group honored Pearce as an inaugural Rock Star of Chemistry.

Pearce, who studied with such luminaries as Herman Mark and Charles Overberger, has a string of professional accomplishments to his credit, including directing the Polymer Research Institute from 1981 to 1996 and serving as a dean here from 1982 to 1990. He is delighted to be considered an official ACS Rock Star and quips that the title is somewhat fitting. "I was quite a good dancer when I was younger," he asserts. ■

JUL 10 On JULY 10 New York City Department of Education Chancellor Carmen Fariña helped launch this year's #STEMNOW summer initiative, involving 19 different programs and nearly 500 middle and high school students. For more on our K12 STEM activities, see page 38.

MEN (AND WOMEN!) OF STEEL

Steel Day Festivities Come to the NYU Polytechnic School of Engineering

Ask most people what autumn means to them and you might hear about Halloween costumes and turkey on Thanksgiving. But every civil engineering and construction management student knows that it also means Steel Day, an annual celebration sponsored by the American Institute of Steel Construction (AISC) and and hosted by its members and partners. Steel Day events—including tours, presentations, and open houses—are organized all over the country, making it the industry's largest educational and networking function.

Thanks to the efforts of Professor Lawrence Chiarelli and the Department of Civil and Urban Engineering, more than 100 attendees gathered at the School of Engineering on September 16 to hear a presentation from the developers of 2 City Point—at 1.8 million square feet, the largest mixed-used center in Brooklyn. Most important to those celebrating Steel Day, the center will include the tallest building in the world constructed using an innovative steel framing system called the Girder-Slab® System, which is less costly and quicker to erect than typical cast-in-place concrete systems. (Dan Fisher, the head of Girder-Slab®, was on hand to explain the proprietary technology and the company's unusual policy of making it available to any fabricator who asks.)

Holding the event at the School of Engineering allowed students to mingle with and learn from industry experts. "Everyone was particularly impressed that the students asked such intelligent questions," Jacinda Collins, an AISC official, says. "They were bright, enthusiastic, and a pleasure to meet, and their presence added immeasurably to the success of the event."

A highlight of the day was the chance to don hard hats and actually tour the project, which is located within blocks of the MetroTech Center. "That proximity made the School of Engineering the ideal spot for the gathering," Chiarelli says. "And any opportunity we have to strengthen our friendship with the AISC, which also co-sponsors the National Student Steel Bridge competition in which our students take part each year, is very welcome." ■

TOP: A VIEW FROM 2 CITY POINT; BELOW: STUDENTS EAGER TO TOUR THE PROJECT

MINDING THE GAP

The NYU Polytechnic School of Engineering Is Fast Becoming a Hotbed for Women in Cybersecurity

SELLIE TEACHES A CLASS OF HIGH SCHOOL GIRLS ABOUT PROGRAMMING, DIGITAL FORENSICS, AND MORE

According to the Computing Research Association, a group comprised of members from across academe and industry, women represent only 8 to 13 percent of the cybersecurity workforce. The Department of Computer Science and Engineering is doing its part to close that gender gap, running an intensive two-week summer program introducing female high school students to the field. Organized by Professor Linda Sellie, who acknowledges the support of the Alfred P. Sloan Foundation, the program touched upon programming, digital forensics, and more.

Among the highlights were visits to the New York Offices of Google and Facebook, where the young women had a chance to network with accomplished female engineers, including Eleni Gessiou, a Facebook security expert and former School of Engineering student, who not only arranged the visit to the social media giant but returned to the MetroTech Center during the program to teach UNIX commands and, not incidentally, serve as an incomparable role model. The visit to her employer, she explains, was as enjoyable for her as it was for the students: "It was so much fun to see the girls interacting with different Facebook employees and asking questions," she recalls. "I can already imagine them applying that curiosity to the technical problems of the future."

Gessiou had the opportunity to return to the school again in October, when she joined other powerful women in cyber security—including Joanne L. Martin of IBM and Candace Worley of McAfee—at "Career Discovery in Cyber Security: A Women's Symposium," organized and hosted by members of the Department of Computer Science and Engineering.

Sellie asserts that cybersecurity is a fantastic career path for women, saying, "Women tend to want to do jobs that help the world," and Gessiou firmly concurs. "Working in cybersecurity is equivalent to protecting millions or even billions of people at the same time," she says. "Doing the job well requires a certain level of empathy and compassion toward people, and I believe women can be just as capable if not more so in bringing those qualities to their work." ■

AUG 25 The academic year officially kicked off on **AUGUST 25**, when the 700 members of the **CLASS OF 2018** were welcomed during convocation with bagpipe players, inspirational speeches, and a video presentation.

OCT In early **OCTOBER** Popular Science published its annual "Brilliant 10" list, and **PROFESSOR JONATHAN VIVENTI** was on it. Recognized for designing sensors that can be placed directly on the brain, Viventi is "poised to transform the way scientists understand neurological disorders."

ROBOTS ROVING THE GOWANUS

With the Help of Citizen-Scientists, School of Engineering Researchers are Monitoring the Health of the Superfund Site

The Gowanus Canal is an unwelcoming place for a human diver. Named a Superfund site by the Environmental Protection Agency (EPA) in 2010, the almost-two-mile-long waterway was deemed one of the most polluted canals in the country, thanks to decades as a dumping ground for industrial run-off and raw sewage. One year, a healthy baby whale blundered into the canal and was almost immediately covered in sludge; it died within days, providing a stark warning to any living creature who might think of venturing into the lead- and mercury-tainted waters.

How, then, could anyone hope to collect detailed data relating to the Gowanus? NYU Polytechnic School of Engineering Professor Maurizio Porfiri had a solution. In 2012 he worked with a team of mechanical engineering students to design, build, and launch Brooklyn Atlantis, a remote-controlled, robotic vessel capable of closely monitoring conditions in the canal thanks to its two cameras (one above the water line and one below) and its many sensors, which can check water temperature, pH levels, and more. Real-time findings are transmitted to the project's website every 30 seconds.

Brooklyn Atlantis can send thousands of images each week—many more than a small team of students could reasonably be expected to monitor. Luckily, the School of Engineering has on its faculty Professor Oded Nov, an expert in human-computer interaction, who thought of harnessing the power of citizen-scientists. Anyone can now register on the site and review as many photos as they have time for, identifying and tagging objects (plants, trash, and animals, for example), so that researchers can detect patterns and trends.

Recently, the project's 800 or so volunteers began analyzing and tagging even more photos, because Brooklyn Atlantis II, which was launched over the summer, is able to travel longer throughout the canal and is equipped with a powerful panoramic camera that captures 360-degree images that will soon be reflected on the website. "We're happy to report that the images we've been capturing lately show a marked improvement in water quality," Jeffrey Laut, a doctoral candidate involved in the project, says. "The EPA has activated what's called a flushing tunnel from the East River to the canal, and that's bringing in much-needed cleaner water, as noticed in our water quality data."

Laut and his colleagues encourage everyone to register at the site and begin tagging photos. "Our citizen scientists are helping us immeasurably," he says. "It doesn't take any formal training, but the information they're providing is absolutely essential to our efforts to monitor conditions in the canal and track its cleanup." And while you're at it, he adds, if anyone has an idea for a better name, the team would like to stop referring to their aquatic robotic vehicle by the admittedly unexciting moniker Brooklyn Atlantis II. "Maybe we could have a contest and give a small prize for the best idea," he muses. One thing is quite certain—Brooklyn Atlantis II is making important contributions to the health of the Gowanus Canal, and that's a winning proposition for all New Yorkers.

To learn more or to register as a citizen-scientist, visit www.brooklynatlantis.org. ■

A PANORAMA FROM THE CAMERA ATOP BROOKLYN ATLANTIS II

TINKERING AROUND… WITH A MISSION

Students Devise an Award-Winning Way to Empower Women

Everyone knows that engineering schools can train students to provide communities with potable water and sturdy bridges. But what happens when they're asked to help solve other types of complex social questions?

Associate Professor Anne-Laure Fayard's Design Thinking Class and the Design Tinkering Club, which she advises, regularly take part in OpenIDEO, an open innovation platform that asks the public to brainstorm solutions to a wide variety of important problems.

This past year Fayard's students tackled the question of how to make low-income urban areas not only physically safer but more empowering for women and girls. Their ideas demonstrated the school's commitment to producing creative, deep-thinking, problem-solving professionals, no matter what their major.

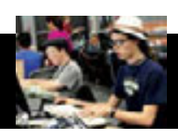
Students from Design Tinkering proposed to identity and train female leaders in low-income urban areas: these community "concierges" would gather and share information and connect other women across their communities. The students involved are currently collaborating with Women for Human Rights (WHR), a Nepal-based NGO, to prototype and pilot the idea of providing women in Kathmandu slums with a training program encompassing leadership skills, health, and craft.

That idea attracted considerable attention and was one of only five selected to receive funding from Amplify, a program of the the British Department for International Development (DFID). (Almost 600 ideas from around the world had been submitted to the Challenge.) The Design Tinkering students are also developing a downloadable open-source toolkit for other NGOs, as well as a web documentary to raise funds for making the program sustainable after the pilot phase.

"Collaborating with WHR in Kathmandu gave us the chance to have an impact on the life of women in the slums," Fayard says. "Getting their input on our original idea, the design of the badge, and the content of the training have been crucial in the development of a program which, we hope, can really empower these women socially and economically. This project proves that our club, if we needed proof, can develop and implement innovative solutions that address important social issues." ■

OCT 22 Happy Anniversary! On **OCTOBER 22** the NYU Polytechnic School of Engineering celebrated the **FIFTH ANNIVERSARY OF ITS INCUBATOR SYSTEM**—a half-decade of driving invention, innovation and entrepreneurship for the benefit of New York City and the world.

NOV 13 Thousands of young tech wizards participated in the largest set of student cyber security competitions in the world—the NYU Polytechnic School of Engineering **CYBER SECURITY AWARENESS WEEK** (CSAW)—and from **NOVEMBER 13 TO 15**, competitors gathered in Brooklyn for the hotly contested finals.



