

GW RESEARCH

THE GEORGE WASHINGTON UNIVERSITY

SPRING 2017

THE AUTISM SEX BIAS

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A BIG BOOST
FOR TINY SATELLITES

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SAVING A SHELL-
SHOCKED BAY



THE IMMIGRANT COLOSSUS

**A professor mines the 400-year history of
windswept hopefuls who have called New York
home, and built an island into a singular global city.**



A NOVEL IDEA

I grew up in Manhattan, and I went to Catholic school there. One day in the eighth grade, Sister Catherine announced we would be taking a trip to the United Nations, and everyone was very excited, including me. Normally we had to wear a uniform; for the boys it was a white shirt, a jacket, blue pants. And for some crazy reason, the day of the trip I decided to wear a checkered shirt that

my grandmother bought me for my birthday.

It was ... ambitious.

Sister Catherine saw it as rebellious, and the decision left me sitting at school with the seventh-graders while my class went to the UN.

The lesson there is one that applies to research, too, and it's advice I still offer to young investigators applying for their first grants: Be novel, but not too novel.

With federal research dollars already squeezed, and the grip now only tightening, having solid, grounded proposals and good communication are paramount. In reaching to answer big questions, they'll need to not overextend into vague, speculative territory.

But still, to be novel is to dream, to live on the cusp, to persevere and endlessly prepare, electrified with a sense there is something unseen waiting to be found.

It's an entrepreneurial spirit that has arrived in the bellies of ships, and by wing and by foot for 400 years, as history professor Tyler Anbinder details here on Pg. 30. (My parents were among them, fleeing Ukraine as World War II was ending.)

It's the conviction of people like autism researcher Kevin Pelphrey (Pg. 22), whose heart is entangled in every study he conducts.

It's the reason my office awards funds every year to a slate of cross-disciplinary research proposals, creating pairings like the physicist and doctor who are studying epigenetics and the 3-D structure of the genome.

And being novel is the courage of the dozens of teams that vie for startup funds each year in our New Venture Competition, and the hundreds of students who present posters at the university's annual Research Days.

To be novel is to make luck look easy.

Eventually I did make it to the United Nations. It took more than five decades along a winding, uphill path—till just this spring—and I went not as a tourist, but as an invited speaker. And this time I left my checkered shirt at home.

Sincerely,

A handwritten signature in dark ink that reads "Leo M. Chalupa".

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Researchers are helping to build an instrument that will allow scientists to see farther into space than ever before, and to study celestial objects and events with unprecedented precision.

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Boys are diagnosed with autism at more than four times the rate of girls. Scientists are trying to figure out why, but this much is becoming clear: All that we think we know about autism is only half the story. BY KRISTEN MITCHELL

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In an excerpt from his new book, *City of Dreams: The 400-Year Epic History of Immigrant New York*, history Professor Tyler Anbinder revisits the first settlers upon the shore of the city that immigration built.

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City of Dreams author Tyler Anbinder talks about the constancy of immigration history, saving the name of a Civil War commander and the value of always revisiting an original source. BY DANNY FREEDMAN

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Back cover: Scanning electron micrograph of an HIV-infected T cell (Courtesy National Institute of Allergy and Infectious Diseases)

HISTORY

THE FINAL WORD

After 50 years at GW and 22 volumes of work, researchers prepare to hit the lights on a project that became the definitive history of the first U.S. Congress.

BY DAVID FREY

In a windowless room in a West End office building, Charlene Bangs Bickford's life work fills desktops, bookshelves, filing cabinets and, increasingly, several very large recycling bins.

For more than 50 years, her First Federal Congress Project has set out to document a little-known nor long-remembered period of American history, when a group of mostly forgotten Founding Fathers gathered to take the framework of a new Constitution and build a government.

Bickford, MA '69, joined the team as a graduate student in 1967, a year after the project left the National Archives to be based

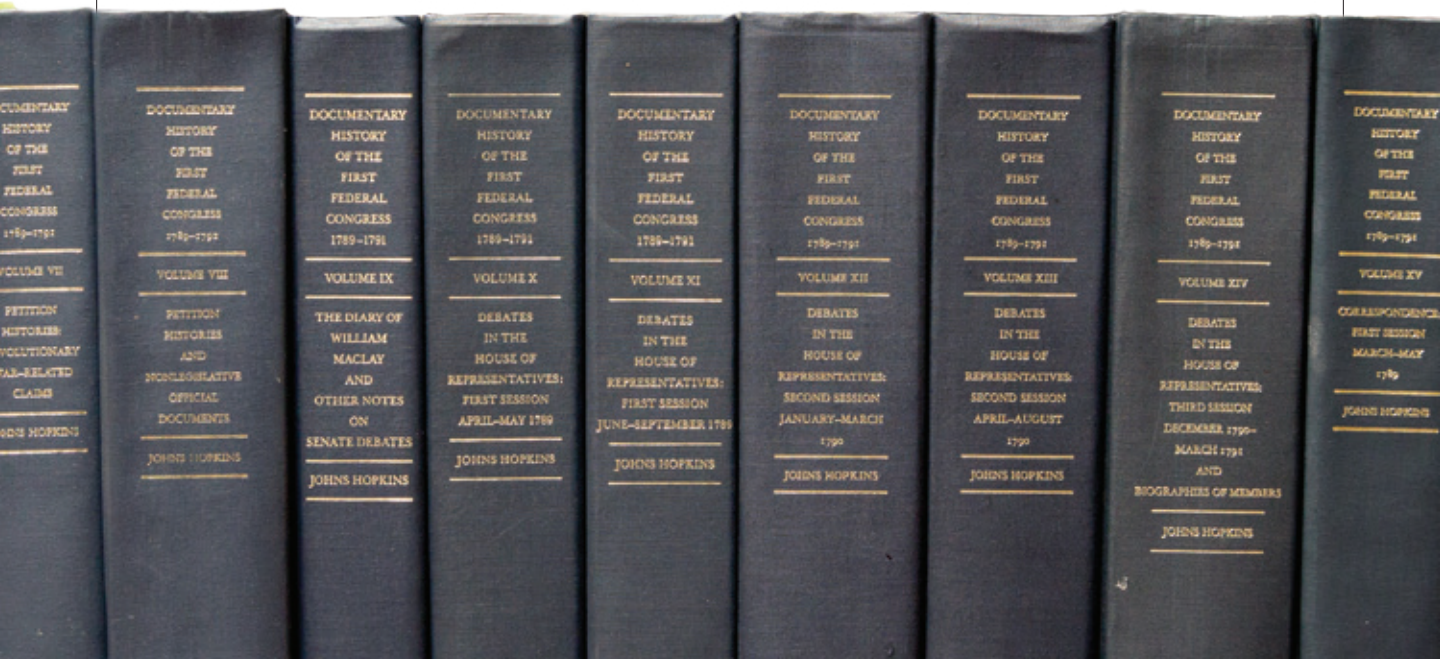
at GW, within the Columbian College of Arts and Sciences. She's been its director since the 1970s, steering it through the publication of nearly two dozen volumes that document that first Congress using official records, personal diaries, correspondence, historic doodles and the occasional acerbic poem. Each book, published by Johns Hopkins University Press, is as thick as a fist—some more than a thousand pages—bound in blue with gilded lettering.

"It's an enormous scholarly achievement," says historian Fergus Bordewich, whose 2016 book, *The First Congress*, relied on the project's work. "It's

packed with rich detail and has a comprehensiveness that is unmatched by any collection I've worked with."

When Bickford and her team—co-editor Ken Bowling and associate editors William diGiacomantonio and Helen Veit, MPhil '77—publish the final two volumes in 2017, a project that officially began in 1950 will end, and the office will close the doors on more than a half-century of research that included gumshoe sleuthing, codebreaking, stolen artifacts and an FBI sting.

"There are big bins full of paper debris going out of here every day at this point," Bickford says. "It's a little strange."



When the books are published, she will retire, ending a career entirely dedicated to a momentous but overlooked period of American history.

The First Federal Congress convened from 1789 to 1791, before the District of Columbia had been carved out along the banks of the Potomac River. Most of those first 95 senators and representatives left behind families to meet in New York and, later, Philadelphia, to cobble together an experiment in federalism.

"We are in a wilderness without a single footstep to guide us," lamented James Madison, then a congressman from Virginia and one of the few in that first Congress who remains a household name.

The Articles of Confederation had failed. The revolutionary government and many of the states were deep in debt. Threats loomed from the British to the north, the Spanish to the south and Native American tribes to the west. States sparred with one another. Regions mistrusted each other. Four-dozen currencies were in exchange. Americans, including many of those first legislators, distrusted a federal government. Amid this backdrop, lawmakers put aside deep divisions to craft a government.

In three sessions, the first Congress established the Supreme Court and a federal judiciary. It created the first executive departments—the Treasury, State and War departments. It passed the Bill of Rights. It passed duties and tariffs to fill federal coffers, launched a national bank, embarked on a census, drafted copyright and patent laws and named a capital.

"It was the most important and

productive Congress in United States history," says Bickford, sitting at a massive table formed from six wooden desks pushed together in the center of a room that smells of coffee and old paper.

Scattered across the desks are fading file folders she made 50 years ago out of stapled construction paper to hold oversized documents. The project's 20 volumes run down the center of the table like a spine. Page proofs for Volume 21 lie stacked in a dozen piles on one side. Another stack destined for Volume 22—which nudges into the

In three sessions, the first Congress established the Supreme Court and a federal judiciary. It created the Treasury, State and War departments. It passed the Bill of Rights. "It was the most important and productive Congress in United States history," says Bickford.

period after the first Congress and collects materials unavailable for earlier volumes—sits on a desk in the entryway.

Across the table, Ken Bowling, the co-editor, dumps a stack of papers into a gray bin filled to overflowing. They're all photocopies, he says; the office has no original manuscripts. The papers he's tossing are old newspaper accounts of the first Congress.

Already gone are boxes of copied notes on the proceedings of the first House of Representatives. Those records were jotted in a personal shorthand that project editors had to decipher character by character.

Bowling started on the project a few months before Bickford but didn't become a full-time editor until 1989. Back in the '60s, he set off to comb through more than a thousand collections west of the Mississippi in search of manuscripts.

"It's a detective kind of job in many ways," he says. In one case, he tracked manuscripts to a Pennsylvania auction, alongside a pile of *Hustler* magazines. Another turned up precious letters in a Wilkes-Barre, Pa., barn.

Bowling helped find Pennsylvania's missing original of the Bill of Rights (it was hanging in the New York Public Library), as well as North Carolina's, which had landed mysteriously in the hands of private collectors before FBI agents posed as buyers and seized it.

Touching those old documents feels like touching history, Bowling says. "You have your hands on something" that one of the Founding Fathers touched, he says.

But they also hold lessons that are still relevant, the researchers say.

"The retroactive idealization of the [nation's] founding airbrushes out parts that were chaotic, combative and full of cynical politicking," Bordewich says. "It's important for Americans today to understand that the Revolution was fought not to take politics out of government—the way certain people on both sides of the political spectrum think it ought to be. The Revolution was fought so that people could do politics. It was never, ever a group hug." *BWR*



GENETICS

A NEW ROUTE TO COUNTER CYSTIC FIBROSIS

Researchers have identified a potential new drug that could treat and halt the progression of cystic fibrosis.

In preclinical trials on a mouse model and on cells from CF patients, the single-molecule based therapy, called Thymosin $\alpha 1$, was able to correct genetic and tissue defects and reduce the inflammation seen in CF patients, the researchers reported in the journal *Nature Medicine*.

Cystic fibrosis is a genetic disease that causes persistent lung infections and progressively limits the ability to breathe. It affects around 70,000 people worldwide, including 30,000 in the U.S. The disease results from a genetic mutation, which causes the misfolding of a protein that usually plays a role in the regulation of mucus and other factors necessary for normal functioning of the lungs and pancreas.

“Right now there are multiple treatments for cystic fibrosis, and while these have improved life expectancy dramatically, there is still only a lifespan of about 40 years for patients. No one treatment

can stand alone,” says Allan L. Goldstein, one of the study’s co-authors and a professor emeritus in residence of biochemistry and molecular medicine at the School of Medicine and Health Sciences.

Thymosin $\alpha 1$ is a synthetic version of a naturally occurring peptide that Goldstein and his colleagues first isolated from the thymus and characterized in 1979.

Under the commercial name Zadaxin, the drug has been available outside the U.S. in more than 35 countries for the treatment of viral infections, immunodeficiency diseases, malignancies and HIV/AIDS.

HEALTH

MINING THE MICROBIOME

Work to uncover the ecosystems of the human penis and the nose aims to halt the spread of HIV and staph.

Two new studies into the human microbiome will explore the bacterial ecosystems of the penis and of the nose in the hopes of better protecting people against HIV and life-threatening “superbug” infections.

The projects, supported by two grants totaling \$7 million from the National Institute of Allergy and Infectious Disease, will be led by Department of Environmental and Occupational Health researchers Lance Price and Cindy Liu.

“These studies will tell us more about the colonies of microbes living in and on the human body,” says Price, who also is director of the Antibiotic Resistance Action Center based at the Milken Institute School of Public Health. “In both cases, we will be looking for ways to alter the microbiome and protect people from disease.”

In the first project, researchers will look at bacteria living on the penis and the role it plays in vulnerability to HIV.

A 2013 study by Liu, Price and others found that circumcision led to a drop in anaerobic bacteria, which require a low-oxygen environment to thrive. There’s evidence that the decline might protect women from HIV, but the new study will look for a direct link in men, says Price.

“If anaerobic bacteria play a role in transmission of HIV, we might be able to develop novel ways of preventing HIV infection,” he says, regardless of whether a man is circumcised.

The second study will focus on bacteria living in the human

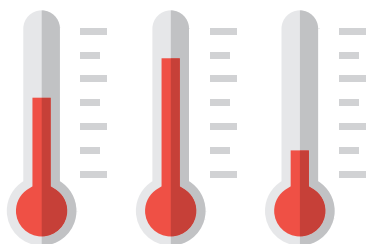
nasal cavity and search for new ways to prevent infections with *Staphylococcus aureus* (a common inhabitant of the nose)—particularly drug-resistant strains of staph, such as MRSA, or methicillin-resistant *Staphylococcus aureus*.

The team hopes to find out whether there may be bacteria that could be introduced to route staph from the nose.

“This study will show us whether we can introduce the good bugs to crowd out the bad,” Liu says. “If we are successful, this probiotic approach could be used to prevent the spread of superbugs like MRSA and others that have become resistant to multiple antibiotics.” GWR

\$7M

The total funding of two new grants aiming to explore pieces of the human microbiome



CLIMATE CHANGE

LIKE POLITICS, ALL WEATHER IS LOCAL, TOO

For Americans, belief in climate change—errantly tied to warming only—may hinge on their local forecast

Local weather may play an key role in determining Americans' belief in climate change. A new study found that people who recently experienced record-low temperatures are less likely to believe the Earth is warming compared to those who have experienced record highs.

"The idea here is that individuals make decisions about climate change not just based on what they read in the news, but what they experience," says GW geography professor Michael Mann, a co-author of the study.

The research, conducted by scientists at several institutions, was published in December in the journal *Proceedings of the National Academy of Sciences*.

"One of the greatest challenges to communicating scientific

findings about climate change is the cognitive disconnect between local and global events," Mann says. "It is easy to assume that what you experience at home must be happening elsewhere."

Experts say climate change will have a diverse set of effects. It may cause some regions to get cooler in the short run while others grow warmer, but past characterizations of the global shift have seeded doubt among skeptics.

"Unfortunately climate change was very early on framed as just climate warming," Mann says. "If someone has a big snowstorm with a new record-low temperature, they may look at climate change and think, 'Oh, that can't be right.'"