A TRIFECTA OF NSA HONORS

There was good reason to celebrate early in August, when the NYU Polytechnic School of Engineering was officially honored as a National Center of Academic Excellence (CAE) in Cyber Operations by the National Security Agency (NSA). The school was the first in New York to earn that prestigious designation, which will be limited to just 25 institutions across the country, and it is now one of only a handful to have earned all three CAE designations, having been previously named a CAE in Information Assurance Education and a CAE in Information Assurance Research.

The newest laurel, signaling that a school boasts a deeply technical, interdisciplinary program with extensive opportunities for hands-on learning, was presented at a celebratory luncheon by Steven LaFountain, the Distinguished Academic Chief for Information Assurance and Cyber in the Associate Directorate for Education and Training (ADET) at the NSA.

Speaking to the attendees following the presentation, Professor Nasir Memon excitedly outlined his vision for the future of cybersecurity studies at NYU. "We're thinking of instituting an undergraduate cybersecurity degree in addition to our graduate program," he explained, "and one day we plan to have industry leaders in residence, much like some schools have artists or writers in residence." He also stressed the need for industry to partner with academia. "Businesses will need the next generation of experts we are educating," he asserted. "There is a strong case that now is the time for collective action." ■

FROM LEFT: NASIR MEMON, THOMAS REDDINGTON, STEVEN LAFOUNTAIN, AND PETER BLONIARZ

DEC 10 | On **DECEMBER 10** former Secretary of the Navy and current government advisor **RICHARD DANZIG** presented "Surviving on a Diet of Poisoned Fruit: Reducing Risks from Cyber Dependency." The eagerly anticipated event was part of an annual lecture series funded by the Alfred P. Sloan Foundation.

FACULTY NOTES

The Max Planck Institute for the Science of Light held a weeklong seminar on biosensing at the very smallest extremes, during which research developed at the NYU Polytechnic School of Engineering played a key role. Professor **Stephen Arnold** presented his research on the Whispering Gallery Mode Resonator, which senses at the molecular level. Associate Professor **Iwao Teraoka**, who collaborated in early work on the Whispering Gallery Mode Resonator, was invited to present research on a new biosensor that he is developing.

Springer Science+Business Media, a leading global scientific, technical, and medical publisher, has selected NYU Polytechnic School of Engineering Professor of Applied Physics, Professor of Mechanical and Aerospace Engineering, and Vice Dean for Academic Affairs **Kurt H. Becker** for two editorial positions. He will serve on the Board of Editors of the *European Physical Journal ST* (Special Topics) and will be a series editor for *Graduate Texts in Physics*.

Assistant Professor of Computer Science and Engineering **Justin Cappos** has introduced PolyPasswordHasher, an open-source password protection scheme for institutions and corporations that offers an unprecedented level of security for password servers, making it immensely difficult forhackers to decode even small numbers of individual passwords. PolyPasswordHasher is being tested as part of the Password Hashing Competition, a global effort organized by security professionals to improve security practices.

NYU Polytechnic School of Engineering Associate Professor **Nikhil Gupta** has developed a fiber-optic sensor that provides a safe way for engineers to closely monitor the safety and durability of the composite materials used in aircraft and spacecraft. The patented extensometer is exceptionally sensitive, able to detect a single micron in displacement. Earlier this year, Gupta earned a second patent for a method of using his device, which works by sending out a beam of light and measuring how much passes through the material being tested.

This September, research on persistence by three members of the NYU Polytechnic School of Engineering Computer Science and Engineering faculty will receive the best paper award at the European Symposium on Algorithms in Wroclaw, Poland. Professor **John Iacono**, Postdoctoral Teaching Fellow **Özgür Özkan**, and Postdoctoral Researcher **Pooya Davoodi** authored the paper, along with Jeremy Fineman of Georgetown University. The European Association for Theoretical Computer Science (EATCS) chose their paper, "*Cache-Oblivious Persistence*," from more than 250 submissions to the symposium.

Assistant Professor of Mechanical Engineering **Joo H. Kim** of the NYU Polytechnic School of Engineering has won a three-year, $350,000 National Science Foundation grant to develop a novel joint-based method of modeling and computing human metabolic energy expenditure. In addition, his paper, "Joint-Space Dynamic Model of Metabolic Cost with Subject-Specific Energetic Parameters," has won the Best Paper Award from the Advanced Modeling and Simulation Technical Committee 2014.

Internet users have long been warned about phishing scams, in which criminals indiscriminately send out mass emails to trick consumers into revealing sensitive personal data like social security and credit card numbers. Two faculty members at the NYU Polytechnic School of Engineering—Associate Professor **Oded Nov** of the NYU Polytechnic School of Engineering Department of Technology Management and Innovation and Professor **Nasir Memon**, head of the school's Department of Computer Science and Engineering—won a National Science Foundation grant of $203,648 to study ways to address the threat.

Associate Professor **Oded Nov** of the Department of Technology Management and Innovation has been awarded a $150,000 grant by the National Science Foundation to study how human-computer interaction can help non-experts understand and engage with their personal genomic information.

Google has granted a Faculty Research Award to Professor **Torsten Suel** to support his study of new index pruning and index tiering techniques that could significantly reduce hardware and energy costs for large web search engines. This is the third Google award given to Professor Suel, who holds a Diplom degree from the Technical University of Braunschweig and a doctorate from the University of Texas at Austin. Suel's latest award provides him with $55,500 in funding.

New research in quantitative finance indicates that the wealth divide in financial markets may be both mental and structural—not a matter of large investors' access to faster computers for stock trading or a factor of their personal connections. In a paper to appear in *Quantitative Finance*, NYU Polytechnic School of Engineering Professor **Charles S. Tapiero** examined a classic financial pricing model in which investors were not financial equals. His analysis showed that investors big enough to affect a market hold an arbitrage advantage.

The National Bureau of Economic Research Innovation Policy recently selected NYU Polytechnic School of Engineering's **Zhaoxia Xu** as one of two recipients worldwide of a research grant of $10,000 for the academic year 2014–2015. Xu, an assistant professor in the Department of Finance and Risk Engineering, focuses her research on government economic policy and corporate innovation.

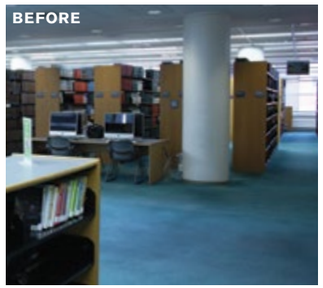
The premiere conference for data visualization will feature eight research papers co-authored by NYU Polytechnic School of Engineering faculty members from the Department of Computer Science and Engineering. The papers will be presented at the IEEE (Institute of Electrical and Electronics Engineers) VIS 2014, which will be held November 9–14, 2014, in Paris, and includes conferences on Visual Analytics Science and Technology (VAST), Information Visualization (InfoVis), and Scientific Visualization (SciVis).

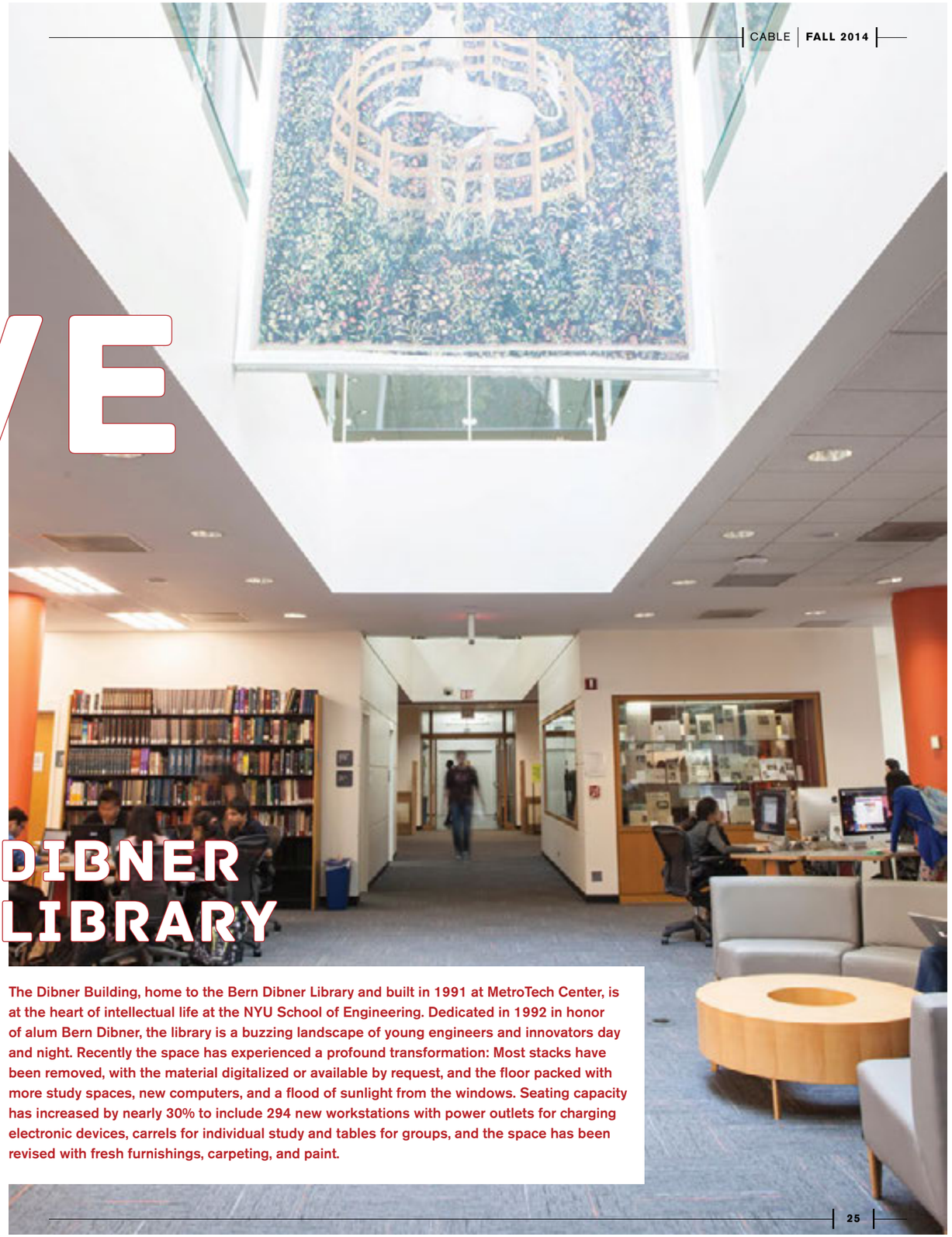
TRANS-FORMATIVE PROCESS

FROM NEW CLASSROOMS WITH STATE-OF-THE-ART TECHNOLOGY TO REVAMPED STUDY SPACES IN THE LIBRARY, THE NYU POLYTECHNIC SCHOOL OF ENGINEERING IS UPDATING ITS LOOK FOR THE NEXT AGE OF DISCOVERY