For the study, researchers looked at data from more than 18,000 local weather stations across the country and temperatures recorded there. That information was compared to survey-based estimates of the beliefs of people living nearby. The authors note that differentiating between the terms "weather," which they define as the temperatures of a short period of time, like a season, and "climate," average temperatures over two or three decades, may be helpful in communicating more effectively.

—Kristen Mitchell

EVOLUTION

A CLOSER COUSIN

A new study of the musculature of bonobos suggests that the rare great ape may be more closely related to humans than is the common chimpanzee.

Previous research had suggested the theory at the molecular level, but the study is the first to compare the anatomy of the three species.

"Bonobo muscles have changed least, which means they are the closest we can get to having a 'living' ancestor," says Bernard Wood, one of the study's authors and a professor of human origins at the GW Center for the Advanced Study of Human Paleobiology.

Scientists believe that modern human and common chimpanzee/bonobo lineages split around 8 million years ago, and the two great ape species split from each other 2 million years ago. Over time, they found, the bonobo muscles have changed less than that of the common chimpanzee.

For the study, published in April 2017 in *Scientific Reports*, the team examined seven bonobos from the Antwerp Zoo in Belgium that had died and were being preserved—an extremely rare opportunity to study the endangered species. GWR



SPACE

A DEEPER PERSPECTIVE ON SPACE

GW researchers are helping to build an instrument that will allow scientists to see farther into space than ever before and to study celestial objects and events with unprecedented precision.

The OCTOCAM will have eight high-speed detectors working simultaneously yet independently, each capable of imaging and analyzing a different band of visible or invisible light. The instrument is designed for the Gemini Observatory's facility in Chile and will be built over the next five years. ▶

A laser, used to help cancel out atmospheric turbulence, rises from Gemini South, in Chile.

▶ OCTOCAM will be used with a new telescope, the Large Synoptic Survey Telescope, which is under construction. The 8.4-meter-wide LSST will be able to map the entire visible sky in just a few nights, documenting billions of new stars and galaxies. OCTOCAM is designed to perform detailed, efficient follow-up observations on LSST finding. “We want to go after the most interesting objects and exciting events that LSST finds, and then observe to great depth with OCTOCAM,” says GW physics professor Alexander van der Horst, who is the OCTOCAM project scientist.

Van der Horst worked for two years on the proposal for the

instrument and assembled a team of some 50 astronomers from around the world to work on the project. GW will receive a portion of a \$15 million grant to lead the scientific efforts and develop software for astronomers to efficiently use the new instrument.

The project, led by Antonio de Ugarte Postigo, a scientist based in Granada, Spain, is scheduled to be completed by the end of 2021, ahead of the LSST’s completion the following year.

Stephen Goodsell, who manages the instrument program for Gemini, says that OCTOCAM’s capacity for fine detail across a wide stretch of spectrum “will undoubtedly lead to transformational scientific

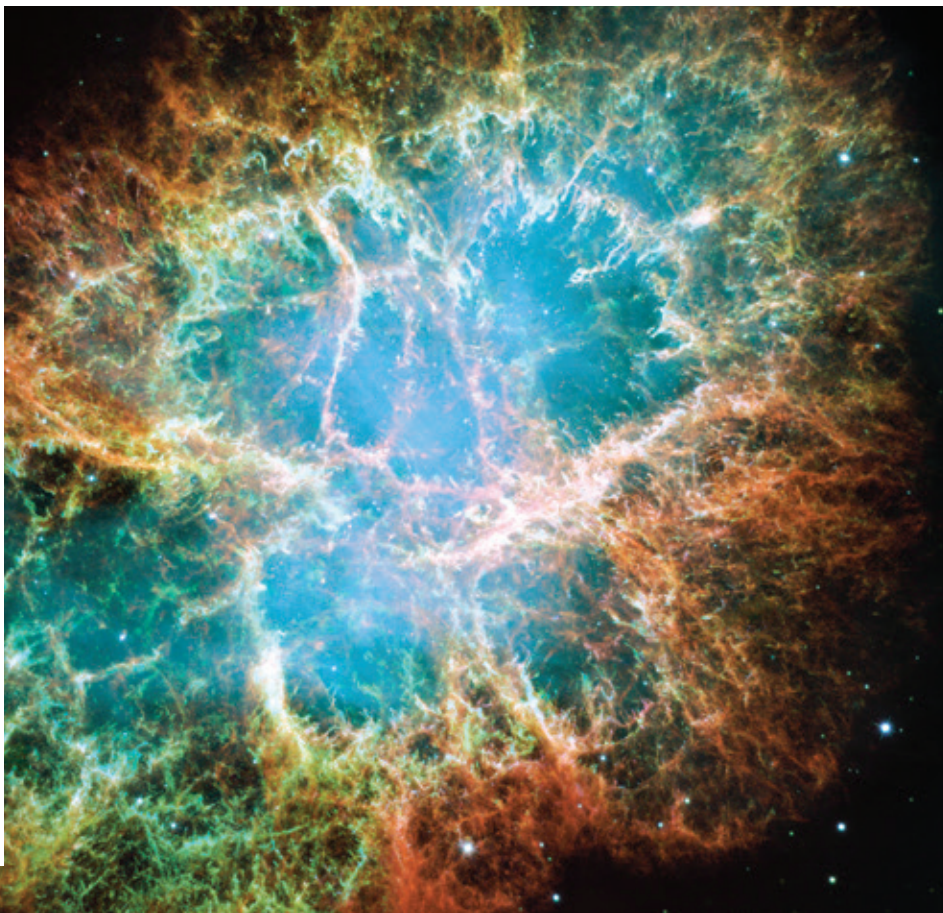
discoveries.”

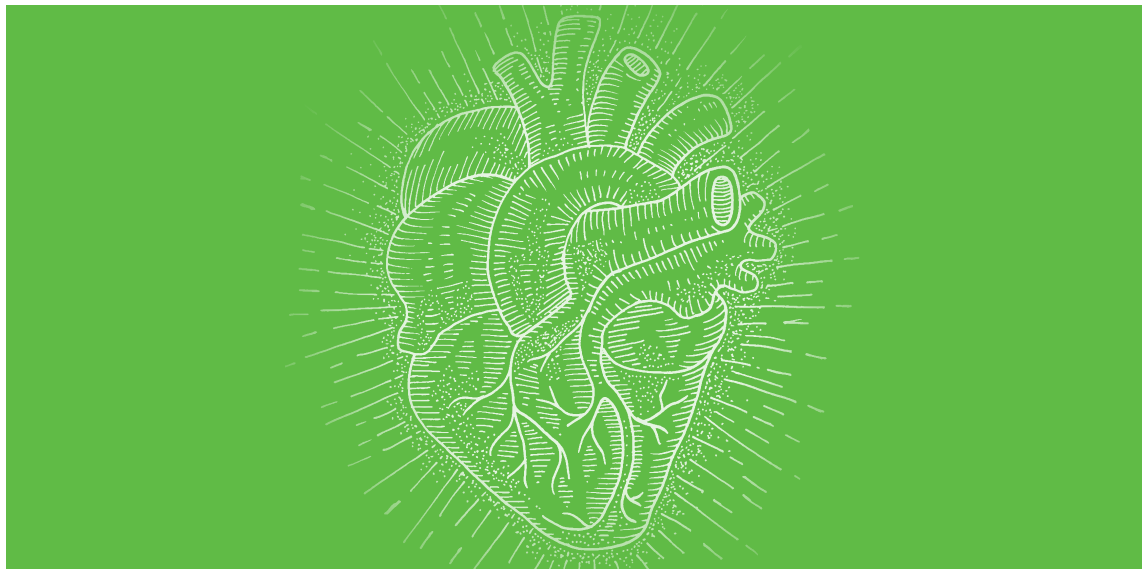
Van der Horst, for instance, is interested in studying short-lived events, like the explosions of massive stars at the end of their lives, and collisions between extremely dense objects, the visible and near-infrared light of which OCTOCAM may be able to detect for the first time.

The science team also includes GW physics professors Oleg Kargaltsev, who is interested in studying neutron stars, the densely packed corpses of massive stars that have exploded; and Chryssa Kouveliotou, who is hoping to use OCTOCAM to study magnetars, a rare and extremely magnetic type of neutron star. —Kristen Mitchell

COSMIC CLOUD

Scientists for the first time detected a wind nebula—a cloud of high-energy particles—surrounding a rare, highly magnetized type of neutron star, which may help reveal the origins of these stars. The team, led by GW post-doctoral researcher George Younes and including physics professors Chryssa Kouveliotou, Oleg Kargaltsev and Alexander van der Horst, published the findings in June 2016 in *The Astrophysical Journal*. Previously, wind nebulae had only been seen around young neutron stars called pulsars (like the Crab Nebula, pictured at right). The object in the study is a magnetar, of which only 29 have been identified. —K.M.





OPTOGENETICS

LIGHT-CONTROL TECHNIQUE COMES TO HEART CELLS

Researchers using a technique for controlling cells with light say they may be able use the process to speed the screening of drugs for possible heart complications, reducing to minutes an effort that currently can take years.

The method, which uses optogenetics to make the heart cells beat and to measure response to the drug, would allow researchers to automate the testing on heart cells, streamlining what has been primarily a manual test that is

required to be in compliance with U.S. Food and Drug Administration rules.

“This new method has the potential to vastly improve the speed at which we get safe and essential drugs to seriously ill patients,” says Emilia Entcheva, a professor of biomedical engineering and senior author of the research. The findings were published last year in the journal *Nature Communications*.

Optogenetics has been used in

neuroscience for a decade, but is relatively new in cardiac research. Traditionally, the most reliable method of measuring cell response to a drug is by sticking probes into the cell. While high-throughput technologies have been developed to speed up the process, until now no high-throughput systems have been available for work with heart cells, the researchers say.

Co-author Aleks Klimas, a PhD student in Entcheva’s lab, says the new system not only allows for faster testing but also provides a safer way to do measurements when using hazardous materials. “The benefit of optical stimulation and optical recording,” she says, “is that it provides a way to dynamically control millions of cells simultaneously without needing to come into contact with the sample.”



272,769

The number of times law professor **Daniel J. Solove's** scholarly writing has been downloaded on the Social Science Research Network as of May 1, 2017—making him the second-most downloaded law professor on the network. Law professor Orin S. Kerr held the No. 9 spot on the list, with 115,400 downloads.

ENGINEERING

PURE WATER'S FREEZE FACTOR

While ice typically forms around particles like pollen or dust inside water, ultra-pure water can remain a liquid down to minus-40 degrees Celsius. At that point, the geometry of the surface that the water is sitting on becomes important for ice formation, but exactly how has remained a mystery.

In a new study, published in *Nature Communications*, researchers in the Engineering School's Department of Civil and Environmental Engineering used a computer simulation to find that pure water ice forms most efficiently in a wedge shape that contains a 45-degree or 70-degree angle. They say that's likely because it allows water molecules to align in a way that helps form an ice lattice.

"It wasn't very surprising for us to see ice formation is accelerated by a 70-degree wedge, because it matches the crystalline ordering of ice perfectly," says lead author Tianshu Li, an associate professor. "The real surprise came when we found a 45-degree wedge is nearly equally effective in catalyzing ice formation."

The team found that a 45-degree wedge helps lead to the formation of an ice crystal that has a topological defect. "Once such a defect is formed, it can facilitate the growth of regular ice around it," Li says.

Better understanding the formation of ice has potential implications for the design of things like airplane surfaces and even better-tasting ice cream. But also, Li says, "because crystal formation is an important process in other fields, our study may also influence the production of new materials and crystallization of pharmaceuticals."

IMMUNOLOGY

\$26M GRANT WILL FUEL PURSUIT OF AN HIV CURE

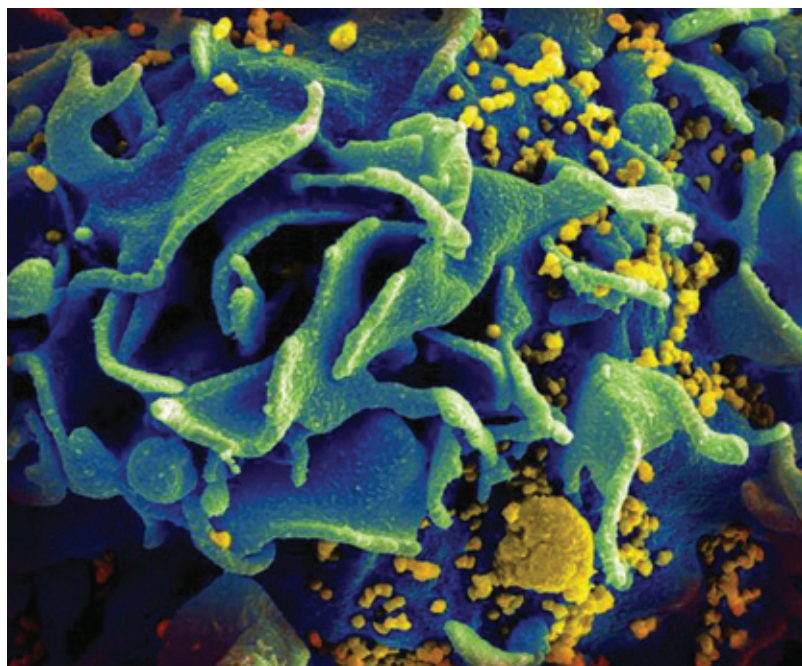
GW researchers will lead a group of 17 public and private partners in the search for a cure for HIV under a new five-year, \$26.4 million grant.

The international team of scientists will be applying advances in immunotherapy—already being employed against cancer—that aim to improve and reprogram a patient's immune system. Researchers hope the new techniques could boost current

"kick and kill" strategies against HIV, in which latent HIV—sitting beyond the reach of antiretroviral therapies—is woken and then destroyed, helping to reduce or eliminate the body's reservoirs of the virus.

"We are happy and humbled to have been selected as one of the recipients of this important award," says Douglas Nixon, principal investigator on the National Institutes of Health grant and chair of GW's Department of Microbiology, Immunology and Tropical Medicine in the School of Medicine and Health Sciences.

Partners include researchers from GW's Milken Institute School of Public Health, Children's National Health System, Johns Hopkins University and other institutions of higher education in the U.S. and abroad, as well as private companies Altor BioScience Corporation and Torque Therapeutics. GWR



HIV infects a T cell in this image from a scanning electron microscope. Under a new grant, researchers aim to boost current efforts against latent HIV, which sits beyond the reach of antiretroviral therapies.

BIOLOGY

SAVING A SHELL-SHOCKED BAY

A class spawns student-led efforts to rejuvenate and study the dwindling-yet-crucial population of oysters in the Chesapeake Bay.



By John DiConsiglio

They call it “Oyster Alley”—a narrow strip of concrete tucked in an alcove beside Bell Hall. There, a meshed wire bin overflows with oyster shells. The husks come from all over the D.C. area—discards from Whole Foods, half shells from restaurants, donated leftovers from in-home meals.

“This looks like a very small step, but every little bit helps,”

says biology professor Tara Scully. The shells are being collected for donation to the Chesapeake Bay Foundation, where they will be used to spawn baby oysters and address the ecological crisis threatening one of the world’s most important waterways. “Even if we are just putting one more oyster into the bay, the impact can be profound.”

Created by students, Oyster Alley is one of several research and conservation efforts spearheaded

by Scully through her class Understanding Organisms Through Service Learning. In addition to the shell collection project, students from Scully’s class are raising oysters in Bell Hall tanks and measuring the effects of herbicides and pesticides on the bay’s marine life.

“We are taking too many oysters out of the bay. But even the ones that are left in the water are still being eradicated” by chemical and

agricultural pollutants, says senior environmental studies major Adrian Britt, the lead researcher in Scully's herbicide experiment. "This is a crisis. It will take a lot of work inside and outside of the lab to address it."

'The Lungs of the Bay'

At 200 miles long, stretching from Havre de Grace, Md., to Virginia Beach, Va., the Chesapeake Bay is the largest estuary in the U.S. and third largest in the world. Oysters are, in many ways, the life source of the bay. Not only are they the region's most valuable fishery, oysters play a crucial role in everything from improving water quality to preserving marine life.

Dubbed the "lungs of the bay," oysters are a "wonderful natural filtration system," Scully says. In a day, a single oyster can clear algae, sediment and pollutants from 50 gallons of water. They're also a vital piece of the landscape: As oysters repopulate, for example, they build reefs that provide food for small fish and crabs. And their shells serve as homes for organisms like sea anemones and barnacles.

In the 1600s, oysters were so plentiful in the bay that reefs racking above the surface were navigational hazards for ships. But a range of man-made threats, from overharvesting to pollution and agricultural runoff, have sent the oyster population plummeting to just one percent of its historic level. Fertilizers, pesticides and animal waste from nearby farms stimulate algae blooms, sucking oxygen from the water and hindering the growth of oyster larvae.

When oysters die, fish and their predators soon follow, endangering the entire ecosystem and affecting locals who rely on the bay for their livelihood. Over the last three decades, oyster decline has cost Chesapeake businesses more than \$4 billion and cut more than 7,000 oystermen jobs.

From her house in Reedville,

Va., where the Rappahannock and Potomac meet the bay, Scully and her family have long volunteered with bay preservation efforts. "It struck me as a biologist teaching ecology that I should think more about what I can do to offer students the opportunity to get involved as well," she says.

Britt needed little incentive to join Scully's crusade. As a D.C. native, his connections to the bay stretch back to childhood, when he and friends sailed the bay waters and its tributaries as far north as Rehoboth. "I love marine life," he says. "In the summer, we would see horseshoe crabs spawning in the bay. But over the years, some of that natural habitat has been destroyed."

As an assistant in Scully's lab, Britt has focused on spawning and maintaining baby oysters, or "spats," which are then donated to bay restoration societies. With Scully, Britt has embarked on a new project to test how atrazine—the second most commonly used herbicide in the U.S., and a carcinogen banned by the European Union—affects the growth of oysters, their food and their immune response to infection.

The students who initiated the shell collection project—nicknamed the "GW Baywatchers"—had little biology background or knowledge of the bay.

"I'd never eaten an oyster in my life and I knew almost nothing about the bay," says Hannah Finkel, a history and Judaic studies double major and Baywatcher founder. "I guess I thought of oysters as appetizers—not something that

pretty much sustains an entire ecological system."

Finkel and sophomore communications major Diana Kussainova realized their talents were best suited to efforts outside of the lab. Moved by Scully's passion for bay restoration, they launched the shell collection program, building the Oyster Alley bins and spreading the recycling message through social media and word of mouth.

Even discarded shells shucked of oysters are crucial in repopulating the bay, they note. Oyster larvae must attach to an adult shell within the first two weeks of their lives to survive. "There are all those potential baby oysters floating around in the bay, and if they can't find a shell, they won't make it," Kussainova says.

Scully and her students say they are optimistic about the long-term health of the bay, pointing to a 2010 executive order by then-President Obama limiting pollutants from impaired waterways.

At the same time, many oystermen are reversing the decades-long trend of over-harvesting and turning to more aquacultural approaches that are less stressful on the oyster population.

"We are just one little lab; we aren't going to breed enough oysters or collect enough shells to repopulate the bay," Britt says. "But can we lay the foundation for future environmental legislation? Can we educate farmers about the true impact of atrazine so maybe they will consider using something else? Can we make a real difference? I believe we can." GWR

"I guess I thought of oysters as appetizers—not something that pretty much sustains an entire ecological system."





PSYCHOLOGY

CAPTURING A VANTAGE ON DISCRIMINATION

In testing a new tool for recording and measuring black men's experiences with law enforcement, researchers found that half of their study participants felt they had been discriminated against in recent encounters.

In the study of 1,264 black men in Georgia, 633 reported that in dealings with law enforcement over the past five years they perceived they had been treated unfairly through accusations related to drugs or driving, through verbal or physical abuse, or on the basis of their clothing.

The researchers found that, as in previous studies, those experiences were associated with symptoms of depression.

The questionnaire that

was developed to conduct the study, called the Police and Law Enforcement Scale, is aimed at filling "a fundamental gap in the psychological literature," the researchers wrote in the article, published in *Cultural Diversity and Ethnic Minority Psychology* in April 2017.

"There is a substantial gap between what you hear from black men regarding their experiences with law enforcement officials during their lives and what is in the scientific literature," says Devin English, a GW Psychology Department doctoral student and the lead author of the study. "We see our study as helping to document what black men have been experiencing for centuries in

the United States."

The researchers said that future uses of the questionnaire could include broadening the scope beyond Georgia and incorporating younger black men and adolescents (the average age among the study group was 44), or black women. It also could be used to probe more specifically the public health impact of these experiences.

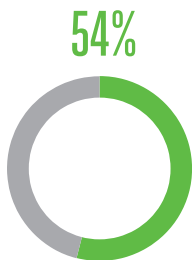
"It's of the utmost importance for those of us who do research and work on black men's health to understand black men's experiences from their vantage point and how factors in the social environment shape mental and physical health," says Lisa Bowleg, a GW psychology professor and one of the authors of the new study. GWR

STUDENT DEBT

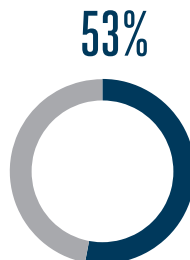
“A sizable percentage of the people who took out these loans didn’t know what they were getting into.”

Annamaria Lusardi, the Business School’s Denit Trust Chair of Economics & Accountancy, speaking to *Forbes* about student loan debt in the U.S.

A policy brief she co-authored mined data from the triennial, nationally representative National Financial Capability Study, administered in 2015 by the FINRA Investor Education Foundation. Among the findings:



Percentage of people with student debt who did not try to elucidate their monthly payments before taking on their most recent student loan



Percentage of people who said they would make a change if they could go through the student loan process again

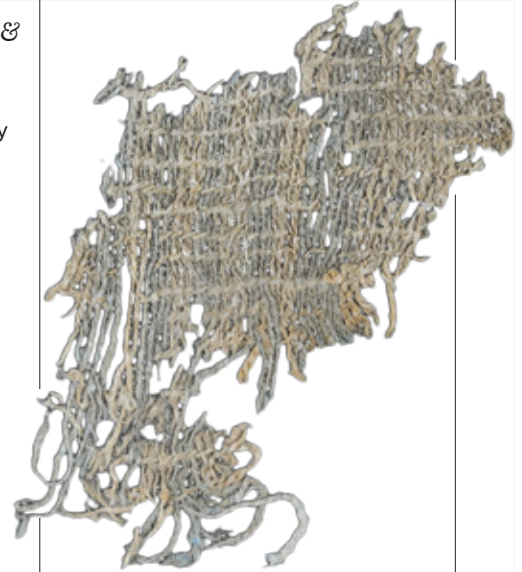
19%
said they didn’t know whether they have an income-driven repayment plan, which are designed to make repayment more manageable



26%
of Americans have student debt

48%
expressed concern about their ability to pay off their student debt

37%
have been behind in payments at least once in the 12 months leading up to the study



TEXTILES

6,200

The estimated age of a piece of indigo-dyed woven cotton found in Peru—more than 1,800 years older than what was previously considered the oldest textile of that color. The finding, reported in September in the journal *Science Advances*, sheds light on the advanced textile-making of the ancient Andean people, says GW anthropologist [Jeffrey Splitstoser](#), who discovered the cloth during a 2009 excavation.

**Adrienne Hancock (right)
with graduate student Alyssa
Giegerich**



SPEECH

FINDING THEIR VOICE

At the Speech and Hearing Center, transgender clients are guided through the intensive work of uncovering a new, unique and “life-giving” voice.

By John DiConsiglio

When the 15-year-old walked into the GW Speech and Hearing Center, she looked and acted just like most other ninth-grade girls. But like many transgender people, she felt there was an obstacle blocking her path to portraying her gender identity: her voice.

“I want to sound more like a girl,” she told Adrienne B. Hancock, associate professor in the Department of Speech and Hearing Science.

The girl, whom Hancock refers to by the protective pseudonym “Lisa,” explained that she was home-schooled during her transition because a teacher had bullied her at public school. Before returning to school, she’d said, she wanted to feel confident about her feminine voice.

Hancock, as she often does, asked Lisa what famous person she wanted to sound like. She expected Lisa to mention someone with a high, lilting tone like Taylor Swift. Instead, Lisa singled out Kari Byron from the TV show *MythBusters*, a woman whose voice pitch was lower than Lisa’s. She acknowledged feeling powerless since the transition began and wanting to

sound cool, confident and smart, like Byron.

It was a revelatory moment for the speech-language pathologist. Most treatments focus on raising pitch and modifying tone and intonation patterns to align with what’s considered typical adolescent female speakers. “But I listened to her additional need to express her power and confidence now as a young woman,” Hancock wrote in the journal *Perspectives on Voice and Voice Disorders* in 2015, recalling the interaction. And she was reminded that “cultural competence is a necessary complement to clinical competence.”

Since switching her specialty from Parkinson’s-related cognitive deficits a decade ago, Hancock has worked to help transgender people find satisfaction with their voice. Her research on the role of voice and communication in gender

transition led to \$300,000 in funding from the National Institutes of Health, starting in 2012. That project involved characterizing the physiological mechanisms behind a voice and how those relate to a listener's perception of the speaker's gender.

More recently, Hancock and a group of undergraduate and graduate students launched Access and Barriers to Communication Services, a project to identify barriers to voice services experienced specifically by transgender people of color.

"I want students and practicing speech-language pathologists to be able to provide services in the real world, where cultural influences of gender, age, race and class intersect," says Hancock. "But right now we don't know enough about all the nuances and subgroups of the transgender and gender non-conforming populations to determine if we are serving them well, or how we could serve them better."

Individualizing Treatment

In the past, speech-language pathologists might have guided clients toward a binary view of how a masculine or feminine voice might sound. "We used to work like we were going down a checklist: raise the pitch above a certain level, change the resonate tone, work on intonation," Hancock says.

But over the years, therapists have moved toward a more patient-specific approach. "It's important

with any voice clients—particularly trans clients—to understand who they are, to make sure you are giving them the voice that's theirs."

Like Lisa, transgender people often see their voice as among the most difficult characteristics to change but also one of the most important, Hancock says. She hears clients say they are afraid to speak in public because the sound of their voice doesn't match the person they really are.

"For a lot of our clients, having a voice that aligns with their gender identity is life-giving," she says. "That sounds dramatic, but I've had people tell me that without a successful voice modification, they wouldn't have their jobs." Clients tell her that changing their voice provided a layer of safety from discrimination and physical threats.

Training a voice is a long, intensive process and one that's particularly difficult for males transitioning to females.

Most transgender men—people assigned the female sex at birth but identifying as male—can develop deeper voices by taking testosterone. But for transgender women, estrogen hormone treatment has little to no effect on the voice. That is why trans women like Lisa—and 10 to 30 percent of transgender men, Hancock says—rely heavily on voice treatment with speech-language pathologists or voice coaches.

At the GW Speech and Hearing Center, graduate students supervised by certified speech-

language pathologists assist clients with daily exercises and breathing techniques to loosen vocal cords and relax neck muscles. They use software to measure changes in signals that listeners perceive as pitch, tone and quality of a voice. Aligning a voice typically takes six months to a year of regular practice, although some people don't see results for two to three years.

"It definitely requires a lot of practice and there are a lot of ups and downs," says graduate student Alyssa Giegerich, "but the women we work with at the clinic are very motivated to put in the time and effort."

Beyond attending to physiology, Hancock stresses to students that their job also is to be mindful of client's personal circumstances. For some people, "when they lose their old voice, they lose their old identity, and often they need to mourn that loss," Hancock says.

By the end of a successful round of therapy, Hancock says, the difference can even be visible. In pre- and post-therapy videos, she has seen more lively facial expressions and more confident body language.

"You might think that the voice is such a little part of everything going on in their lives as a result of gender transition. But when people are so grateful, I realize it fills a deep need," she says. "I learn so much from them about coping with life. I feel honored to be able to help in return." GWR



“For a lot of our clients, having a voice that aligns with their gender identity is life-giving. That sounds dramatic, but I’ve had people tell me that without a successful voice modification, they wouldn’t have their jobs.”



STUDENTS

RESEARCH DAYS

They study stress grooves in mountain gorilla teeth; whether elementary school teachers are biased against overweight people; the low number of high-risk patients being screened for hepatitis C at a community hospital; and 583 other topics in between, from engineering to chemistry to global health and economics. Student research abstracts for April's universitywide Research Days for a fourth straight year eclipsed the record high set the previous year.

2017
586

2016
567

2015
477

2014
424



16,900,000

The number of adult females and, to a lesser extent, children (often girls) responsible for collecting water when it's a long haul—more than 30 minutes per trip—in many households across 24 countries in sub-Saharan Africa, according to a study by Milken Institute School of Public Health researcher [Jay Graham](#).

WATER

IN AFRICA, AN UNEVEN BURDEN OF WATER

Nearly 17 million women and children, mostly girls, bear the burden of hauling water long distances for households in 24 countries in sub-Saharan Africa, according to a new study, one of the first to fully quantify the gender imbalance of the dangerous household chore.

"The journey to collect water every day harms health, uses up limited human energy and takes time away from other opportunities," says lead researcher Jay Graham, an assistant professor of environmental and occupational health at Milken Institute School of Public Health. "By reducing the distance to water—preferably by having water piped to each property—many women and girls

would be freed up for work, school or other activities."

The study, published in the journal *PLOS One*, estimates that in instances where a trip to collect water for a household takes 30 minutes or more, the task in those countries falls to some 13.5 million women and 3.36 million children. Women were found to be the primary collectors of water across all 24 countries studied, and when the duty falls to children, it goes to girls 62 percent of the time.

Moving heavy water containers, which can weigh 40 pounds or more, can lead to health problems like early arthritis and exposure to water-borne diseases, Graham says, and the long trip can also put women and girls at risk for sexual violence. GWR

IN BRIEF

AN 'ATLAS' OF BRAIN DEVELOPMENT



Researchers have established the first mouse model for the electrical activity of the human fetal brain, offering new insight into the development of circuitry and the normal checkpoints along the way. “We are trying to provide an atlas for neural development, so that if you see aberrant brain activity in the clinic, you know which part of the brain is affected and why, which could form a basis for further treatment,” says Assistant Professor of Pharmacology and Physiology Matthew Colonnese, who led the study, which appeared in November in the *Journal of Neuroscience*. The model could drive future work looking for the underpinnings of neurodevelopmental disorders and understanding preterm births.

FACEBOOK FOR LEMURS

A team of biologists and computer scientists has developed a facial-recognition system capable of identifying individual lemurs in the wild. The system, called LemurFaceID, could be a boon to conservation efforts and to evolutionary studies, which require longterm data that, in the past, has meant lemurs needed to be trapped and tagged, says Rachel Jacobs, a biological anthropologist at GW’s Center for the Advanced Study of Human Paleobiology.

ENTERING THE NOMENCLATURE

Earlier this year, scientists reported a new iron-rich, high-pressure mineral found in a meteorite and named it “hemleyite” for Russell J. Hemley, a research professor in the Department of Civil and Environmental Engineering, in honor of his contributions to science. Elsewhere, a team of biologists named a new snake, *Atractus pyroni*, for Alex Pyron, the Robert F. Griggs Assistant Professor of Biology, calling him “one of the most prolific contemporary herpetologists.” Pyron told *National Geographic*: “To have one of those relatively few discoveries be permanently named in your honor is pretty humbling.”