The NYU Polytechnic School of Engineering and its home in the MetroTech Center—dreamt up by Brooklyn Borough President Howard Golden and then Polytechnic University President George Bugliarello in the mid-1970s—have experienced profound transformations through the decades. Where there were once elevated train tracks for the Myrtle Ave. El, there now lies a bustling four-lane road; Rogers Hall, once the site of a razor factory, now houses some of the most exciting engineering research going on in the country.

Since 2010, the then-named i²e Campus Transformation has been reshaping and updating the School of Engineering with projects like outfitting newly acquired academic spaces at Two MetroTech to the opening of the Center of Innovation for Technology and Entertainment (CITE) to renovating restrooms and corridors. This year, a new phase has begun: Let us take you on a tour of the most exciting improvements and changes happening at the NYU Polytechnic School of Engineering.





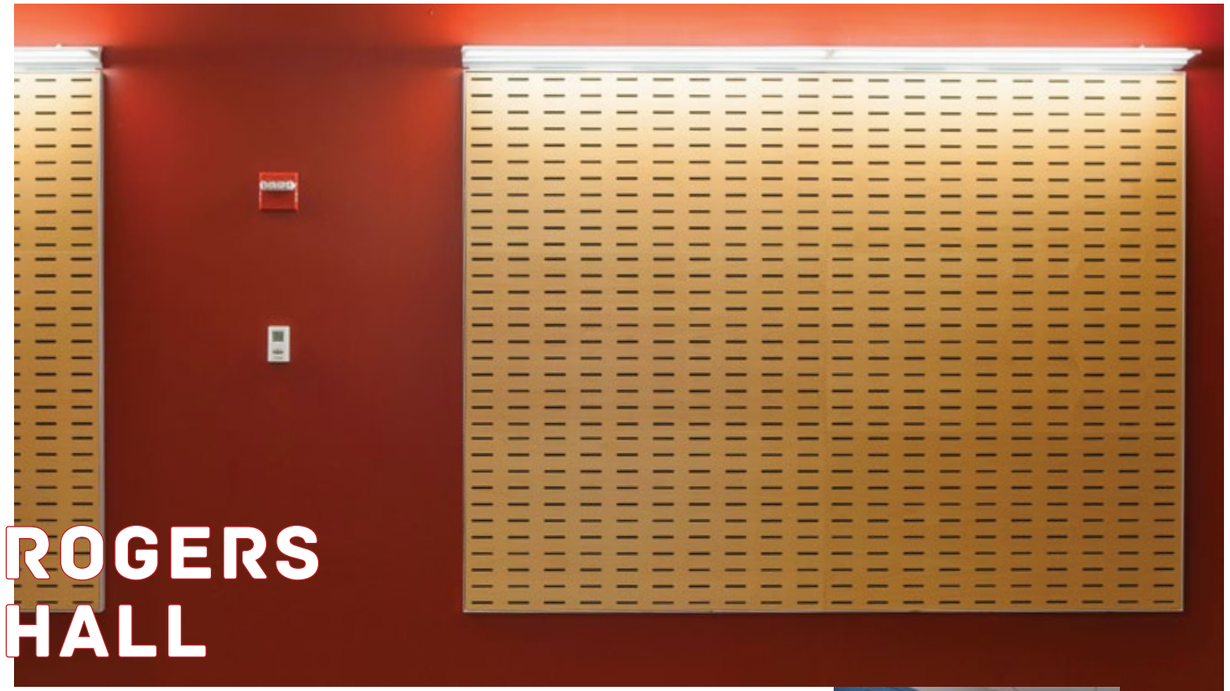
DIBNER LIBRARY

The Dibner Building, home to the Bern Dibner Library and built in 1991 at MetroTech Center, is at the heart of intellectual life at the NYU School of Engineering. Dedicated in 1992 in honor of alum Bern Dibner, the library is a buzzing landscape of young engineers and innovators day and night. Recently the space has experienced a profound transformation: Most stacks have been removed, with the material digitalized or available by request, and the floor packed with more study spaces, new computers, and a flood of sunlight from the windows. Seating capacity has increased by nearly 30% to include 294 new workstations with power outlets for charging electronic devices, carrels for individual study and tables for groups, and the space has been revised with fresh furnishings, carpeting, and paint.

HIT THE BOOKS

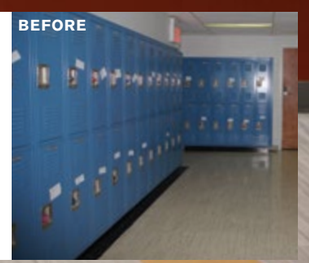
Classroom renovations on the 2nd floor of Rogers Hall revamp academic life

When construction of six new classrooms and upgrades to six existing rooms began this year it meant a few things: Moving classrooms to lower floors would alleviate demand on the building's elevators by allowing students to use the stairs; lab renovations could begin on upper floors; and the classrooms themselves would welcome new furniture, flooring, windows, and paint, along with "smart" audio/visual systems and new lecterns. Improvements to corridors and hallways—including new sound-absorbing wall-structures and a lounge for students—extend the feeling of transformation outside the classroom.



ROGERS HALL

When the massive Rogers Hall was converted from the American Safety Razor factory to an academic building able to house most services for what was then known as Polytechnic Institute of Brooklyn in 1958, things like laboratories and classrooms were at the forefront of the minds of administrators and planners. Since then, the building has gone through several iterations, and currently houses many academic departments, the cafeteria, undergraduate academics, the STEM center, and the gymnasium, among other facilities. This year, high-impact projects have taken the building into a new era of research, learning, and student engagement with renovations to dining rooms, hallways, classrooms, and windows.



READ IT HERE

The "Our Authors" publication display enlivens the first floor of Rogers Hall and the minds of aspiring engineers

This year a nearly 40-foot-long display with striking environmental wall graphics was installed on the first floor of Rogers Hall directly outside the cafeteria, where more than 80 publications from the school's faculty are on view in a couple of contemporary display cases with embedded LED lights.

CAFÉ CULTURE

Cafeteria expands to include the private dining room, opening the new school year with fresh furnishings and new flooring

Once reserved for special events, the private dining room is now open to all and features new furniture, carpeting, and paint. The main cafeteria also has been updated with new wood-look flooring and furniture for eating and lounging.

THROUGH THE LOOKING GLASS

A Massive Window Replacement Project Gives Rogers Hall a New Face

In an effort to elevate the building's exterior appearance and efficiency, an ambitious project to replace the exterior windows of Rogers Hall began this year. Beginning with the Jay St.-facing side of the building and newly renovated classrooms, the window replacement finds 45 bays updated with 183 new windows as of the summer of 2014. The new windows meet the latest New York City specifications for wind resistance and are approximately four times more efficient at retaining heat than the previous windows.

WHAT'S NEXT?

The transformation doesn't stop there. In 2015, construction is expected to begin on labs on the upper floors in Rogers Hall for the new faculty hires. In the basement, a new student health center, which will incorporate counseling services, begins this fall. Coming up next year, the building will see Phase II of its window replacement project.

Nearby, Dibner Library will see the renovation of its fourth floor, which could include a new conference center, more collaborative study rooms for students, and an expansion of academic spaces.