SWEET SURRENDER



The percentage of children in the U.S. consuming food and drinks that contain low-calorie sweeteners jumped by 200 percent—to 25 percent of kids, up from 8.7 percent—between 1999 and 2012, according to a study by Milken Institute School of Public Health researchers. About 41 percent of adults—a 54 percent increase—reported consuming low-calorie sweeteners, which may be linked to diabetes and obesity. The researchers say the findings suggest that parents may not realize the terms “light” or “no added sugar” may mean that a product contains a low-calorie sweetener.

HONORS

Milken Institute School of Public Health Dean **Lynn Goldman** received the National Academy of Medicine’s Walsh McDermott Medal in October, which is given to an academy member for distinguished service to the National Academies over an extended period of time.

Sean Murphy, the Patricia Roberts Harris Research Professor of Law, in November was reelected by the United Nations General Assembly to a second, five-year term on the UN International Law Commission, among 33 others from around the world.

Sarah Wagner, an associate professor of anthropology, and **Andrew Zimmerman**, a professor of history and international affairs, were awarded Guggenheim Fellowships by the John Simon Guggenheim Memorial Foundation, selected among a class of 173 people from a pool of nearly 3,000 applicants. Both will use the fellowship to support current book projects: Wagner’s a study of war, memory, science and innovation surrounding the accounting for and memorializing of America’s missing-in-action from the Vietnam War; Zimmerman’s book offers a new lens on the U.S. Civil War and a model for rethinking archetypal national events.

School of Nursing Dean **Pamela R. Jeffries** received the National League for Nursing’s Mary Adelaide Nutting Award for Outstanding Leadership in Nursing Education. Jeffries led the NLN’s early research studies on the use of simulation in nursing education and, in 2015, her framework for designing and implementing simulations evolved into the monograph, NLN Jeffries Simulation Theory.





“PREVENTION IS GOING TO BE THE ANSWER.

It's going to get more and more expensive, so we need to be more aggressive in terms of prevention.”

Eduardo Sotomayor,
Director of the
new GW Cancer Center



THE WAR ON CANCER

Medical oncologist **Eduardo Sotomayor** is the director of the new GW Cancer Center. Established last year as a nucleus of all cancer-related activity, from research to clinical care—set up by the School of Medicine and Health Sciences, GW Hospital, the GW Medical Faculty Associates (an independent physician group) and the Milken Institute School of Public Health—the center opened in December at the top of Science and Engineering Hall, where floor-to-ceiling windows open a bird’s-eye view of the city. Sotomayor launched his career studying cancer immunotherapy—efforts to kickstart an immune system stymied by cancer—which he continues as he expands GW’s work into new directions, from the microbiome to one-stop patient care.

Congrats on the new space. This must feel like a very tangible expression of the commitment to the Cancer Center.

It's a great space. One thing I like about this building is that we have engineers, chemists, anthropologists, the School of Public Health, and we are establishing collaborations with them. One of the most exciting is this synergy that we found with engineers that's allowing us to think differently. They are always willing to learn. They say, what is cancer? How are cancers divided? How many cancer cells are in the tumor? And then they start to talk about physics, the space, how having more malignant cells in a confined space actually made metastasis easier, not more difficult—I had the wrong concept. So now we are working with physicists to try to answer important biological questions. That's the beauty of being in this building. It's sort of like the United Nations: We talk different languages ... [but] when we get together we can identify problems and work together toward a common goal.

"The way immunotherapy is working now for some patients, it exceeds my expectations by a thousand percent."

What's the focus of the center?

We are focusing on four scientific programs. One is cancer immunotherapy. The second problem is cancer biology, which involves the genetics, epigenetics, signaling and genomics of cancer. The third problem is cancer engineering and technology. The

fourth is microbial oncology. With that, we are interested in viruses and other microbes, but also we are trying to understand the microorganisms that live within us—the microbiome—which can influence cancer development. This field is in its infancy.

Should the emphasis now be on a cure, treatment or prevention?

Prevention is going to be the answer. If you imagine cancer being a book with 20 chapters, what we're doing now is focusing on the last chapter: diagnosis and treatment. For example, in a 50-year old patient with melanoma, his cancer started long before, when his skin got exposed to sun every day without protection. Plus, no society has the resources to make investments only in cancer diagnosis and treatment. It's going to get more and more expensive, so we need to be more aggressive in terms of prevention.

Are there clinical and basic science things that can be done for prevention?

Oh yes, there are different types of prevention. For primary prevention, aimed at avoiding disease in the first place, we are building a team composed of clinicians and population scientists to focus in particular on people who are at a high risk of developing cancer. For example, investigators at the Cancer Center are evaluating the diabetes drug metformin to see if it can prevent the development of some cancers. In terms of secondary prevention, for people who have already had cancer, we are trying to find biomarkers that can identify patients at high risk for developing secondary malignancies.

You got into this research not through cancer, but through immunology. What was it that got you hooked?



Areas of Scientific Focus

1. Cancer Immunotherapy
2. Cancer Biology
3. Cancer Engineering and Technology
4. Microbial Oncology

When I was at University of Miami, my mentor, Diana Lopez, was working on how the immune system recognized breast cancer in animal models. The potential was there, so I was intrigued. And it was a great opportunity because it was an empty field: Ninety percent of the scientific community did not believe in cancer immunology. So I said, "OK, I want to do that. It's a challenge."

The way immunotherapy is working now for some patients, it exceeds my expectations by a thousand percent. I mean, metastatic lung cancer—when I was a fellow, it was chemotherapy or hospice. Now it's immunotherapy. For me, though, it's like the pendulum is moving too far. We're abandoning targeted therapy and not paying attention to other emerging areas, like the microbiome. I think there should be a parallel growth of immunotherapy with other strategies.

So this is the beginning of a new era. We will make progress as we understand more about the mechanisms. But also we need to be careful about unleashing the immune system against cancer, because it can cause significant collateral damage and hurt patients. GWR



PUBLIC HEALTH

RISKY BUSINESS

A researcher glimpses the veiled currency of power that is driving an HIV epidemic in China.

By Menachem Wecker



When Elanah Uretsky first set out for an 18-month research trip to China, to study a shadowy part of the HIV/AIDS epidemic, she anticipated spending a lot of time interviewing businessmen and government officials in karaoke bars. She learned a lot more, though, talking to those men and women in more intimate settings, like restaurants and even their homes.

Uretsky, an assistant professor of global health, anthropology and of international affairs, was there to study a ritual called *yingchou*, the Chinese businessman and government official's take on the art of sealing the deal: lavish banquets, luxury cigarettes and liquor, and a visit to a brothel. *Yingchou* was recently outlawed but still occurs in secret and easily could return to favor in a power shift, she says.

The practice has helped to fuel the spread of HIV/AIDS in China, she says. Uretsky spent most of her time in the border city of Ruili, in part because it's less conservative than many other cities, she says, and because it's "the ground zero

of China's HIV epidemic," the place where it was first detected in China.

Overwhelmingly, the sex-worker portion of *yingchou* doesn't involve protection against sexually transmitted diseases, and she found a general lack of understanding about the risks and of infection. When she began her research, the chief nurse at then-China's lone hospital treating HIV patients told her that men were calling the hospital and asking to be tested over the phone. They feared the stigma of being seen entering an HIV hospital.

Uretsky developed trust and even friendships with many of the people she interviewed. She was invited to the banquets and into people's homes, although not to the brothels.

In one example from the book, a wealthy businessman invited Uretsky to attend a celebration

of his mother's 60th birthday. The two rode with his driver in one car while his wife drove the 60-odd miles in another car. Ten minutes in, he told Uretsky that he planned to marry a second wife and father a child, while maintaining his first marriage "within the boundaries of Chinese law," she writes.

"Because I'm an American and that is not the kind of world that I live in, my gut reaction was, 'Oh my god. This man is going to do something that is totally counter-cultural for me,'" she remembers.

He asked if she thought he would be doing a bad thing—a question that involves nuanced terrain for a researcher, something Uretsky tries to impart to her students.

"I don't have a right to judge you," she says, looking back on the situation. "My role as an anthropologist is to learn and understand what goes on in other cultures."

The study, she says, isn't about HIV per se, but about broader issues of masculinity and societal pressures. Sitting out on the

banquets or the brothels could cost men their jobs, or at least chances of promotion.

"Sex for these men, in other words, is work, and not merely a way to satisfy an individual desire," she writes. "Addressing the problems that result from these sexual

encounters will require examining them through a sociocultural and politico-economic lens that will reframe how we look at public health risk within this context." GWR



Occupational Hazards: Business, Sex, and HIV in Post-Mao China (Stanford University Press, 2016)
Elanah Uretsky, MA '97,
assistant professor of global health, anthropology and international affairs

① The New Arab Wars: Uprisings and Anarchy in the Middle East (PublicAffairs, 2016)

Marc Lynch, professor of political science and international affairs

It's no secret that some of what appeared to be promising signs in the Middle East have proven quite the opposite. Lynch notes early on in this book that the failures of U.S. policies in Libya were, for him, personal. "When these events were unfolding, I was writing as a columnist for *Foreign Policy*, meeting regularly with Obama administration officials, and appearing frequently in the media," he writes. "That this intervention failed led me to publicly rethink many of the arguments for American intervention in the Middle East." He wrote the book in part to convince others to do the same."—*Menachem Wecker*

② China's Future (Polity Press, 2016)

David Shambaugh, BA '78, professor of political science and international affairs

"This is a relatively short book about a Big Topic," Shambaugh begins the preface. To date, he notes, only democratic countries have ever developed modern economies. As China aims to get there another way, will its authoritarian government survive intact or collapse trying? Or will the nation bend to meet the economic goal? Shambaugh unpacks these possible futures—"one of the key global uncertainties," he writes—which promise to reverberate for decades. —*MW*

③ The Rising Price of Objectivity: Philanthropy, Government, and the Future of Education Research (Harvard Education Press, 2016)

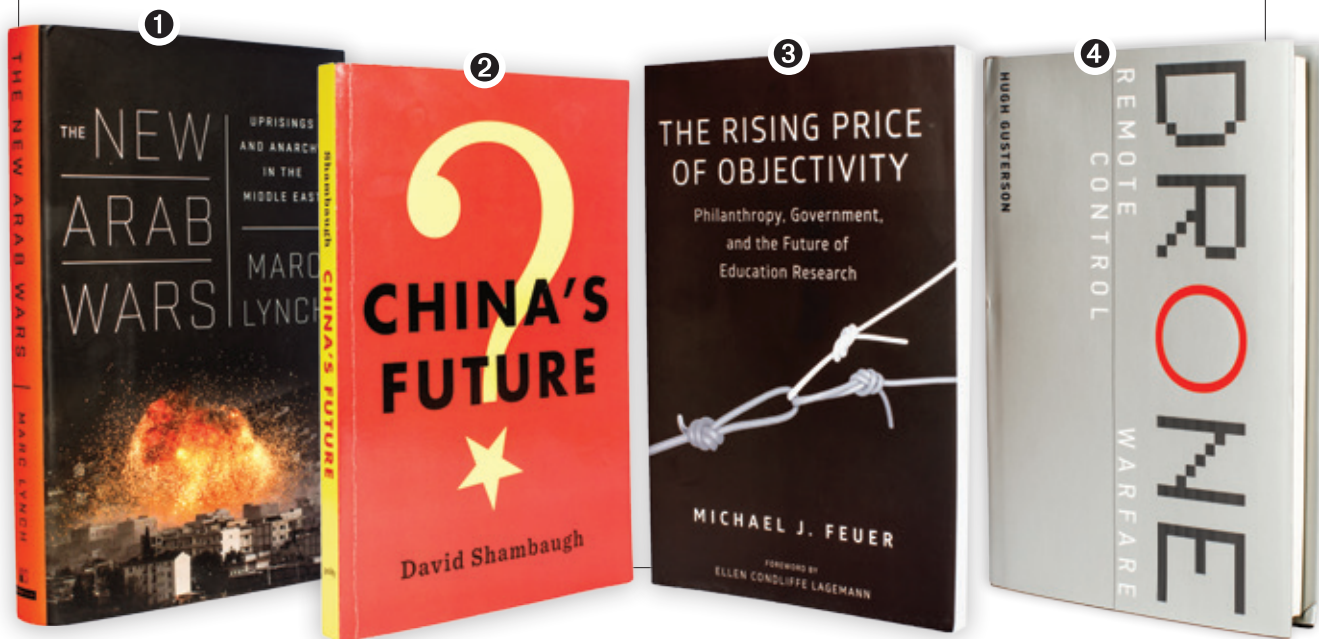
Michael Feuer, dean of GW's Graduate School of Education and Human Development

Feuer charts the impact of three forces negatively influencing education research: "strategic" philanthropies selectively funding research that fits their missions; less government funding for objective

and independent research on social and educational problems; and an ecosystem of think tanks—what Feuer calls the "advice industry"—facing mounting pressure to succumb to partisan and financial interests. It's the sort of thing that "keeps deans of social science and education ... awake at night," he writes. —*MW*

④ Drone: Remote Control Warfare (MIT Press, 2016)
Hugh Gusterson, professor of international affairs and anthropology

U.S. embassy staff used to call drones "Voldemort," for the Harry Potter villain who isn't supposed to be named. The CIA has used drones for "targeted killings" for more than 15 years but only acknowledged that in 2012. "A technology that is almost magical gives its owners, who are looking on the scene from high in the sky, a godlike power over life and death," Gusterson writes in this book, which details the history of drone warfare, the ways that drones impact everyone from the operators to the families of targets, and drones' inherent contradiction of intimacy and distance. —*MW*





THE AUTISM SEX BIAS

Boys are diagnosed with autism at more than four times the rate of girls. Scientists are trying to figure out why, but this much is becoming clear:

All that we think we know about autism is only half the story.





STORY BY
**Kristen
Mitchell**

WHEN FRANCES WAS BORN, SHE WAS AN UNDERSIZED BUT EASY BABY— HEALTHY, HAPPY, SOCIAL.

As she got older, she was slow to roll over, to crawl and to take her first steps. She didn't always respond to her name. And while she could seem somewhat disinterested in the people around her, she was consumed with Henry the octopus from the kids show *The Wiggles*. And it was a stuffed Henry toy that finally, at age 3½, coaxed out her first word—a full phrase, actually.

Frances had just excitedly opened the gift when her mom teasingly claimed the doll as her own. Frances screamed: “Henry! That’s my Henry.”

Her father, Kevin Pelphrey, was a recently minted PhD in psychology

from the University of North Carolina at Chapel Hill, working as a postdoc studying cognitive neuroscience at Duke. He’d often discussed his daughter and her struggles with his co-workers, a group that included autism researchers, but the possibility of autism never surfaced.

It also never came up with any of the multiple specialists he took Frances to see. Frances’ development was slightly delayed, he was told, but she would catch up.

Then when Frances was 4 years old, a psychologist for the first time suggested autism as an explanation.

“I had a degree in child psychology, and I was willing to accept the answer, ‘She’ll grow out of it,’ because I liked hearing that,” Pelphrey says.

But fathers can be forgiven a little wishful denial. And physicians are reminded over and over in their training that when they hear hoofbeats, look for a horse not a zebra—that an ailment is likely the garden-variety thing, not the exotic exception. A girl with autism was a zebra.

Today, boys in the U.S. are affected at four-and-a-half times the rate of girls: 1 in 42 versus 1 in 189, according to the Centers for Disease Control and Prevention. As a result, for decades it’s been the boys with autism who overwhelmingly are the ones enrolled in studies, and it’s boys for whom treatments and interventions are designed. Now researchers are realizing that the textbook definition of autism—the repetitive behaviors, impaired communication and social interactions—might pertain only to boys, too.