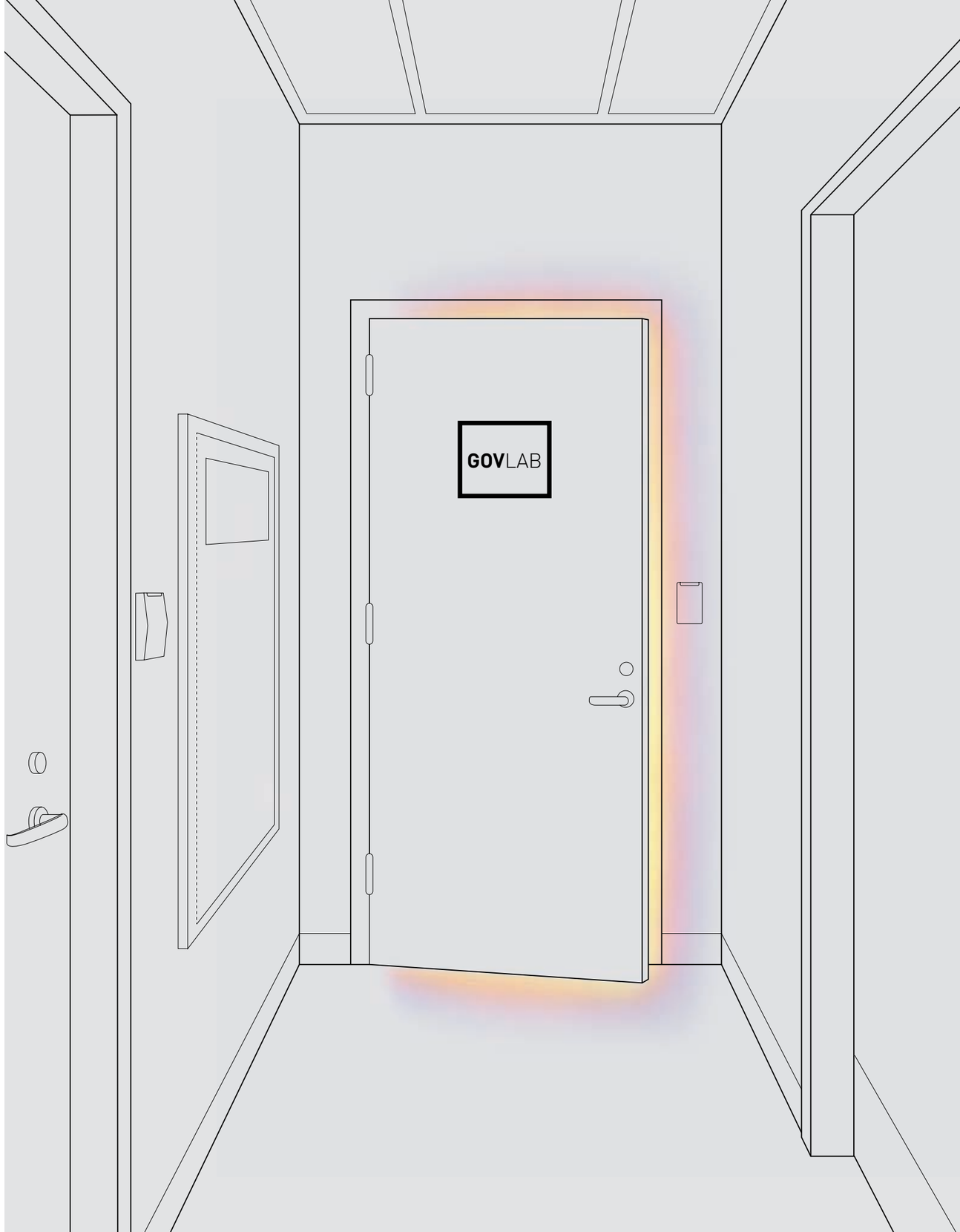
Across the commons, historic Wunsch Hall began renovation in October of this year to house Graduate Admissions, Undergraduate Admissions, and the Wasserman Center for Career Development.

There's even more to come in the distant future. We hope you'll stop by for a visit to witness it firsthand. ■

THE **DIGITAL** REVOLUTION IS HERE

THE **GOVERNANCE** LAB IS HOME TO INNOVATIVE MINDS DETERMINED TO CHANGE THE WAY PUBLIC POLICY IS APPROACHED AND APPLIED

THE BAT CAVE: If you weren't looking for it, you might walk past the new Governance Lab without even seeing it. GovLab headquarters moved into Two MetroTech at the NYU Polytechnic School of Engineering in September, setting up in an open, concrete-floored space at the end of a narrow, unadorned hallway that is soon to be totally renovated (see "Transformative Process" on page 24); a handful of arrows printed on foam-core quietly announced its arrival. But what many people don't notice might be one of the most exciting experiments in public policy today—an "action research" organization focused on facilitating innovations in governance at the intersection of law, policy, and technology that improves people's lives.



"It's like a secret, underground operation of brilliant thinkers and doers trying to imagine, test and deploy the bottom-up solutions that every government needs, even if they don't realize it yet," notes one online participant in "Solving Public Problems Through Technology," the flagship course offering of the Academy, the part of GovLab devoted to educational and training offerings to both degree students and public officials.

Okay, so it's not actually a secret, or underground. It's on the ninth floor and looks more like a tech startup than a Bat Cave. But the people here are rethinking the biggest problems facing the world today, using emerging technologies, public data, and civic engagement. They're partnering in innovative ways with students, as well as civic leaders and entrepreneurs, to build tools to improve healthcare, prisons, immigration, elder care, literacy, and more.

The common thread running through it all can be found in the name: governance. What does governance mean—more importantly, what can governance be—in a technologically advancing, information-oriented, and socially networked world? Quite simply, how can technology create a more open and representative government?

Experts warn that the effects of climate change will soon be the cause of as many as 250,000 deaths per year. The *British Medical Journal* said that the much-discussed death toll of this year's Ebola outbreak will "pale into insignificance when compared with the mayhem we can expect for our children and grandchildren if the world does nothing to check its carbon emissions." John Farrell, an NYU law student, hopes that his team's project will give people "a platform for education and action on climate change" in their everyday lives. The specifics of the project are still being hammered out, but one possibility is a tool for consumers to gauge the impact of green choices or purchases they make. The opportunity to develop it at the Academy has Farrell feeling optimistic. "My partners and I have talked about pursuing [this] for a long time," he says. "[This course] has presented us with the structure to realize the idea. Everyone at GovLab has helped to push and direct us towards our final goal."

MOVING MOUNTAINS


BETH NOVECK

"Every survey will tell you that the rate of trust in government is declining," says Beth Noveck, the GovLab's Co-Founder and Director. "People are actively banding together to express these concerns—just think of Occupy Wall Street, the Arab Spring, the Climate March. But we don't have a clear conception of what could replace the things that people are so dissatisfied with. We don't have the models of how we might do things differently."

It's a late September afternoon, and Noveck has just finished meeting with a half-dozen students, discussing open government, online resources, and crowdsourcing. Toward the end of the conversation, she is heard to say, "We're not sitting on a mountaintop, here." The students lean forward in their chairs when she speaks.


STEFAAN VERHULST

Just three years ago, Noveck was in the Obama White House as Deputy Chief Technology Officer and Director of the Open Government Initiative. She is also the founder of the New York Law School "Do Tank," the State of Play conferences, and co-founder of a software company launched to encourage democratic deliberation in the early days of the commercial web.

The American critic Alexander Woollcott once wrote, "I'm tired of hearing it said that democracy doesn't work. Of course it doesn't work. We are supposed to work it." From her early days as a student of fragile democracies in 20th-century Europe, Noveck has been devoted to working democracy. So has the GovLab's other Co-Founder and its Chief of Research and Development, Stefaan Verhulst. Verhulst spent 13 years heading up the research activities of a private foundation, looking at solving public problems through information technology.

"I became frustrated that most of the problems we know can somehow be solved, but are mostly not solved because we don't manage to actually engage the public or because the government's mechanisms are flawed," says Verhulst. "There is a lot of experimentation regarding governance and solving public problems. Unfortunately, there's little evidence as to what works when or for whom or in which context. I thought our biggest contribution would be finding out what works and what doesn't work through action research."

Action research means implementing changes or processes while simultaneously reflecting on and evaluating their effectiveness. In a fast-moving world, action research means solving problems in real time and tailoring the solutions as you go.

So when Noveck says "We're not sitting on a mountaintop, here," it's because she and Verhulst agree that if you're going to move a mountain, you can't be sitting on it.

WORKING DEMOCRACY

Verhulst and Noveck met years ago at a conference in the United Kingdom. They shared an interest in creating an information culture that would serve the goals of democracy, so when they co-founded the GovLab in late 2012, says Noveck, "We start[ed] from the core hypothesis that more open and collaborative ways of working, enabled by technology, [would] lead to decisions and solutions that are more effective and more legitimate."

The GovLab's approach to proving this hypothesis is three-pronged. First, it runs education and training programs through the GovLab Academy. Its primary offering is "Solving Public Problems with Technology," a masters-level course delivered both in person (alternating between the NYU and MIT campuses), and online to students across the world. (Plans are underway to launch shorter, intensive workshop versions of the course, too.) Whether for credit or not, students apply to the course by proposing specific social problems they'd like to address. Student projects this fall include tools to monitor and report neighborhood noise pollution; encourage cardiovascular health; track library usage among educationally at-risk minority boys; and improve the living conditions of women immigrants in the Bronx.


ALAN KANTROW


ARNAUD SAHUGUET

"The course is offered as a series of supports, interventions, and exercises to help people get real projects done—it's all about how to create and implement governance innovation in the real world," says Alan Kantrow, the GovLab's Chief Learning and Communications Officer. "The research reflex runs through it all."

Secondly, the GovLab undertakes research projects with partners in civic leadership. Like the Academy students, these organizations come with problems to solve. One recent project, with United Kingdom health officials, explored the delivery of open data to citizens to make informed healthcare decisions. Another reimagined Internet governance with ICANN (Internet Corporation for Assigned Names and Numbers). A number of upcoming partnerships are with governments of American cities.

"None of the content [of this work] is proprietary," Kantrow points out. "It's all available for use and dissemination."

This is key to the GovLab's efforts because, according to Verhulst, the two biggest assets in society today are the amount and availability of data and the level of connectivity between people. "We're focused on opening up data, then using it for a variety of public interest projects [and] on how [to] tap into the collective intelligence to solve problems differently," he says.

The GovLab's third endeavor is to attract and cultivate the in-house technical talent to build tools that enable organizations and citizens to solve problems and participate in their communities and government. To work democracy, as Woollcott put it.

Arnaud Sahuguet, the GovLab's Chief Technology Officer, came to this position from Google, where for years he pushed for projects around open data and access to civic information. "I'm not yet convinced that we can actually solve all these problems," he admits, "But at GovLab I can give them my full attention and see what we can do."

Sahuguet is building software tools while also building a technology team. He's recruiting product designers and engineers passionate about governance. He says Brooklyn, infused with the spirit of collaboration and invention, is the perfect place for this. "At [the NYU Polytechnic School of Engineering], there is a reservoir of talent [and] a rich engineering environment. We're creating an infrastructure where we can welcome contributions."

"If you look around, turn on the TV, governance is the number-one issue everywhere," Sahuguet says. "Selling you on the mission is a complete no-brainer. The challenge is to convince people to join a risky adventure."

In other words, never mind climbing Everest—who wants to help move it? ■

Nikki Zeichner used to work as a criminal defense attorney representing narcotics dealers in a federal system that she felt focused more on negotiation than rehabilitation. "I started looking at how I could tell those stories outside a legal context," she says. "How can you get to know the realities of individuals or communities that aren't typically heard? How can we bring about change and make policy recognize their voices?" Zeichner, now an MS candidate in Integrated Digital Media and a GovLab Fellow, is working with a coder, a civic hacker, and a data artist to collect public data from parole hearings that will faciliate predictions about rehabilitation versus recidivism. Their parole reform project could have major social and budgetary implications; moreover, it addresses what Zeichner sees as a problem of opacity and invisibility in the penitentiary system. "People think about how prisoners enter the system," she says, "They don't think about what happens afterward."

"I take an engineering perspective on proteins. I work on a nanoscale to engineer biological material. The possibilities are endless because we have the ability to modify and make proteins that nature has never thought of making."

– JIN MONTCLARE, ASSOCIATE PROFESSOR OF CHEMICAL AND BIOMOLECULAR ENGINEERING

Encouraging Progress Through Diversity

From her own research on nano- and micro-scale proteins to mentoring the next generation of women in science, Jin Montclare is making a lasting impact.

From the Protein Engineering and Molecular Design Lab at the NYU Polytechnic School of Engineering, Montclare and her team focus on designing and generating protein-derived building blocks that are tailored to serve numerous applications, such as tissue engineering, drug-delivery, imaging, energy and other such domains that require novel biomaterials.

In October, she and her colleagues were able to break the nano barrier to engineer the first *micro* protein. For as long as scientists have been able to create new proteins that are capable of self-assembling into fibers, their work has taken place on the nanoscale. For the first time, thanks in large part to Montclare, this achievement has been realized on the microscale—a leap of magnitude in size that presents significant new opportunities for using engineered protein fibers.

"This was a surprising and thrilling achievement," said Montclare, explaining that this kind of diameter increase in the presence of small molecules is unprecedented. "A microscale fiber that is capable of delivering a small molecule, whether it be a therapeutic compound or other material, is a major step forward."

Despite the enormity of the jump from nano- to microscale, the research team believes they can devise even larger fibers. The next step, Montclare says, is developing proteins that can assemble on the milliscale, creating fibers large enough to see with the naked eye. "It's even possible to imagine generating hair out of self-assembly," she says. The group published the results of the successful trials in the creation of engineered microfiber proteins in the journal *Biomacromolecules*.

The Next Generation

Montclare hopes that other women will join her at the forefront of science and technology. She works hard to make sure more girls and women study and consider careers in STEM (science, technology, engineering, math) fields. One of her latest projects, which involves engineering a protein that may prevent brain damage in soldiers and civilians exposed to toxic chemicals, combines the two.

"The project was initiated by a high school student named Michelle Zhang, who wanted to [experiement with proteins]," Montclare says. Zhang ended up participating in Intel and other science competitions for high school students and is now a Cornell undergraduate.

Montclare and her team engineered the protein after becoming interested in how they could break down organophosphates—compounds commonly used in pesticides and warfare agents, which interact with enzymes involved in transmission in the brain and can cause irreversible damage. "We looked at enzymes and considered ones called phosphotriesterases, which can do the job," she says, but with the drawback that they're not very stable and don't last long.

Their next step was to reengineer these proteins so they would stand up to heat and time by adding non-natural amino acids. "We introduced new building blocks and used them to fortify these enzymes, stabilizing them," she explains. Using a computational tool called Rosetta, they were able to identify a more stable, longer-lasting protein that does the work of the original. Their research was supported by a grant from the U.S. Army Research Office and the National Science Foundation.

The lab continues to refine this patent-pending process. "Ideally, it will work against lots of toxins not just a specific one," Montclare says. She expects that a spray that can quickly wash pesticides off produce may be available in less than 10 years.

Paying it Forward

Part of the reason Montclare feels so strongly about encouraging young women in science is because she had "wonderful mentors who shuttled me into science, from elementary school through college and beyond." A native New Yorker, she earned her undergraduate degrees in chemistry and philosophy from Fordham. She has a PhD in bioorganic chemistry from Yale and a post-doc from Caltech in chemical engineering.

Montclare's original role model was her paternal grandmother, who fled with her four children to an orphanage in Busan, Korea, where she managed to find work as a nurse, after her husband was taken captive during the Korean War. She was eventually able to go to Canada to study and then to the U.S., bringing her children over one by one. "[My grandmother] was my role model and an inspiration to my whole family," Montclare says. "For her, education was truly important—it's what got her through, how she was able to come to this country."

Montclare believes the interest and drive toward science must start long before college. To that end, she developed an outreach program on science and technology with the Urban Assembly Institute of Math and Science for Young Women, a girls' school near the School of Engineering in Downtown Brooklyn, where most of the students come from underprivileged, minority backgrounds. "If I can show other girls [that STEM fields are] exciting, something they can do, and a career worth pursuing, we can increase the numbers in science and engineering," she says.

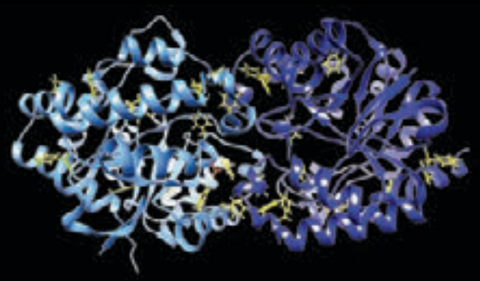
"I wish there were more diverse students, not just females, studying science," she adds. "You need diverse minds to make progress, to open viewpoints and perspectives in order to attack problems and make discoveries." ■

> "You need diverse minds to make progress, to open viewpoints and perspectives in order to attack problems and make discoveries."

How to build a protein

Jin Montclare's lab designs and generates many types of proteins, including one that has been created to detoxify neurotoxins safely.

The proteins she builds are first visualized in three dimensions and generated computationally. This graphic illustrates the process.



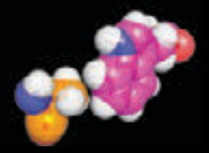
This ribbon diagram shows a three-dimensional structure of a protein called phosphotriesterase, the protein Montclare is engineering to neutralize certain poisons and pesticides. It's shown in two colors because it is a dimer, with two sub-units. Note that this protein is not visible to the eye or with a conventional microscope as it is nanometer-sized; that's why these proteins are rendered computationally.

pFF-PTE

This graphic represents the structure that Montclare originally gave the computational biologist.

The computer found what's known as a steric clash, a molecular detail that means there was a problem in the original structure and it needed a better solution.

pFF-F104A



This is the improved mutation Montclare ended up with, again through the computers.

pFF-F104A is the protein that the computational biologist collaborator designed, based on the original that Montclare had identified.

After that, she was able to build the protein capable of detoxifying neurotoxins with improved stability over the original.

FULL STEM AHEAD

The NYU Polytechnic School of Engineering's Center for K-12 STEM Education Is Devising New Ways to Give Students a Leg Up in Science, Technology, Engineering, and Math (STEM)

BROOKLYN is home to the latest tech boom in the country, a newly located NBA franchise, and, of course, brownstones and cheesecake. Thanks in large part to Ben Esner, a lifelong resident of the borough, K-12 STEM education is on that list too. Esner, the director of the NYU Polytechnic School of Engineering's Center for K-12 STEM Education, says, "We're coming up with ideas and formulating new programs that are making an impact right here in Brooklyn and spreading throughout the world."

Esner can attest first-hand just how far some of the Center's home-grown ideas have traveled: along with several graduate students from the School of Engineering, he spent part of last year in the Malaysian state of Selangor, where the Science of Smart

Cities (SoSC) curriculum—which employs hands-on explorative activities in the fields of urban infrastructure, transportation, energy, and wireless communications and teaches middle-schoolers technologies that allow the building of livable, efficient, sustainable and resilient cities—was adopted and modified by the Education Faculty at the National University of Malaysia.

No less exciting, however, is the learning going on in the Brooklyn public schools that take part in another of the Center's programs: the Applying Mechatronics to Promote Science (AMPS)/Central Brooklyn STEM Initiative (CBSI), which are funded by the National Science Foundation and philanthropic donors, and which pair teachers with graduate student fellows to design dynamic, hands-on classroom lessons in a variety of STEM disciplines.

Russell Holstein, a veteran tech teacher at the Eugenio Maria De Hostos Intermediate School 318, in Williamsburg, calls having a fellow helping in his classroom and coaching the school's robotics team a win-win situation for all. "By working with middle-school students, the graduate fellows hone their presentation skills and learn to convey complex information to a lay audience without using jargon," he says. "And my kids—from the highly motivated members of the robotics team, who take part in the FIRST Lego League competition, to those who purport to not even like science or math—get a lot out of their interactions with the fellows, who are wonderful role models for them." Holstein's assertion that his students are benefiting is borne out by hard data: In a three-year study that tracked some 3,000 young participants, 70% of them increased by at least a half of a letter grade (or more) in not only math and science but other subjects as well. (Like Holstein's fellow, many of the School of Engineering's other graduate mentors pitch in to help with the FIRST Lego League; the Center for K-12 STEM Education is a strategic partner with New York City FIRST, the organization that runs that and other robotics competitions for students from across the country and whose acronym stands for the phrase "For Inspiration and Recognition of Science and Technology." Additionally, NYU has long been the site of the Brooklyn qualifier, which determines which local teams will advance to the citywide competition)

AMPS/CBSI is far from the only project at the Center for K-12 STEM Education making a mark on the educational landscape of the city. The Applied Research Innovations in Science and Engineering (ARISE) program, funded by the Pinkerton Foundation, brings dedicated high-schoolers here for a rigorous seven-week program of high-level research in either Dr. Magued Iskander's Soil Mechanics Lab, Dr. Vikram Kapila's Mechatronics Lab, Dr. Nasir Memon's Information Systems & Internet Security Lab, Dr. Jin Montclare's Protein Engineering Lab, or any of a host of other well-equipped facilities.