Shortly after the suggestion that Frances may have autism, Pelphrey took her for a day of testing at Yale University’s Child Study Center.

After evaluations by a psychologist, a social worker and a speech pathologist, she was officially diagnosed with autism.

The mysteries surrounding her condition and the meandering path to a diagnosis eventually would become the driving force of Pelphrey’s career.

He was studying the human brain and how it comprehends other humans, but “never really cared about its application. It was just knowledge for knowledge’s sake,” he said in an emotional speech at GW in October 2016, eyes red with stifled tears. “[I]t was my daughter Frances that shaped my career into something that’s been incredibly, incredibly valuable for me.”

Pelphrey became a professor at the Yale Child Study Center, where Frances was diagnosed, and the founding director of a center for developmental neuroscience at Yale. Then last year, he came to GW to launch its Autism and Neurodevelopmental Disorders Institute and to fill a new endowed professorship (the Carbonell Family Professor in Autism and Neurodevelopmental Disorders), bringing along \$20 million in grants, including a \$15 million grant from the National Institutes of Health to mine the conundrum of girls with autism.

“He’s now really known as the go-to person in the field,” says Lisa Gilotty, a program chief at the NIH’s National Institute of Mental Health who oversees autism research, including Pelphrey’s grant.

His unprecedented explorations into the brains of kids with autism have led him to believe that the boy-to-girl ratio is probably more like 2 to 1, instead of 4.5 to 1, and that what we think we know about autism is certainly only half the

story. The differences in autism between the sexes, he says, is “actually very fundamental to what autism is.”

FRANCES PELPHREY IS NOW 13

and, in a lot of ways, is a typical middle-schooler. She’s in love with Zac Efron, she likes her music loud and she’s inseparable from her phone.

Pelphrey has said that 10 years earlier, when doctors were stymied by her symptoms and inclined to wait it out, they would have been more proactive were she a boy. The problem is that time in those first years is crucial.

His son Lowell, the youngest of three biological kids (he and his wife, Annie, have five children altogether), was 1½ when he came to the attention of doctors. He was about to participate in a control group made up of the typically developing siblings of children with autism when Yale researchers discovered Lowell wasn’t making appropriate eye contact for his age. He was diagnosed with Pervasive Developmental Disorder-Not Otherwise Specified, or PDD-NOS, a gray area under the autism umbrella in which a person typically has social or communication impairments but not all of the features of the more defined subgroups.

He began an intense weekly regimen of 32 hours of behavioral therapy and after four years, Lowell, now 8, was no longer considered to be on the autism spectrum, although he does tend to shy from social interactions, Pelphrey says, and to speak in a “direct and precise,” almost scholarly cadence.

Coming off the spectrum is rare, but studies have shown that an early

jump on therapy can give kids with ASD critical developmental and social boosts, and the American Academy of Pediatrics recommends screening children as early as 18 months old in order to get them into the treatment pipeline.

But girls, historically, have not had the benefit of that early and often life-changing intervention because their symptoms go overlooked.

Girls with ASD tend to have better social skills and often are less disruptive than boys with ASD, and even their typically developing male peers, Pelphrey says. Frances, for instance, has always sustained good eye contact, while difficulty with that is considered one of the hallmark red flags of ASD. Instead, Pelphrey says, for Frances and some other girls with autism, difficulty regulating emotions is more of a distinguishing feature.

Obsessive lining up or ordering of objects is common, too, but may be more apparent in boys because of the inanimate objects, like cars and trains, that a boy might be more prone to play with, Pelphrey says.

“If a girl is more likely to be interested in dolls and is lining up dolls, it looks more typical because she’s lining up social objects when really she is just lining them up like they’re dominos,” he says.

The issue of girls with autism being underidentified by doctors and teachers and little-understood

by researchers became a self-perpetuating cycle.

Donna Werling, a postdoctoral researcher at the University of California-San Francisco, worked in Pelphrey’s Yale lab a decade ago as an undergraduate. “At that time,

everyone would report there was a sex bias in autism diagnosis,” she says, “but they would go on to use that as an excuse not to include girls.”

Today Werling studies how typically developing boys and girls are different on a genetic level, and how those differences relate to autism. The underdiagnosis of girls makes her work difficult.

“Inherently, the work that we’re doing is challenged by the fact that the samples we have available to us are more biased toward boys than they should be,” she says. “Hopefully, time will fix that.”

Funding for studies focused on sex and gender differences in people with autism is on the rise. In 2015, some of the top organizations funding autism research designated more than \$6.4 million for 11 projects on sex differences, compared to slightly more than \$300,000 on two projects in 2008, according to an analysis by Spectrum, an autism news site that is an editorially independent wing of the Simons

Foundation Autism Research Initiative.

Pelphrey predicts it will take at least another decade for the ➔



I HAD A DEGREE IN
CHILD PSYCHOLOGY,
AND I WAS WILLING
TO ACCEPT THE ANSWER,
'SHE'LL GROW
OUT OF IT'

Kevin Pelphrey



→ information about girls with ASD to match the mass of information available about boys with ASD.

Part of the obstacle in gathering that has been the way autism is diagnosed. Most children with autism are diagnosed through observation and an intensive, hours-long oral exam with their parents, who are questioned about their child's behavior. Answers are scored on a scale and plugged into a formula to determine where on the spectrum a child might be.

The individualized nature of autism has so far eluded any singular biological signature—a gene, a chemical disruptor, a brain wave—that can be screened for. Instead there's a growing list of promising biomarkers, each indicative of some piece of the autism equation for some people with autism.

It's an effort to understand autism from the inside out, and the intellectual abyss of the brain and genetics offers an opportunity for scientists of just about any stripe to bring their experience to bear. There is no scientifically agreed-upon cause of autism, and people on the spectrum range from those with severe language and mental impairments to those who live and thrive independently.

Pelphrey got involved as a side project while he was a postdoc at UNC; he was working in developmental psychology, building a wearable camera for infants that would track the direction of their gaze.

A mentor, UNC professor Joe Piven, who heads the Carolina Institute for Developmental Disabilities, suggested he use the tool to study people with autism. The result, in 2002, was the first study—albeit a very small one—to compare the eye movements of five

adult males with autism and five without as they looked at a photo of another person's face, which has been cited 900 times in the years since.

While the path of movement for the control group generally formed a triangle across the eyes, nose and mouth, the eyes of the group with autism tended to roam less-revealing facial features, like an ear or chin, Pelphrey and his colleagues wrote. The findings, they said, could point to a reason why people with autism experience difficulty with facial perception and with reading a person's affect, or it may be the result of a broader information-processing issue.

Pelphrey was still primarily interested, though, in more broadly understanding the so-called "social brain," the parts that process things like facial expressions, posture, movement—the nonverbal signaling we absorb and use to make sense of other people.

Occasionally that veered into autism research over the years, including, in a big way, in 2010. Pelphrey and a team from Yale compared the brain activity of kids and teens with autism to that of their unaffected siblings and of typically developing kids as each group watched a video of familiar human movement, like someone playing pat-a-cake.

They found brain regions where there was reduced activity only in the autism group, and they found areas of the brain where both the autism group and their unaffected siblings had reduced activity—indicative, they suggested, of some shared genetic risk for neurodevelopmental disorders.

But most intriguing: Only among the unaffected siblings, they also found heightened activity in areas of the brain that aren't typically

involved in processing that kind of visual data. It was almost as if the brains of the unaffected siblings had found an alternate route, compensating for deficits by circumventing them.

"Development is an active process," Pelphrey says of the brain, drawing an analogy to rivers carving through a landscape. "It's not just an unfolding plan; it's not just the unfolding of a preconceived destiny. And with that, you've got the opportunity for flexibility. This one gene is pushing you, but the rest of your body is constantly trying to get back [on track]."

Exploring this kind of issue through the engines of both genetics and brain imaging at once was an intensely powerful tool—one autism researcher, who was not part of the study, told a reporter at the time that using them to reach this finding was "nearly unprecedented."

The next step for Pelphrey would be to add people and time.

He wants to build a data set that might even be considered, in his words—those of a man who scraps daily with the love, the pain, the elation and the biological wonder of autism—"a national treasure."

EVENTUALLY, HE HAS SAID,

"I would like for anyone in the D.C. area who Googles 'autism' to see that they have a place to come that has everything they need."

That place, a 10,000-square-foot clinical center that Pelphrey's institute is building at GW's Virginia Science and Technology Campus in Ashburn, is expected to open in the fall. It will be a place for diagnosis and therapy, with specialists on hand from mental health and medicine to nursing, occupational therapy and speech and hearing sciences, working



Boys in the U.S. are affected at four-and-a-half times the rate of girls: 1 in 42 versus 1 in 189, according to the Centers for Disease Control and Prevention. As a result, for decades it's been the boys with autism who overwhelmingly are the ones enrolled in studies, and it's boys for whom treatments and interventions are designed. Now researchers are realizing that the textbook definition of autism—the repetitive behaviors, impaired communication and social interactions—might pertain only to boys, too.





By The Numbers

Some top funders of autism research, including the NIH and Autism Speaks, in recent years have ramped up their spending for studies exploring sex and gender differences in people with autism, according to an analysis by Spectrum, an autism news site.

2008

\$300,000

2 PROJECTS

2015

\$6.4 million

11 PROJECTS

together, as well as with clinical and research partners from Children's National Health System.

Also planned are training opportunities for graduate students and undergrads, and a second location in Monroe Hall on the Foggy Bottom Campus.

The idea is to take what's learned in the lab—from a molecular level on up—and use that to build more targeted autism treatments and interventions for use in the clinic. When one of those works, or doesn't, the team will break it down to its molecular level again to figure out why, and then push that knowledge into even-more-tailored treatments and, possibly, translate it outward into efforts to influence public policy.

At the moment, though, it's the basic science that's giving the young institute its oomph and confident stride into a competitive field.

"Kevin has always been very innovative," says Joe Piven, the mentor from his days at UNC. "He's not doing the 10th study of some idea, he's often doing the first study."

In 2012, Pelphrey, while still at Yale, was awarded a five-year, \$15 million grant from the National Institutes of Health to lead a network of researchers in trying to understand the nature of autism in girls and how it differs from that of boys. It was part of a \$100 million assault on autism's vagaries that year by the NIH, funding nine centers and networks, with Pelphrey's the only one exploring sex differences.

Since then, Pelphrey—along with collaborators at Harvard University, Seattle Children's Hospital, the University of California-Los Angeles, the University of Southern California, Yale and, now, GW—is building what the team of researchers is

calling an unparalleled study sample: 250 girls with autism and 250 boys, 100 each of sisters and brothers of people with autism, and 100 each of typically developing girls and boys, all within the range of 6 to 17 years old.

They've been stratified by their observable, behavioral characteristics; they've had extensive brain imaging; their genomes are being sequenced and their gene expression—the turning on or off of a gene, and when—is being analyzed.

So far they've used that data to generate some 50 peer-reviewed articles, which have been cited nearly 2,000 times. Among them is a 2016 study that found brain imaging can predict which kids with autism will benefit from one of the only evidence-based therapies, called pivotal response treatment.

Another study, published in 2016 by Pelphrey and others, turned again to brain activity in the regions responsible for processing biological motion. The researchers found that they could look at that brain circuit and predict with 76 percent accuracy who was affected by ASD—but it only worked on the boys. The technique could not distinguish a girl with autism from a typically developing girl.

"This was incredibly important for us to understand, because it might be that everything we thought we knew, really, was specific to boys," Pelphrey said last year during a public lecture through the Interactive Autism Network.

"We're doing a great job of characterizing the neurocircuitry that's disrupted in boys. Our whole field should be proud of that," he said. "But we've overlooked the girls."

Still, the findings could have

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"A NATIONAL TREASURE."

enormous implications for diagnosing boys with autism and getting them earlier access to treatments. It also gets researchers one step deeper into the fog of the girl question. They're hunting now for the equivalent biomarkers in girls. But if girls are somehow being shielded, or even compensating for autism's deficits, the answers stand to benefit both sexes.

Entering the final year of the grant, which Pelphrey hopes to renew, he's anxious to begin tracking the study group through the transition into adolescence and adulthood, and to see how the childhood data bears out over time.

Similar to the all-absorbing brains of newborns and toddlers, and the emphasis on early intervention for them, he says, neurologists are finding that adolescence brings a second window of brain plasticity and potential growth. "You've got this massive reorganization in the brain as well as this reorganization of societal demands," Pelphrey says. "So it's a time when you can either get worse or be doing better. We're hoping to understand how that transition happens."

And whether he's looking for them or not, similar changes will be underway at home, too, as Frances transitions into adolescence.

Fixations with children's TV shows have given way to fixations with boys, and requests for him to print out photos of Zac Efron for her. The answer is always no.

But Pelphrey's come to appreciate her bare honesty, and that it keeps open a window that might be abruptly shut for other fathers of teenage girls.

"Growing up, my sister never discussed boys with our dad," he says. "Frances tells me more than I want to know. It's cute." **GWR**

METROPOLIS RISING

In an excerpt from his new book, *City of Dreams: The 400-Year Epic History of Immigrant New York*, history Professor Tyler Anbinder revisits the first settlers upon the shore of the city that immigration built.

BY TYLER ANBINDER



Peter Minuit was furious. It was springtime, 1632, and he had a colony to run, which he directed from a spot—Manhattan Island—that he had personally chosen and bought from the *wilden*, or Indians, known to the Dutch as the Canarsie. He should have been there now organizing fur-trading expeditions up the great river that Henry Hudson had discovered only a few years earlier, directing the planting of a new crop, policing the port of New Amsterdam for smugglers, adjudicating disputes between quarreling settlers, and writing letters trying to induce more Europeans to immigrate to the fledgling colony—his colony.

But instead, the 43-year-old Minuit was under arrest, in Plymouth, England, of all places, charged with theft of property from England's King Charles. The 5,000 beaver pelts in the hold of his ship *Unity* rightfully belonged to Charles, insisted his captors, because Minuit's settlement sat on a continent that Italian explorer Giovanni Caboto had claimed for England in the 16th century. Besides, the person who "discovered" Manhattan, Hudson, was himself an Englishman, further confirming England's sovereignty over the territory. Never mind that Hudson's voyages in his ship, *Half Moon*, were sponsored by Dutch merchants.

Minuit, of course, contended that New Amsterdam was Dutch. If an Italian in the employ of England could claim territory for the English, then an Englishman hired by the Dutch could surely claim it for the Netherlands. But the English would not listen to reason. They retorted that even if Hudson had claimed Manhattan for the Dutch, that claim was null and void because Manhattan lay in

the northern portion of the English colony of Virginia, established several years before Hudson's voyage to North America. The Dutch minister to the Court of St. James's understood that Minuit and his ship were merely pawns in a much larger North American chess game. England could not afford to ruin its amicable relationship with the Netherlands over animal pelts when both nations faced a much more menacing threat from Spain. Yet while the Dutch minister worked confidently but patiently over the course of a month to negotiate the release of the vessel and its passengers, Minuit remained under lock and key in Plymouth. His prospects for regaining the directorship of the colony of New Netherland—already in doubt before he had set sail—diminished with each passing day.