"I got the experience of a lifetime," one participant wrote at its conclusion. "[During my time here] I was not just a high school student; I was a real researcher, attending symposia, preparing posters and presentations, and working independently in the lab." Another concurred, writing, "How many people can say they started working in a university lab at age 15? Now that's impressive." And in a sentiment that any engineering professor would be thrilled to hear, a third asserted, "I now know that I am made for engineering and research."

"BY WORKING WITH MIDDLE-SCHOOL STUDENTS, THE GRADUATE FELLOWS HONE THEIR PRESENTATION SKILLS AND LEARN TO CONVEY COMPLEX INFORMATION TO A LAY AUDIENCE WITHOUT USING JARGON."

One of three teams of Malaysian high school students putting the finishing touches on their Smart City prototype.

BEING A TEACHER IS SMART

BEING A TEACHER WITH ENTREPRENEURIAL EXPERIENCE IS SMARTER.

Ask a group of teachers to brainstorm lesson plans or techniques to gain the cooperation of unruly students, and you expect the discussion to be lively. Ask them to come up with ideas for new businesses and products, and their discussion is every bit as vibrant.

When the teachers participating in a recent Science and Mechatronics Aided Research for Teachers with an Entreprenuership expeRience (SMARTER) program were set to that task, they came up with a variety of innovative ideas, including USB devices that could be incorporated into fashion accessories and camera-ruler combinations that could take photos and measure on a micro scale.

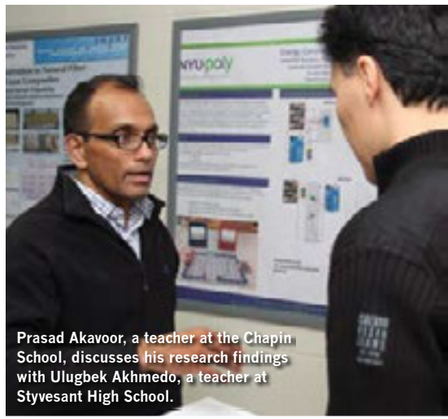
As part of their six-week summer experience, the teachers were treated to a unique workshop conducted by experts from the U.S. Patent and Trademark Office, who discussed intellectual property, patents, copyrights, and trademarks. Putting that information to immediate practical use, the teachers completed patent and trademark searches on their own ideas—just in case someone had already thought of the backpack with an integrated charger for mobile devices.

The teachers brought their newly ignited entrepreneurial zeal back to their students, who later competed in a high-school version of the School of Engineering's Inno/Vention competition. The winning team was led by Mamaroneck High School teacher Jigar Jadav, whose students have already filed a preliminary patent on their invention: a computerized system for providing football quarterbacks with cognitive as well as physical training. The second-place team, coached by teacher Charisse Nelson of Brooklyn's Park Place Academy, also addressed a football-related problem; they came up with a belt that allows a player in a wheelchair to stabilize the ball and be a fully integrated participant in the game.

The benefits of the SMARTER program are far from one-sided. In addition to gaining insight into areas they might never before have explored, the teachers were happy to lend students and faculty from the School of Engineering their own expertise. In one noteworthy example, Lee Holman, a teacher who works with children on the autism spectrum at PS 153 in the Bronx, worked with the developers of CAESAR, a humanoid robot built with off-the-shelf and 3D-printed parts and programmed using open software with the intent of helping people with disabilities. Caesar's blank, robotic expression, they had found, disturbed many who tested the original model, however. Thanks to Holman's input, Caesar now boasts moving eyebrows and other attributes that allow him to clearly express a wide range of emotions, including happiness, sadness, and surprise.

Caesar is not the only one at NYU and its Center for K-12 STEM Education expressing excitement in recent months. In late summer 2014 it was announced that a team of researchers led by Vikram Kapila had won a four-year $2,545,955 grant from the National Science Foundation for a project focused on professional development and teaching STEM with robotics. (In addition to Kapila, the team includes School of Engineering Professor Magued Iskander, the K-12 STEM Education Center's Ben Esner, and Steinhardt Professors Catherine Milne and Orit Zaslavsky.)

Next summer will thus be bringing even more teachers, fulfilling programs, and STEM projects to Brooklyn.



Prasad Akavoor, a teacher at the Chapin School, discusses his research findings with Ulugbek Akhmedo, a teacher at Styvesant High School.

LIVING PROOF

ANY NYU School of Engineering faculty member who has worked with high schoolers as part of the Center's programs can pull from their memories examples of exceptional students. Professor of Computer Science and Engineering Nasir Memon and Postdoctoral Fellow Tzipora Halevi can pull out an actual paper, "Touchpad Input for Continuous Biometric Authentication." The paper lists as its primary author Alexander Chan, a Hunter College High School student who worked in their lab in 2013 as part of the Applied Research Innovations in Science and Engineering (ARISE) program.

"He really took the initiative in writing up his findings," Halevi explains, "so while it's unusual for a high school student to be listed as the first author on a scholarly paper, in this case, it's a perfectly justified honor."

Chan received an additional honor when he was invited to present the paper—which explores how people's behaviors and gestures when using computer touchpads might be incorporated into the authentication process—at an international cyber security conference in Portugal in late September. He was the youngest presenter by far. "The most exciting thing was being in the audience at the other presentations and realizing that I was among the first in the entire world to hear about some of this new research," he said.

Chan will undoubtedly be attending other conferences in the future; he and Halevi explain that while he was not an official part of ARISE in 2014, he returned, by special request, to the lab to continue his research. Another paper is already in progress.

TEACHING THE TEACHERS

NO ONE would argue that it takes a lot to be a teacher—years of training in pedagogy, hours of lesson planning each week, classroom management skills, deep reserves of empathy along with the ability to be firm—the list could go on and on. Now what if you're charged with getting your students excited about STEM fields and preparing them for the higher-level course work that leads to rewarding careers in the tech sector? Sure, you could bring in a scientist or engineer to give a guest lecture a few times a semester, but what if you wanted to bring that level of excitement and tech expertise to your classroom every day? Simple...just ask the NYU Polytechnic School of Engineering's faculty and its Center for K-12 STEM Education to help.

Thanks to grants from the National Science Foundation (NSF), the School of Engineering is designated as a Research Experience for Teachers (RET) site and has hosted dozens of teachers who come to Brooklyn over the summer to receive mentoring from professors, engage in entrepreneurship activities, and conduct inquiry-based, hands-on, engineering research as part of a program called SMARTER (Science and Mechatronics Aided Research for Teachers with an Entrepreneurship expeRience).

SMARTER participants return to their classrooms in the fall with new project ideas and practical experience in using sensors, actuators, microcontrollers and other sophisticated equipment, and their students directly benefit. How many high school kids get a chance to fully equip a model home with an Arduino, Wi-Fly, lights, and a servo garage door opener and then develop an iPhone App to control those functions? Jeffrey Bernhardt did during an eight-week curriculum he created after participating in SMARTER. How many can test underwater robotic vehicles in a 125-gallon tank installed right in their classrooms or investigate the material properties of soft tissue by using digital force probes and Jell-O? Other teachers have brought those creative learning opportunities to their schools after their own SMARTER sessions.

In 2014 the NSF awarded a team of professors—Nasir Memon, Justin Cappos, Vikram Kapila, and Ramesh Karri—$500,000 to develop a Research Experience for Teachers Site focused on the burgeoning field of cyber security. (Not incidentally, the new program lays the groundwork for teachers to involve their students in the School of Engineering's annual Cyber Security Awareness Week forensics competition.)

Whether they're studying mechatronics, cyber security, or some other topic here, teachers have the satisfaction of knowing that they're an important part of a push to provide America's classrooms with exceptional STEM teachers. Esner has no doubt that with the help of programs like those at the School of Engineering that goal can be met. "K-12 STEM education has been a continually growing part of the culture here for over a decade," he says. "And during that time, literally thousands of students and their teachers have been impacted by this work through dozens of programs. Professor Vikram Kapila, with 18 years of experience in our Mechanical and Aerospace Engineering Department, is a driving force behind making K-12 STEM a priority, and we expect it to remain so for decades to come."

JUST WHAT THE CHANCELLOR ORDERED

ANY YOUNGSTER interested in science, technology, engineering, and math has the wholehearted support of Department of Education Chancellor Carmen Fariña, as she explained to the audience at the July launch of the NYU Polytechnic School of Engineering's 2014 #STEMNOW initiative, which involved fully a quarter of the School of Engineering's full-time faculty, 90 NYU student fellows, 50 K-12 and college faculty, and nearly 500 middle and high school students. "There's a shortage in this country of people to do the science, the engineering, and the technology work," she asserted. "You are the answer to that. . . . You are the answer to all of our problems."

#STEMNOW was comprised of well over a dozen individual programs, including:

- Applied Research Innovations in Science and Engineering (ARISE)
- Applying Mechatronics to Promote Science (AMPS) and Central Brooklyn STEM Initiative (CBSI)
- Code Liberation Foundation series on women in digital game development
- College-credit courses for high schoolers
- CrEST Mobile
- Cyber Security for Teachers and College Faculty
- Cyber Security for Young Women
- Research Experience for Teachers—SMARTER
- Science of Smart Cities
- Summer Research Opportunities for High School Students
- Tech Kids Unlimited

Middle school students run experiments to learn how different types of soil react with liquids with various properties. Here, Christopher Hernandez (CE, 2014) guides students.

TAKING A NEW PATH

RYAN CAIN no longer teaches at Brooklyn's P.S. 3 The Bedford Village School. He left behind his after-school robotics club, the 3-D printers he had worked so hard to obtain for his classroom, and the sand table where he taught the impact of flood events on our built environment by using model building structures created by students using 3D printers. "It was a hard departure," he says. "My principal and co-workers were not happy I was going, and of course I felt some guilt for leaving the students."

"ALL STUDENTS IN ALL CLASSROOMS SHOULD BE EXCITED ABOUT STEM LEARNING. AND THEY ALL DESERVE A SOLID FOUNDATION THAT WILL PREPARE THEM FOR THE FUTURE."

Perhaps your first thought is that Ryan heartlessly abandoned the Bedford Village community to pursue a more lucrative career as a bond trader. Perhaps you assume he is following some impractical or selfish dream (say, sailing solo around the world, for example). If so, think again. Ryan does, indeed, have a dream, but it is both practical and selfless.

He is now a doctoral student at Utah State University, where he won a competitive fellowship in Instructional Technology and Learning Sciences. He was inspired to apply, he explains, because of the time he had spent in various programs run by the Center for K-12 STEM Education. (A veteran participant, Ryan had completed a mechatronics-based Research Experience for Teachers, hosted AMPS/CBSI fellows in his classroom, and coached an afterschool robotics team.) "It was great taking everything I learned and applying it to the lessons I taught my own students in my own classroom, but I wanted to have an even bigger impact," he explains. "All students in all classrooms should be excited about STEM learning. And they all deserve a solid foundation that will prepare them for the future."

Ryan reasoned that one of the most effective ways he could work towards that goal would be to teach teachers, just as the professors at the NYU School of Engineering were doing with their efforts. "I realized I wanted to achieve what they were achieving," he says. "They were affecting much more than just one classroom at a time."

SARANII MULLER IN HER OWN WORDS

I'VE BEEN TEACHING technology at Fort Greene Preparatory Academy since the school opened more than four years ago, and I've been working with the NYU Polytechnic School of Engineering's Center for K-12 STEM Education for almost that long. As part of the AMPS/CBSI program, I had a terrific graduate fellow in my classroom for two years, James Muldoon, an electrical engineer, and this year my fellow is Matthew Moorhead, a mechanical engineer.

It's a good situation for everyone involved. The fellows bring great expertise in their specific fields, and as I learn from them, my curriculum grows. In addition to robotics, we now program with Python, design computer games, work with Arduinos, and much more. In turn, the fellows learn from my pedagogical approach; they develop the ability to explain their work to laypeople and get comfortable addressing a class.

Most important, they really get the kids excited about the practical applications of STEM and the career possibilities. My students might never have met an engineer before, so the fellows are living answers to that common question, "Why do we have to study this stuff?"

Fort Greene Preparatory Academy was founded on the belief that children should have access to a well-rounded education, and what I teach is an important part of that. It really opens the kids' eyes when they start out the year thinking they know all about technology simply because they can operate their smartphones and then they realize how much there is to learn! ■

Muller celebrates with her students at the 2014 FIRST Lego League Brooklyn Qualifier.

GREETINGS FROM A BYGONE BROOKLYN

Alum and Photography Buff Joseph Salgado Left Long Ago, but the Borough Still Holds a Place in His Heart

A VIEW OF THE SMOKESTACK ATOP THE OLD RAZOR FACTORY; THE STORES ALONG JAY ST.; A VIEW OF THE EL; LOOKING ACROSS JAY ST.; ROGERS HALL SITTING BEHIND THE EL; A BUS TRAVELS DOWN MYRTLE AVE.

I graduated from Poly in 1968 with a bachelor's degree in economics. I got to school by taking the Myrtle Ave. el to the station on Jay Street. The elevated tracks ran so close to the windows of some of our classrooms that we could look up and see the wheels on the train go by a few feet from our desks. We got used to it, but students who came after us didn't have to; the MTA shut down that line in 1969, not long after I graduated. Those trains stopped running, and ultimately, the tracks were torn down altogether.

Of course I didn't take the pictures that show the el at the corner of Myrtle and Jay—those were taken in 1945, and I came across them while doing research. If you look behind the building right on the corner, which was later torn down, you can see Rogers Hall.

The bus in one of the pictures is driving right down Myrtle Avenue, which you could do before the plaza at the MetroTech Center was built. In fact, there used to be an underground garage across Jay Street, and you could drive right in. There was a park on top of it, where a Marriot Hotel now stands.

The entire area looks very different now from when I attended Poly, and it's certainly come a long way from the days when the building that housed the American Safety Razor Company at 333 Jay Street was first purchased by the school. ■

IN MEMORIAM: CLIFFORD H. GOLDSMITH (HON '06)

The NYU Polytechnic School of Engineering mourns the passing on June 25, 2014 of much-admired former trustee and board vice chair, Clifford H. Goldsmith (HON '06).

In 1986, Clifford was appointed to the Board of Trustees of Polytechnic University, now the NYU Polytechnic School of Engineering, and served as Vice Chairman. Early in his 19-year tenure on the board, Clifford co-founded the Promise Scholarship Fund which provides scholarships to exceptional students with financial need. Thanks to his vision, the Promise Scholarship Fund, thrives today, enhancing our ability to provide critical resources to diverse students seeking a high-quality STEM education. In recognition of his contributions, he was presented with the Polytechnic Distinguished Service Award for Science and Technology in 1998. In 2006, Clifford's legacy of achievements was further acknowledged with an honorary degree.

Born on September 6, 1919 in Leipzig, Germany, Clifford graduated from Bradford University, Yorkshire, England, with a degree in textile engineering and later emigrated to the United States in 1940. He served in the United States Army during World War II and was held as a prisoner of war in Germany. In 1945 he joined the Benson & Hedges Company, ultimately becoming President of Philip Morris Incorporated from 1978 until 1984.

The NYU Polytechnic School of Engineering community has lost an exceptional leader and humanitarian. His dedication to advancing our mission will long be remembered. We extend our condolences to his wife, Katherine; his two daughters; and the entire Goldsmith family.

WILLIAM ORTH ('52)

We sadly report the death of **William Orth ('52)** on September 22, 2013, at the age of 94 in Pearland, Texas.

As a young husband and father, Orth worked full time and attended what was then known as the Brooklyn Polytechnic Institute in the evenings, in order to earn his bachelor's degree in mechanical engineering. (Until the end of his life, he displayed bookends inscribed with the school name, and the set proved to be a conversation starter for visitors to his home.)

The loyalty and responsibility Orth felt towards his family was echoed in his work life; he remained at the Ford Instrument Company, a division of Sperry Gyroscope, for more than three decades. A member of the American Defense Preparedness Association, Orth worked on such projects as modernizing an electro-mechanical analog control computer used by both the U.S. Navy and the British Navy and upgrading the MK 10 Range Keeper—part of the Gun Director System used on warships like the U.S.S. *Texas*. Orth later joined Lundy Electronic and Systems as a staff engineer, and there he worked on components for the Minuteman III Missile.

In addition to square dancing—a pursuit he avidly enjoyed—Orth's other hobbies included riding roller coasters, and he was a devoted Gold Passport member of Busch Gardens until well into his 80s.

Our deep condolences go to his wife of 66 years, Betty; his son, William; his daughter, Louise; his grandchildren, Ashley-Anne, Derek, Drew, Christopher, and Travis; and his fellow Masons at Morton Lodge No. 63.

RALPH TEKEL ('41)

With deep sadness, we report the passing of **Ralph Tekel ('41)** on October 8, 2014 in Philadelphia, Pennsylvania, at the age of 94.

A graduate of Stuyvesant High School, Tekel worked his way through the Brooklyn Polytechnic Institute, as the NYU Polytechnic School of Engineering was then known, by waiting on tables at Catskills resorts in the summer and blowing glass for use in laboratories. It was during graduate school, at Purdue University, where he was studying for a doctoral degree in chemistry, that he became an unwitting participant in the top-secret Manhattan Project. His research group there, led by Henry Hass, had been engaged in what was called "Project 220," preparing fluorocarbons. Not until after the war did they learn that these were used to separate isotopes, for use in the atomic bomb.

While working in the Pediatric Research Laboratories at Jewish Hospital in Brooklyn, Tekel received two patents, in 1946 and 1950, for his work in x-ray contrast media. He subsequently entered the pharmaceutical industry, developing synthetic steroids, antibiotics and psychoactive drugs for such companies as Wyeth Laboratories and National Drugs. From 1965 until his retirement in 1985, Dr. Tekel taught at La Salle College (now La Salle University), where he endowed a scholarship. He was also an exceptionally generous benefactor to the NYU Polytechnic School of Engineering, his alma mater of 73 years.

Our deepest sympathies go to his devoted wife, children, and grandchildren.

T. RICHARD FISHBEIN

It is with deep regret that we announce the passing of dedicated board member **T. Richard Fishbein** on October 14, 2014, at the age of 76. Fishbein—who held an AB from Dartmouth College, an MBA from Harvard Business School, and a Diploma from the School of Advanced International Studies of Johns Hopkins University in Bologna, Italy—had an enduring passion for the life of the mind, and he lived, as he put it, with vigor, surrounded by family and friends and immersed in career, travel, art, and a wide variety of other personal interests. (He held a special place in his heart for New York City's Metropolitan Museum and particularly loved spending time in England, France, Italy, and, especially, Japan.)

A retired partner of the Cortec Group, a private equity investment firm based in New York, Richard served on the boards of several institutions in addition to the School of Engineering. (When the School was a separate institution, he served as a member of its Board of Trustees.) These included the National Academy Museum and School of Fine Arts, the Japanese Art Society of America, and NYC Seed. He gave generously to numerous other organizations, including the Stanley M. Isaacs Neighborhood Center, Dartmouth College, and Columbia University College of Physicians and Surgeons.

Our thoughts are with his wife of more than three decades, Dr. Estelle Bender; his stepdaughter, Melissa Bender; and the rest of his devoted family. We miss his engaging participation in Poly's future while remaining true to its broad spirit of support for the underdog.

Continuing the tradition of philanthropy he established during his life, his family asks that donations be made in his memory to the Bender-Fishbein Endowed Scholarship at NYU Polytechnic School of Engineering, Attn: Judy Sager, Office of Development and Alumni Relations, 15 MetroTech Center, 6th Fl., Brooklyn, NY 11201.