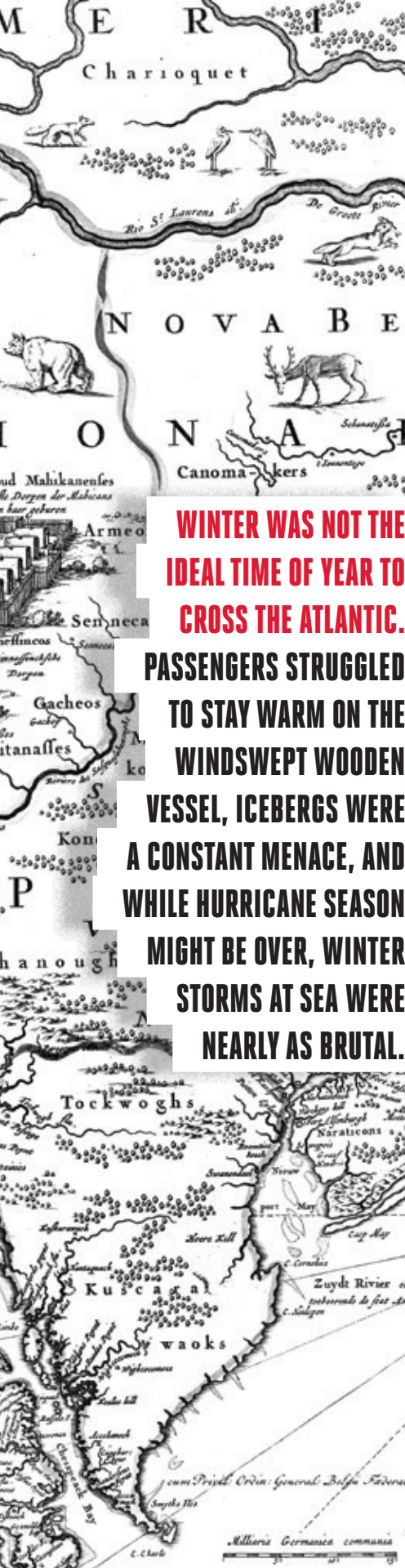
Minuit's journey from obscurity to international incident had been a circuitous one. He had been born in about 1589 in Wesel, a town in the Rhine River valley in the western German duchy of Kleve near the Dutch border. Minuit's parents were Walloons, French-speaking members of the Dutch Reformed Church who originated in the predominantly Catholic region that is now southern Belgium. This district belonged, in theory, to the Netherlands, but Spain had occupied it for more than 50 years. Wallonia had become less tolerant of Protestants under the Spanish Inquisition, and approximately 150,000 Walloons fled the resulting persecution and settled in England, Holland, and the far western German states such as Kleve.

Young Minuit overflowed with ambition. In 1613 he married Gerdruudt Raets, daughter of the mayor of Kleve's capital. Soon they moved to the prosperous central Dutch city of Utrecht, where Minuit learned diamond cutting. Yet the gem trade did not satisfy him. He yearned for something

more exciting, more lucrative. Learning that some Walloons had volunteered to serve as the first immigrants to a Dutch colony in North America, Minuit asked to make the journey too. He did not, however, want to commit to living in the wilderness for six years, like the expedition's typical colonists. Nor did he desire employment with the Geoctroyeerde West Indische Compagnie (Dutch West India Company, henceforth WIC), the group financing the expedition. Minuit merely wished to serve as an expedition volunteer who would aid the organizers of the colonization effort in exchange for the opportunity to scout out North American trading opportunities. Having found only thirty or so Walloons initially willing to settle in New Netherland, the WIC agreed to take Minuit too. After all, if Indians attacked or a fire broke out, another able-bodied soul would be welcome, no matter his ulterior motives.

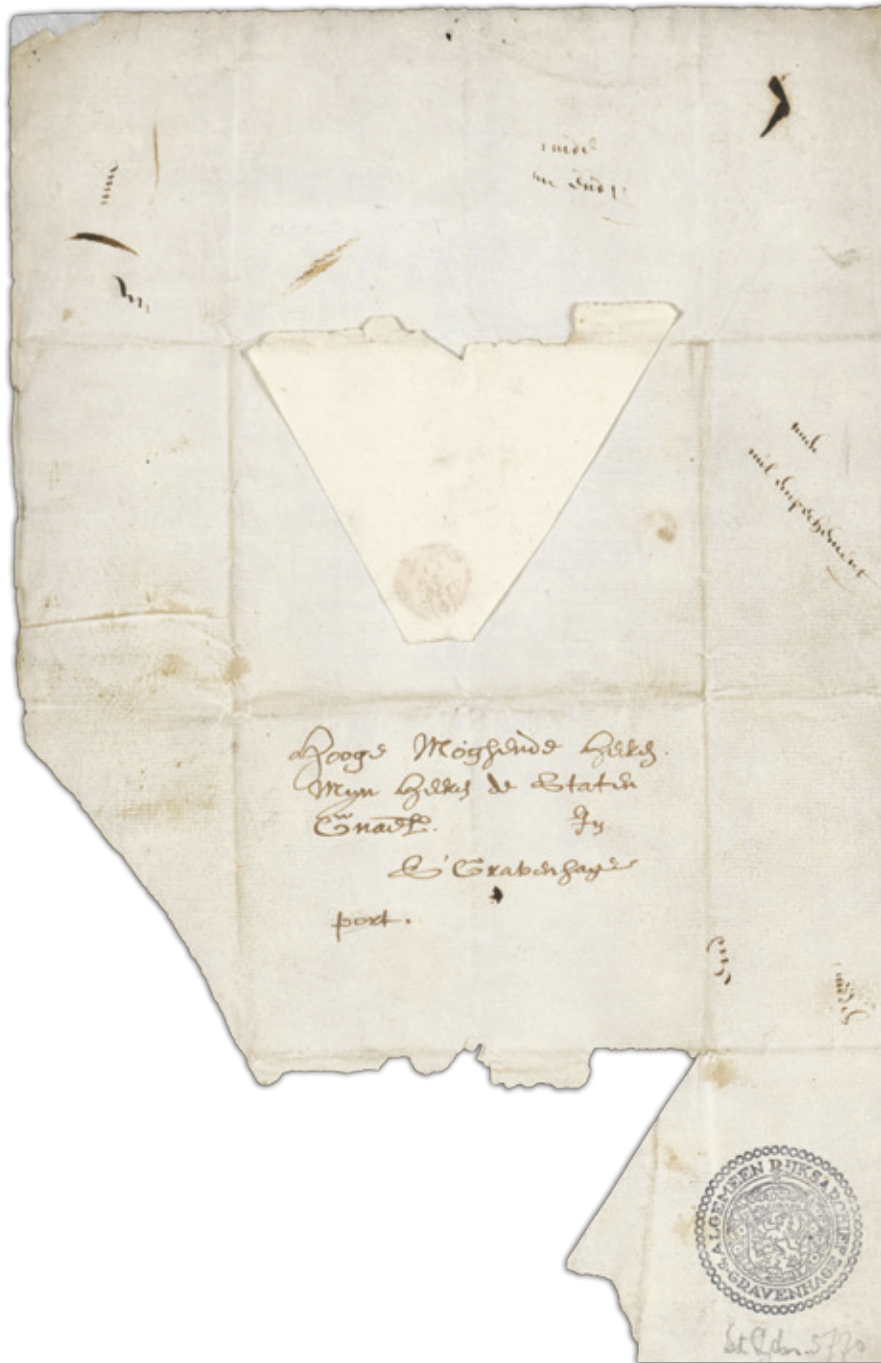
It appears that Minuit arrived in New Amsterdam with the colony's provisional director, Willem Verhulst, in the spring of 1625, about nine months after those 30 original Walloons had begun the arduous work of constructing a colony from scratch in the wilderness thousands of miles from home. The instructions given to Verhulst by the WIC refer to Minuit as a "volunteer" who would explore trading opportunities with the Indians near Fort Orange, modern-day Albany. Three months later, when the WIC sent further directives to Verhulst, it named Minuit to the colony's governing council. Minuit returned to Europe in 1625, but he apparently relished his elevated status in the fledgling colony and arranged to go back there, leaving Holland and his family in January 1626 and arriving in New Amsterdam, most likely via a Dutch possession in the Caribbean, on the fourth of May.

Minuit must have been



**WINTER WAS NOT THE
IDEAL TIME OF YEAR TO
CROSS THE ATLANTIC.**

**PASSENGERS STRUGGLED
TO STAY WARM ON THE
WINDSWEPT WOODEN
VESSEL, ICEBERGS WERE
A CONSTANT MENACE, AND
WHILE HURRICANE SEASON
MIGHT BE OVER, WINTER
STORMS AT SEA WERE
NEARLY AS BRUTAL.**



2415
 recept 7 novem^{er} 1626
 Hooghe Moghende Heeren



Guke is ghestick t'begip troepen van Amsterdam
 aengekomen ende is ds 23 septem. int veldt vande
 Lant gegaet int de Heere Mauritius. rapporteert
 dat ons volck daer kloet is in velding luttel
 sake vromdaz gibbs oer kinderz atwak gebakt
 gibbs t'ylant Manhattes van de veldt gheest, vrom
 de veldt van 60. gul. is groot 11000 margz.
 gibbside alle kornz gelf mē gēst, ende gelf
 auguste gēmad. daer was gēmadt minst luttel
 van zomke kornz, als taxus, haggv. gēst, gabik
 bouwst. kunnigst, boontjē in veld.

Het Cingsoen van t'zē schip is

- 7246 bēkē veldz
- 178½ otte veldz
- 675. otte veldz
- 18. mēkē veldz
- 36. veldt veldz
- 33 mēkē
- 34 hātē veldt.

Wes gheve balckz, in noten-gent.

Guke mē

Googz moghende gēkz, zyt ds demogende
 in veldz luttel.

In Amsterdam den 5^{en} novem^{er} 1626.

Geve Hoo: Moo: Dienstwillighe

P. Schagen



THE 'PURCHASE' OF MANHATTAN

In 1626, Dutch official Peter Schagen sent to The Hague this report of a ship's arrival from New Netherlands, announcing that the settlers had "purchased the Island Manhattes from the Indians" for goods worth 60 guilders. Anbinder clarifies that the deal was more likely a long-term agreement to share the island, and probably misconstrued in the retelling.



shocked by what he found upon disembarking in New York Harbor that second time. The very colonists Verhulst was supposed to direct had placed him under arrest. Precisely why the settlers turned on Verhulst is not clear. Some claimed he had misappropriated funds, others that he had cheated the Indians, putting the colonists at risk of attack. Indians had recently ransacked Fort Orange, and the immigrants may have blamed Verhulst. One gets the sense that the colonists simply found him insufferable. So, “on account of the bad conduct of Verhulst,” wrote one immigrant in 1626, the colony’s council voted upon Minuit’s return to make him their new director.

Minuit believed that Verhulst's approach to operating the colony had been completely misguided. Following WIC instructions, Verhulst had divided his tiny contingent of colonists among far-flung settlements that stretched from Cape May to Trenton on what the Dutch called the South River (what we call the Delaware), from New Amsterdam to Albany on what the Dutch labeled the North River (the Hudson), and even farther north and east up the water way the Dutch called the Fresh River (the Connecticut). The WIC had envisaged the South River settlements as the most important, but Minuit correctly foresaw New Amsterdam as the key trading hub, and reallocated most of the company's resources there. Minuit also decided, probably for

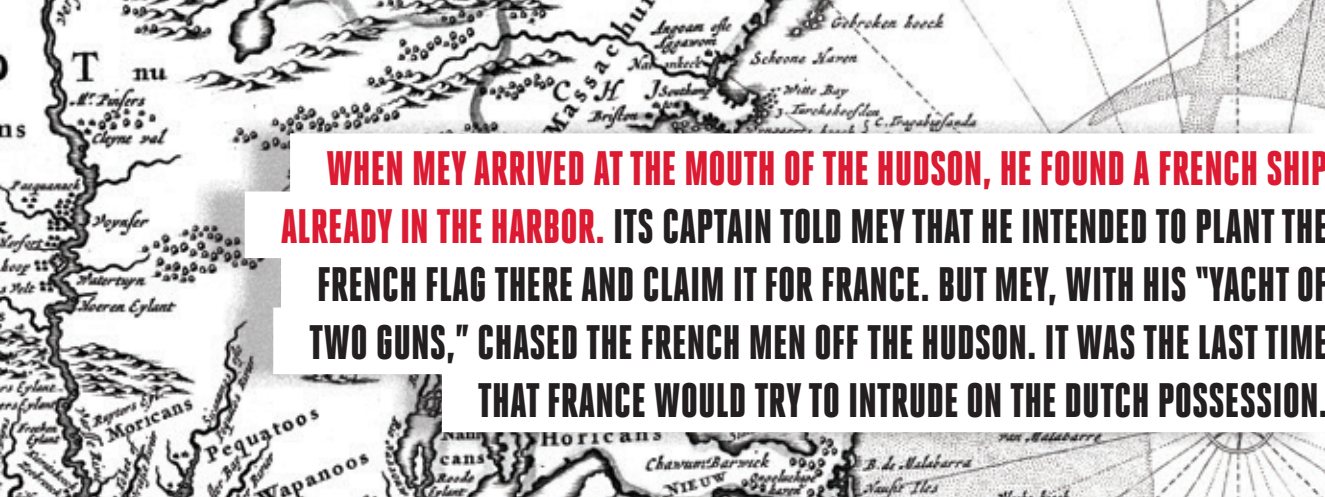
defensive purposes, to concentrate most of the WIC's settlers in one place, so he ordered the bulk of the colonists stationed in other places to relocate to New Amsterdam. Finally, while Verhulst had followed WIC orders and made one of New York Harbor's smaller islands, Nut Island (now Governors Island), the headquarters of WIC operations at the mouth of the Hudson, Minuit countermanded that directive, too, and moved the settlement to the much larger island the natives called Mannahatta.

Unlike Nut Island, Mannahatta was inhabited by Indians, so the move there raised the question of how the *wilden* would react. If land that the Dutch wanted to occupy was “inhabited by some Indians,” wrote the WIC leadership, “these should not be driven away by force or threats, but should be persuaded by kind words or otherwise by giving them something, to let us live amongst them.” WIC instructions dictated that such transactions should be codified in a contract, signed by the Indians “in their manner, since such contracts upon other occasions may be very useful to the Company.”

Thus originated the famous transaction popularly known as the “purchase” of Manhattan Island. It is likely that despite the language barrier, both the Indians and the Dutch initially understood it as a long-term agreement to share the island, because for decades afterward Indians continued to live on Manhattan Island and the

Dutch made no efforts to evict them. Nonetheless, when the Dutch government's representative in the WIC's governing body wrote from Amsterdam to his superiors in The Hague to describe the arrival of a ship from New Amsterdam, he stated that the settlers "have purchased the Island Manhattes from the Indians for the value of 60 guilders." Minuit did not pay cash but instead gave the Indians "trade goods"—axes, kettles, awls, "duffel cloth," and the like. The idea that the Indians bartered Manhattan for beads is a myth, though it is possible that *wampum*, the Indians' currency made of strung precious seashells, was part of the transaction. The WIC must have been pleased with the deal, for while the company had instructed Verhulst to find a piece of arable land at least 2,000 acres in size, Minuit had won the right to settle an island 10 times larger. Yet the best feature of Manhattan, Minuit recognized, was its location. Manhattan stood at the mouth of the Hudson and several other rivers, an early 20th-century historian noted, "like a great natural pier ready to receive the commerce of the world."

Minuit worked to solidify the Dutch presence on Manhattan Island. At the southernmost tip, which was perfectly positioned to catch the breeze coming off the harbor, Minuit oversaw the construction of two windmills: one for grinding grain, the other for sawing lumber. These would dominate the southern Manhattan



WHEN MEY ARRIVED AT THE MOUTH OF THE HUDSON, HE FOUND A FRENCH SHIP ALREADY IN THE HARBOR. ITS CAPTAIN TOLD MEY THAT HE INTENDED TO PLANT THE FRENCH FLAG THERE AND CLAIM IT FOR FRANCE. BUT MEY, WITH HIS "YACHT OF TWO GUNS," CHASED THE FRENCH MEN OFF THE HUDSON. IT WAS THE LAST TIME THAT FRANCE WOULD TRY TO INTRUDE ON THE DUTCH POSSESSION.

skyline for decades. Minuit also strove to improve the other major structure in the young settlement—the fort. The colonists had skimped on the defensive structure, substituting sod walls for stone, so Minuit ordered it rebuilt. The immigrants, seeing that New Amsterdam would be a more important outpost than originally envisioned, soon began, in the words of their first pastor, Jonas Michaëlius, “to build sturdy new houses in place of the huts and hovels in which up until now they have not so much lived as lodged.” It seemed that New Amsterdam finally had a leader who could make the settlement a success.