DR. HOWARD BRENNER

The NYU Polytechnic School of Engineering, along with the entire NYU community, mourns the passing of **Dr. Howard Brenner**, an eminent alum and former faculty member. Brenner, widely considered one of the world's leading theoreticians in the transport properties of flowing suspensions and multiphase systems, earned both master's and doctoral degrees in chemical engineering from NYU, in 1954 and 1957, respectively. He then taught in the Department of Chemical Engineering until 1966. (At the time, the engineering program was located in the University Heights section of Manhattan and had not yet moved to Brooklyn.) He was later affiliated with Carnegie Mellon; the University of Rochester, where he became chair of his department; and MIT, where he served as the Willard Henry Dow Professor of Chemical Engineering.

Brenner was the author of three textbooks and a member of numerous distinguished organizations, including the American Institute of Chemical Engineers, who bestowed on him every major award given by that group. He was also known as a devoted advisor and mentor to his students, many of whom went on to make their own mark in the field. "Until three days before his death," according to a tribute published by MIT, "he was making the final revisions on a paper that reflected the culmination of almost 10 years' work. . . . Of this project, he said that he could always continue to find needed revisions, but, in essence, was done with what he believed to be a seminal piece that overturned a theoretical underpinning of fluid dynamics several hundred years old."

We extend our profound respects and sympathy to his entire family, including his children, Leslie, Joyce, and Suzanne, and his many grandchildren, on whom, by all accounts, he doted.

IN MEMORIAM

Professor Robert C. Ackerberg
Professor Arthur A. Oliner '05 (Hon)
Edward J. Gentsch '34
Dr. Ralph Tekel '41
Charles Ledwith '44
Harold J. Metter '44
Albert H. Greer Ph.D. '45, '49
Walter Rusnak '47
Henry G. Lenz '48
Dr. Martin L. Perl, D.S. '48, '96
Albert A. Sommerfeld '48
Robert W. Unterreiner '48
Jack Borsellino '49
Aaron H. Coleman'49
Arthur W. Lotz '47, '49
John R. Passalacqua '49
Walter M. Davis '50
Charles J. Falco '50
Frederick W. Kahler '50
Donald B. Terrana '50
John K. Benz '51
Joseph F. Coates '51
Alfred G. Hoerrner '51
Arthur H. Mones, Ph.D '51, '57
Semon P. Vincent '51
Robert J. Butt '52
William G. Deichert '52
Allen E. Heyson '52
Gibson Reynolds '52
William Skidba '52
Stephen S. Voris '52
Warren B. Coe '53
Nicholas Di Santi '53
Peter P. Lombardo '53
Joe Manuel Paz '53
Roland A. Roe '53
Irving Abrams '54
Arthur E. Blenkle'54
Robert D. Fischetti'54
Donald B.Hoffman '54
James R. McVey '54
Joseph F. Metzendorf '54
John J. Monagle, Ph.D. '54
Gerald H. Rich '54
William J. Stenger '54
Peter Veit '54
Herman P. De Haan '55
Robert O. Foernsler '55
Thomas F. Gabriel '55
Nathan D. Field Ph.D. '56
Edward C. Jaroszewski '56
Robert H. Lee '56, '71
Adrian J. Basili '57
John Digrindakis '57,62
Eugene J. Dussich '57
Douglas C. Renud '57
David M. Wetstone Ph.D. '57
Morris Daniel Bellware '59
Charles A. Guarneri '59
William H. Moore '59
Dr. I. Hilary Rolih '59
Allen Jay Schwalb '59, '63, '65
Gerald Weiss, Ph.D.'59
Hua Tung Lee Ph.D. '60
Richard Zogheb '60, '66
Eliot Liang '61
Edward J. Bage '62
Robert Quattrone '62, '66
Henry A. Oberndorfer '63
Walter J. Skuggevig '63
Gerald A. Martingano '65
Steven H. Reichman '65, '67
Joseph M. Lestrange '66
Sin Chou Fan Ph.D. '67
Frank V. Fossella '69
Philip C. Washburn '69
Daniel P. Mazzola '71
Elmer Freibergs '73
Daniel L. Beldy '76
Sallyann Aliquo Giuffrida '78
Jeffrey J. Smith '93
Richard Fishbein
George W. Pardee
Helen Warren

LEONARD SHAW

It is with great sadness that we report the passing on October 22 of **Leonard Shaw**, who taught at the NYU Polytechnic School of Engineering for more than four decades.

In addition to his teaching duties, Shaw served as Head of the Department of Electrical Engineering and Computer Science from 1982 to 1990, Dean of the School of Electrical Engineering & Computer Science from 1990 to 1994, Director of the Westchester Graduate Center from 1994 to 1996, and Vice Provost for Undergraduate Studies from 1995 to 1996.

A longtime Fellow of the Institute of Electrical and Electronics Engineers (IEEE), Shaw was a well-respected researcher whose work focused on the filtering and modelling of stochastic processes with applications to signal processing, control, and reliability. His 1975 text, *Signal Processing: Discrete Spectral Analysis, Detection and Estimation*, first introduced the title's topics to an undergraduate audience.

Shiv Panwar, now the Director of the Center for Advanced Technology in Telecommunications and the Chair of the Electrical and Computer Engineering Department, recalls, "He truly personified the best values of service to this institution, much of it during critical times in the school's history. He kept in close touch with us and maintained a keen interest in developments at Poly even after his retirement." Fittingly, Shaw's papers can be found in the Bern Dibner Library's Poly Archives & Special Collections.

The sympathies of the entire NYU Polytechnic School of Engineering community go to the Shaw family.

JOSEPH METZENDORF ('54)

It is with sadness that we report the passing of **Joseph Metzendorf ('54)** on June 29, 2014.

Metzendorf had joined the U.S. Navy shortly before Hiroshima and Nagasaki were bombed and was later able to study at what was then known as the Polytechnic Institute of Brooklyn, thanks to the G.I. Bill.

Despite the tuition funds he received as a military veteran, Metzendorf, who was the first in his large family to attend college, worked during the day and took classes in the evening. He often said that volunteering for the U.S. Navy and earning a degree in mechanical engineering were watershed moments in his life. A third was joining Combustion Engineering, the company that employed him for almost four decades.

On May 11, just months before his death, Metzendorf, who had by then settled in Wisconsin to be near devoted members of his extended family, attended a ball game between the Milwaukee Brewers and the Yankees. The Brewers honor a military veteran at each game, and Metzendorf was chosen that day. When a beaming Metzendorf appeared on the ballpark's massive screen, some 43,000 fans gave him a well-deserved standing ovation.

CLASS NOTES

Bugra Akyildiz '13EE
Bugra Akyildiz works at CB Insights, which provides sourcing and analytics to private investors, corporate ventures, and venture capitalists. The company is hiring software engineers: visit www.cbinsights.com to learn more.

Pratikkumar Chunawala '14EE
Pratikkumar Chunawala would like to meet fellow alumni and network in order to find what exciting and cool opportunities are out there for electrical engineers. He is interested in Network/Infrastructure Engineering and Technical Project Management within the domains of Computer Networks and Electrical Engineering.

Galo Donggilio '98ME
Galo Donggilio currently has the gratifying job of teaching New York City's middle school students.

Leonard N. Podell '60CE, '65CE
After a long and fruitful career that spanned more than 60 years, Leonard N. Podell retired in April of 2014. Leonard, who served during the Korean Conflict in the specialized aviation engineering units known as SCARWAF, worked as a Civil Engineer with consultant offices, the State and City of New York, the Federal Government, and the State of Maryland. He is now enjoying time with his family and friends.

Elizabeth Schrandt '13CE
Elizabeth Schrandt says that graduating from POLY-ENG opened many doors for her. The organizations she was involved in as a student continue to provide great networking opportunities, and thanks to her degree she has found an exciting job at an international engineering firm.

Vikram Sharma '84EE, '89EE
Vikram Sharma is the founder of the New York Computer Circle (NYCC), whose mission is to promote computer and internet engineering in New York, facilitate job and internship opportunities, host training seminars and webinars, assist in chapter formation, and monetize knowledge and experience. For more information, visit www.newyorkcomputercircle.com.

Michael Trizzino '14EE
Soon after graduation, Michael Trizzino began working at Jacobs, performing the commissioning of MEP systems for the World Trade Center Transportation Hub project. This fall he attended an NYU networking event at Tiro a Segno, the oldest Italian-American social club in the United States, where he spoke to influential alumni in the construction and real estate industry. Tiro a Segno translates to "Shoot at the Target," and he was able to do just that at the shooting range in the venue's basement, showcasing the marksmanship he had acquired as a member of the JROTC Rifle Team at Xavier High School. He is looking forward to continuing to be an active NYU alum and taking part in other events like that one.

HENRY BERTONI

"I came to the NYU School of Engineering as a graduate student, when it was known as the Polytechnic Institute of Brooklyn, and stayed on for the next 47 years to teach and do research. As a professor, I've always felt great empathy and admiration for our students. Many have been the first in their families to attend college, and many have come from other countries to better their lives. They're an extremely motivated group, willing to work hard, and I want to do everything I can to help them reach their goals. Because of my investment of time and energy here, the success of our students and the recognition of Poly are very important to me. That's why I choose to fund scholarships; it's a way to have a meaningful impact on the lives of our students, and through them the stature of Poly."

Henry Bertoni '62, '67 earned his M.S. in Electrical Engineering in 1962 and his Ph.D. in Electrophysics in 1967. Over the course of his career, he twice served as head of the Electrical and Computer Engineering Department, was vice provost of graduate studies, and directed the school's Wireless Internet Center for Advance Technology (WICAT). A longtime fellow of the IEEE and the author of the text *Radio Propagation for Modern Wireless Systems*, he has done seminal research on wave phenomena in electromagnetics, ultrasonics and optics.

For more information on how you can help the NYU Polytechnic School of Engineering, contact Judy Sager at jsager@nyu.edu or call 1-718-260-3298. ■

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