But while New Amsterdam continued to expand under Minuit, it did not turn a profit for the WIC. The immigrants sent thousands of beaver pelts back to Amsterdam each year, but the proceeds did not bring in enough to compensate the company for the cost of maintaining fortified settlements, paying the dozens of employees living in the colony, subsidizing the shipping of food and people to North America, and transporting furs back to Europe. Minuit argued that the colony would become more profitable if the WIC invested more in it by financing the emigration of additional colonists, but company officials claimed they could find few Dutchmen willing to risk their lives in the wilds of North America.

The directors started to lose faith in Minuit, in part because of the red ink, and in part because

Michaëlius had begun to undermine him by sending reports critical of Minuit’s conduct back to company headquarters. Minuit might seem energetic and capable on the surface, wrote the minister, but in fact he was “a slippery man, who under the treacherous mark of honesty is a compound of all iniquity and wickedness.” He could deceive WIC officials because “he is accustomed to the lies, of which he is full, and to the imprecations and most awful execrations.” Furthermore, although Minuit was a married man, wrote Michaëlius, “he is not free from fornication ... and deems no one worthy of his favor and protection, who is not of the same kidney as he is.” Minuit denied the charges, insisting that Michaëlius was the liar, but the WIC directors, not knowing whom to believe and realizing that such a feud could not be allowed to continue, recalled them both at the end of 1631 for an investigation. Together, the two men, along with other leaders of the colony, boarded the ironically named *Unity*, filled with the year’s bounty of furs and timber, and sailed for Amsterdam.

Winter was not the ideal time of year to cross the Atlantic. Passengers struggled to stay warm on the windswept wooden vessel, icebergs were a constant menace, and while hurricane season might be over, winter storms at sea were nearly as brutal. The *Unity* had made it almost all the way across the Atlantic when just such a storm struck. Rather than risk losing his

ship, the captain decided to seek shelter in the southwest English port of Plymouth. Minuit expected the Dutch ship to be welcomed by the English; after all, the two Protestant nations were allies against their powerful common enemy, Catholic Spain. But when the English learned that the *Unity* had sailed from “a certain island named Manathans” in North America, authorities in Plymouth arrested Minuit and Michaëlius, insisting that the *Unity*’s hold contained English property taken from English territory without permission. Minuit must have told his captors that the goods originated in territory he had purchased from the Indians, but the English contended that the natives had no right to sell land that already belonged to England.

After they had remained in English custody in Plymouth for more than a month, the Dutch envoy to England finally negotiated the release of the men, their ship, and their cargo. England and the Netherlands could not afford a prolonged diplomatic crisis. But the English had made their point: they laid claim to all of North America, including New Amsterdam, which even Michaëlius recognized would eventually be “the key and principal stronghold of the country.”

When Minuit finally reached WIC headquarters on the third of May, 1632, the tulips were fading as rapidly as his prospects for reclaiming the directorship of New Netherland. After a perfunctory

hearing, the company officials dismissed Minuit, citing as the cause, of all things, his failure to induce more Dutchmen to settle in New Amsterdam. Minuit could only console himself with the knowledge that they had fired Michaëlius too. But Minuit would have at least a modicum of revenge. After several years of underemployment, he agreed to lead a Swedish expedition aimed at seizing part of New Netherland in the name of Christina, Sweden's 11-year-old queen. Minuit, with two ships and fewer than one hundred men, planned to take control of the South River, which he knew would be lightly guarded because he himself had ordered the transfer to New Amsterdam of most of the Dutch colonists previously stationed there. Minuit's plan succeeded. In the spring of 1638 the colony of New Sweden, encompassing the Delaware River valley as far north as the future cities of Trenton and Philadelphia, was born. It would remain a thorn in the side of the Dutch and English for nearly 20 years. Yet once again Minuit did not get a chance to enjoy the fruits of his labor. Ever on the lookout for the deal of a lifetime, he died in a Caribbean hurricane in August 1638. He had sailed there hoping to buy tobacco that he could resell at a steep markup in Europe, whose inhabitants had developed an insatiable demand for North America's "vile weed."

It might seem surprising that the Dutchmen who formed the WIC would risk so much hard-earned



Peter Minuit

money on a highly risky fur-trading venture thousands of miles from home on a continent that Europeans barely knew and in territory over which the Dutch had, at best, a tenuous hold. After all, the Dutch merchants on whose behalf Minuit operated could have contented themselves with the wealth they already had. The early 17th century was the Netherlands'

"Golden Age," one that gave birth to Rembrandt and Vermeer, the microscope and one of the wealthiest societies the world had ever known. "In this country there is no-one who cannot live with ease according to his rank," Venetian ambassador Girolamo Trevisano reported enviously to his government. "Nobody begs, and those who want to give alms, would not know to whom." Dutch prosperity resulted in part from the fact that Dutch merchants (like those who started the West India Company) dominated many of Europe's most important trade routes. Before refrigeration, salt for food preservation was a highly prized commodity, and the Dutch in this period played the leading role in Europe's lucrative salt trade. In an era when the European diet was dominated by bland boiled foods, spices were likewise exceedingly valuable, far more so than today. Dutch merchants virtually monopolized the era's spice trade with Asia. As a result, the Dutch enjoyed the highest standard of living in Europe.

It was the desire to preserve their status as the merchant princes of the Continent that

accidentally led the Dutch to found New Amsterdam. When Columbus "discovered" America in 1492, he had been seeking not a new continent but rather a more direct route to the spice dealers of Asia. More than a century later, Englishmen, Frenchmen, Portuguese, and Spaniards, all hoping to break the Dutch stranglehold on this commerce with Asia, still sought a short cut to the mercantile centers of "the Orient" that would allow them to circumvent Dutch middlemen. If one of them found it, the lucrative Dutch spice trade might quickly collapse. So the Dutch decided that they had to find the new route first.

Pecuniary interests were not their sole motivation. By the time the Dutch founded New Amsterdam, they had been fighting for their independence from Spain for 60 years. Spain still occupied some Dutch-speaking provinces in what would eventually become Belgium. Spain's ouster could only be financed with profits from the spice trade. Thus, the very survival of the Dutch nation was at stake in this battle to preserve the Dutch trading advantage with Asia.

The leaders of the Dutch Republic were not thrilled when Hudson failed to find a shorter route to Asia. But when Dutch fur dealers learned that Hudson had discovered a wilderness full of "skins and peltries" from beavers, otters, foxes and other animals, they were elated. The Dutch fur industry had long been dependent on the French colony in what is now Quebec for their raw materials. They could not wait to exploit Hudson's discoveries to secure animal pelts without the markups imposed by French middlemen. These Dutch fur merchants secured permission from the Dutch government to trade in the area Hudson had explored and immediately began sending ships there.

The fur traders did not attempt to settle Manhattan or any other part of what they called New Netherland. Typically, they sailed

inland looking for Indians with furs to barter, loaded their ships with the Indians' pelts, and then returned immediately to Europe. The Dutch government eventually decided that it wanted more from New Netherland than animal skins, for while it was not yet clear what else North America could offer the Dutch, the fact that their rivals Spain, France and England were all establishing more permanent outposts on the continent suggested that perhaps they ought to do the same. So when the Dutch fur traders' patent to do business in New Netherland expired in 1618, the Dutch government declined to renew it. Instead, it created the West India Company, modeled on the wildly successful Dutch East India Company which monopolized the spice trade in Asia. The new company's investors would be the only Dutch merchants permitted to buy and sell goods in North America, South America and on the west coast of Africa. Its employees would have near total authority to govern, administer justice and make treaties with natives in territories where it operated.

The WIC made its first forays into colonization in the winter of 1623–24. Initially, Manhattan and its immediate environs were not a priority for the company. Instead, the WIC gambled the bulk of its start-up capital on an audacious attempt to invade and occupy the Brazilian port of São Salvador de Bahia and thereby gain control of southeast Brazil's sugar trade. The company assembled a squadron of 26 warships carrying 3,300 men for the invasion, to this day the largest-ever privately financed invasion flotilla.

At the end of January 1624, as the WIC squadron was hurtling toward Brazil, the company dispatched a single sailing vessel (aptly named *New Netherland*) to North America to set up the company's trading outpost there. The ship was commanded by Cornelis Mey, a seasoned Dutch captain who had made several

previous trips to North America. Whereas European ships that had come to this part of North America in the past had carried only sailors or others suited for the business of exploration, the *New Netherland* was the first vessel to bring *immigrants*, people who planned to live in this fledgling colony on a long-term basis.

WIC leaders instructed Mey to set up his base of operations on the southernmost of the rivers Hudson had explored, the modern-day Delaware. Company officials chose this location in the belief that the climate in what is now southern New Jersey would be similar to that in Spain's tropical settlement in Florida. Mey installed an outpost on the north bank of the Delaware Bay (the town there now, Cape May, is named for him) and then set out to fulfill his orders to revive the fur trade on the river now known as the Hudson. When Mey arrived at the mouth of the Hudson, he found a French ship already in the harbor. Its captain told Mey that he intended to plant the French flag there and claim it for France. But Mey, with his "yacht of two guns," chased the French men off the Hudson. It was the last time that France would try to intrude on the Dutch possession.

Having disposed of the French threat, Mey did not establish a stronghold at the mouth of the Hudson, as one might expect. The key to the fur trade, Mey and the WIC believed, lay one hundred miles up the North River, where plentiful pelts awaited Dutch traders. Mey therefore shipped most of his colonists up the river to establish a fortress and settlement on the site of present-day Albany. Others were sent to what is now the Connecticut River, with only a handful of settlers left in New York Harbor on Nut Island. Those settlers used Manhattan Island, a few hundred yards across the bay, to pasture their cattle. It was Minuit, two years later, who had the good sense to put the cattle on Nut Island and the people on Manhattan,

launching its history as a magnet for immigrants.

Manhattan seemed to hold an almost limitless bounty for these settlers. "We were much gratified on arriving in this country," one wrote in 1624. "We found beautiful rivers, bubbling fountains flowing down into the valleys; basins of running waters in the flatlands, agreeable fruits in the woods, such as strawberries, pigeon berries, walnuts, and also . . . wild grapes." Another noted that "there grows an abundance of chestnuts, plums, hazelnuts, large walnuts of several sorts," and blueberries. The nut trees would feed the settlers, the firs and pines would bring a handsome profit in Europe as timber and ships' masts, and the acorns from the tall oaks would fatten their pigs. Until their livestock were established, the colonists could feast on abundant deer, waterfowl, and seafood. "There is considerable fish in the rivers," the immigrants reported. They thought the abundance of shellfish especially impressive, and particularly enjoyed the mussels, clams, and oysters, "fine for stewing and frying. As each one fills a big spoon, they make a good bite." Other than missing the beef and pork to which they were accustomed, the earliest Europeans to settle in New York Harbor concluded that "whatever we desire in the paradise of Holland, is here to be found."



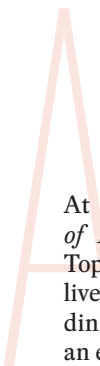
For more on Tyler Anbinder and *City of Dreams*, visit the publisher at hmhco.com



Q&A

OVER CENTURIES, A PLOT UNCHANGED

***City of Dreams* author Tyler Anbinder talks about the constancy of immigration history, saving the name of a Civil War commander and the value of always revisiting an original source.**



At times, History Professor Tyler Anbinder's *City of Dreams* is not so much read as *moved through*. Topography unfolds from the pages and a parade of lives, the mundane and the extraordinary, breach the din of the city and encounter the reader like the cast of an elegantly textured pop-up book.

His 400-year history of immigration in New York City is that “one big book” he felt he had in him, he says—the text and notes come in at nearly 700 pages—and it took the better part of a generation to write. But Anbinder manages to let the enormity of history settle lightly across the pages, especially since grasping the topic means understanding not just New York history but that of half the world: the politics, the culture, the violence that drove people to flee in the first place. All of that was necessary to make sense of the timeless symphony of chaos that Anbinder quotes one immigrant, nearly a century ago, describing as: “Hating one another, loving one another, agreeing and disagreeing in a hundred different languages, a hundred different dialects, a hundred different religions. Crowding one another, and fusing against their wills slowly with one another.”

The book—fueled by grants from the National Endowment for the Humanities and GW's Office of the Vice President for Research, and the help of some two dozen undergraduate and graduate researchers—has garnered positive reviews in the nation's top newspapers, and this March won a \$10,000 book prize from the Columbia Journalism School and the Nieman Foundation for Journalism at Harvard. —*Danny Freedman*

First of all, congrats. How do you feel being done?

Thanks. Back in 2016, it was a huge relief. I've been working on this, on and off, for 15 years. But the interesting thing was, you hand in the finished manuscript and for a day you have this weight lifted off your shoulders. And then immediately the publisher says, "All right, so next week we're going to send you this and send you that, and the corrections ..." And you think, "Oh. It's not done."

Then you get your editor's notes back and you make changes, then you submit that and you think, "It's done," and for a day you feel the weight off your shoulders again. Then they get in touch with you and say, "All right, let me tell you the schedule: the copy editor is working on it now. You're going to get the manuscript back from her in three weeks. You're going to have a week to turn it around." And then you do that, and you feel that, now, it must be done. But no, then it goes into production and they send you the page proofs ... it ends up, by the time it's actually, actually, *actually* done you're exhausted and you're not relieved any more.

And you can't even look at the thing.

You can't look at it. And you're scared to death at that point because now you know there's no way to make changes.

Print is a very final thing.

It is.

So why New York? Are you from there?

I wasn't born there but I grew up in the New York area, and my family is from there. It seemed to me the quintessential immigrant story.

I had written two books that were fairly narrow in focus: one that looked at the anti-immigrant Know Nothing Party in the 1850s, which really covered six years; and then my second project was a history of one immigrant neighborhood in New York, Five Points, that looked at a 4-by-6-block strip of land. A lot went on in that 4-by-6 block area, and the book was chronologically long—it covered a century—but still, it felt narrow.

For every great Five Points story I would find, there would be 10 that I couldn't put into my book because they fell outside those 4 by 6 blocks.

As I started collecting more and more of those, I thought I really should try to do the story of all New York. And I wanted a writing challenge in terms of a narrative, and keeping the reader interested and having a book that didn't end up reading like an encyclopedia.

What drew you to writing about immigration, specifically? It seems like a thread you've followed throughout your career.

I'm not sure exactly. I started out very much not in the area of immigration history, focused on American political history, especially Civil War-era politics. By the time I got to the end of that first book, writing about what the nativists thought, I felt this great desire to tell the other side, to tell the immigrant side of the story. And that was what led me to write about Five Points, which is only such a small part of the story.

And there were these myths that I wanted to debunk. Like this idea that today's immigrants are totally different than American immigrants of the past, which I just find, in writing about New York, is not true; that they may be different on the surface—they may be from different countries, different religions—but their experiences are almost identical. And the way Americans treat them is almost identical, and the way Americans perceive them is almost identical.

We think, "Well today's Muslim immigrants are much more of a threat than the Christian immigrants we had in the past," and we forget that a hundred years ago Catholics were seen as a serious threat—and not just a religious threat, but a physical threat. The big terrorists of the early 20th century were mostly Italian immigrants and, to some extent, Jewish anarchists. So these groups that say, "Well, they assimilated fast unlike today's immigrants," back then nobody looked at it that way. They were looked at just the way we look at today's "threatening" immigrants.

Also, a century ago, we're talking about massive waves of immigrants. You mention in the book how hard it is to immigrate now to the U.S.

Yeah, that's one of the other myths I wanted to debunk: Most people say, "Why don't they just wait on line like my ancestors did," when there

was no line for previous generations to wait on, because pretty much anybody could get in. Whereas today if you're from Latin America or from Asia and you don't have a close relative already in the United States—unless you're rich and can get one of these \$500,000 visas—there's no line for you to get on. It's just that you literally can't immigrate to the United States unless you sneak into the country, and so people do.

I was going to ask if it was strange working on this book at a time when immigration is so much in the headlines, but the book has been ongoing for a while.

I've been working on it for 15 years, and every time I would tell people what I was working on they would say, "Oh, what a shame the book isn't being published this year, when immigration is such a hot topic." Working on immigration history, what I know is: There has been no time in the past 40 years that immigration has not been a hot topic in American politics. So I would say, "You know what, I am not worried that immigration will fall off the political radar by the time this book is done." And every year it's just become more and more of an issue.

Your own ancestors make brief appearances in the book. What was that decision like to insert yourself into the story? It seems unusual for a history book.

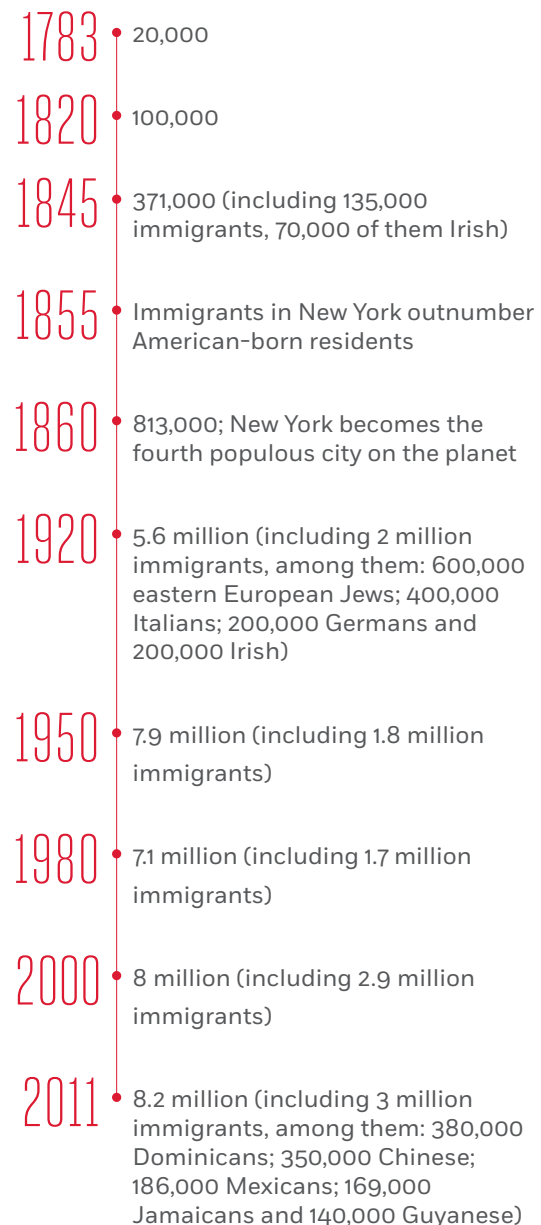
It's not usual, but I was inspired by a book I like a lot by a guy named Ron Takaki. In his book *Strangers from a Different Shore*, which is a history of Asian Americans, he put his family in. I just thought that added such a beautiful dimension to his book, so once I read that I thought, I'm going to do the same thing for my book. So many people mention how much they like that.

Were you surprised by anything you found about them?

The variety of places they were from in Eastern Europe was the biggest surprise. I knew the Anbinders were from this one part of central Ukraine, midway between Kiev and Odessa, and I just assumed that the rest of my relatives must be



"Few cities had ever grown so big so fast," Anbinder writes of New York City. A rough timeline of the city's population:





Tyler Anbinder



Almost everything I see in this story is a constant over time ... immigrants over the course of American history have changed very little.

from there. But instead I found one from what's now Belarus, one from what's now Moldova, one from what's now Poland, one from what's now southwest Germany. So there's a little more variety in my family tree than I realized.

| How about in the details of their lives?

I'd never known, and this was never talked about in my family, even when these people were alive: My great-grandfather came to America in 1911—this is Froim Leib Anbinder—and the rest of the family stayed behind until he could afford to get tickets for his wife and his six kids. But then World War I intervened, and so he wasn't able to bring them over until the 1920s. And by then they'd been through the war, and then there was a famine in Ukraine, and they became refugees.

They tried to get on a ship but they were too sick and were kicked off, which I hadn't known. Then they got on a second ship, and I thought that was the end of the story, but I found that they were detained in the hospital at Ellis Island and told you can't enter into the country until either you get better or you die. They were in the hospital for [their] various children—so this was my grandfather and my great aunts and uncles—for weeks until they were considered well enough to enter the country.

The other thing I found that was surprising was how my family's immigration history perfectly matched the overall nation's history.

The German immigrant ancestor I have came in the 1850s, which was the heyday of German immigration, and came from southwest Germany, which was the place that sent the most immigrants to New York in the 1850s. And then the one who came in the 1870s came from kind of the East German/Polish border area during that area's heyday of immigration. And then the rest of the family came in the early 20th century, at the period when Eastern European Jews were in the majority. So they kind of perfectly matched.

| Which makes sense, right?

It makes perfect sense, and yet you'd never imagine it working out that well.

These are a pretty well-worn paths, New York City history and immigration. Did you feel there were stones left to be overturned? Was there still room for discovery and original research?

There's always room for original research. In this book—even though I didn't intend to at first—I did what I tell my students: Always go to the original source because you can never trust another scholar.

At first I thought it's such a huge book, covering so much that's already been written about, there's no way I can do that. As I started working, that voice in my head said, "You should

really check that ... this quote sounds too good to be true.” And so I would go check, and I would find mistake after mistake after mistake. That’s, in part where, some of the research assistants from GW came in. Through them we found hundreds of things that were wrong that we were able to fix for this.

In the end, it’s 80 percent original research. The part that’s not so much original research is the very earliest colonial history, where I can’t read Dutch so I had to depend on other people for their translation of the Dutch sources.

What are some new things you turned up?

There are a couple books about the New York City draft riots, but they tend to look at it from kind of a law-and-order perspective, or from the perspective of a fight between capital and labor, and I really wanted to tell this from the immigrant’s perspective. So in the end I had to go back and start from scratch, and go to all the newspapers and the police reports and the military reports because I found that otherwise I wasn’t finding the voices that I felt I needed to let the immigrants speak about what happened and why.

One other discovery that I really enjoyed was the one about this guy named Felix Brannigan. His story is pretty much completely unknown—the part that’s known is these racist letters he writes to his sister, saying we Irish don’t want to fight with the African Americans, though he uses the “n” word. And that’s where the stories always ended. He’s quoted in dozens of books about the Civil War as the exemplary case of a bigoted Irishman whose views are what causes the draft riots.

But then I started looking into him, and I found all this other stuff—that he later is the commander of an African-American unit, which lots of white soldiers refused to do. And then he goes to law school at GW, then Columbian College, and eventually becomes a prosecutor in Mississippi and prosecutes the Klan, and he becomes a Republican, which clearly he was not at the beginning of the war.

He had the capacity to change and grow, so that was a really interesting story.

Were you entering into the Brannigan anecdote with idea of using it the way everyone else had, but then you ended up finding those other details?

Yes, exactly.

What was the feeling?

When you find that stuff, it’s the historian’s dream.

You essentially pulled this guy out of history and gave him a redemption.

In a sense.

Taking the long view, are there constants that you see in this history?

Almost everything I see in this story is a constant over time.

I think the most important thing to take away from the book is the idea that immigrants over the course of American history have changed very, very little; that things like where they are from, what language they speak are very unimportant in the long run. And that really the important factors of the immigration process have not changed: that immigrants come here mostly to make better lives for themselves or their kids; they always struggle at first; they always wonder if they’ve done the right thing; they always cling as much as possible to their old world culture and habits.

We have this impression that “immigrants used to assimilate, not like today,” but immigrants have never assimilated much, and the idea that past immigrants did and today’s immigrants don’t is a total myth.

If you look at any time in history, people have complained that immigrants don’t assimilate. And all immigrants throughout American history have been treated unkindly by native-born Americans, and they’ve had to struggle for acceptance. That was the case with Protestant immigrants, with Catholic immigrants, with Jewish immigrants, with Muslim immigrants, with those from Asia, Africa, from every place. And that’s been a constant.

The immigration story really doesn’t change, even though we always think it does—and have always thought it has. GWR



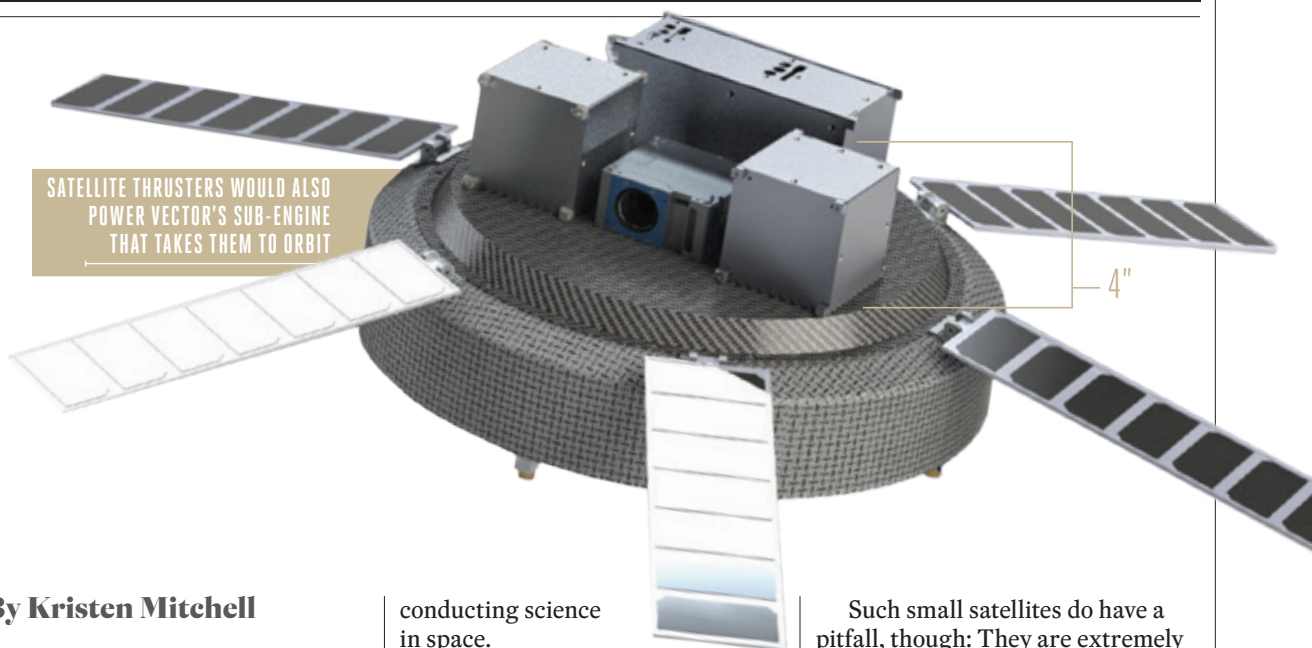
SPACE

PINT-SIZED PUNCH

An inch-long thruster for maneuvering tiny satellites is licensed by commercial rocketeers looking to own a growing slice of the space market.

A Vector-R rocket raised at a launch complex in March 2017 in Cape Canaveral, Fla.

COURTESY VECTOR



By Kristen Mitchell

Tiny thrusters created at GW soon could be powering the next generation of space exploration.

In December, GW and Vector—a commercial spaceflight company geared toward the launch of miniature satellites—reached an agreement to license plasma thruster technology created by School of Engineering and Applied Science Professor Michael Keidar and several graduate student researchers in his lab.

The thrusters allow researchers to propel and maneuver new classes of increasingly small satellites like cubesats, which measure just 4 inches per side. (The Hubble Space Telescope, by comparison, is the size of a school bus.) Small satellites are significantly less expensive and less cumbersome to build and to launch, opening a wave of new opportunities for

conducting science in space.

As part of the collaboration, Vector will develop the inch-long thruster—initially, for its third-stage engine that would ferry satellites further aloft—and provide funding for GW to continue to advance the technology.

“This will be a real step forward to commercialization,” says Keidar, a professor in the Department of Mechanical and Aerospace Engineering. “Our technology will be used in dedicated small-rocket launches by Vector, a recognized leader in this field.”

Thrusters from Keidar’s lab went to space in 2015, powering a cubesat built by the U.S. Naval Academy.

In February 2017, NASA selected a GW-made cubesat, designed to further test the thrusters, to be among a class of 34 cubesats that will go to space between 2018 and 2020.

Because of their relative cost and easy assembly—the first cubesat built by an elementary school went to space in 2015—small satellites are becoming increasingly popular for Earth-imaging and communication applications.

Such small satellites do have a pitfall, though: They are extremely difficult to control in space. The same small stature that makes them appealing also severely limits the size, weight and efficiency of what they can carry for propulsion.

Keidar’s thrusters use titanium, which is converted into a gas-like plasma to provide propulsion. The plasma accelerates and expands into a vacuum at high velocities to produce thrust. This thrust helps the craft overcome drag and maintain the small satellite’s orbit.

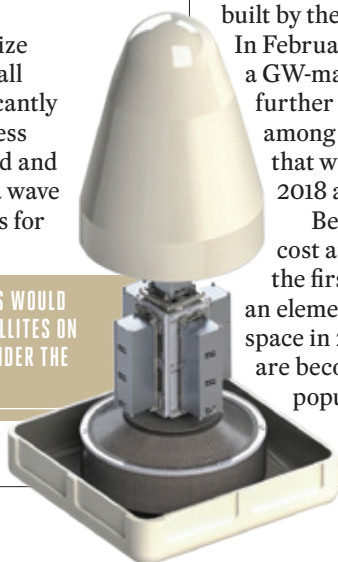
Jim Cantrell, CEO of Vector, called the technology revolutionary.

“Electric propulsion allows a very high degree of fuel efficiency for placing satellites into higher orbits or for maintaining satellite orbits from decaying due to atmospheric drag,” he says. “George Washington University’s technology is extremely flexible in its implementation and can be used in a variety of applications important to Vector.”

Vector plans to use the technology as part of its launch system dedicated to microspacecraft.

It’s smaller Vector-R rocket can launch a roughly 100-pound satellite into orbit, while the larger Vector-H can launch 220 pounds. GWR

VECTOR'S ROCKETS WOULD STOW SMALL SATELLITES ON A SUB-ENGINE UNDER THE NOSE CONE.





ENTREPRENEURSHIP

'IT'S REALLY JUST TIME'

Plan to bring preventative care to low-income and homeless patients wins top prize at New Venture Competition, where more than \$300,000 in cash and in-kind prizes were up for grabs.

By Kristen Mitchell

A team of GW entrepreneurs is looking to revolutionize health care by providing more accessible primary care options to a community's most vulnerable population.

Freya Spielberg, an associate professor at the Milken Institute School of Public Health and director of GW's community-oriented primary care, founded the startup Urgent Wellness, which plans to develop telemedicine and medical vending machines staffed by community health workers to lower health care costs nationwide and improve access for homeless and

low-income patients.

These resources would be put into homeless shelters and housing projects to provide more convenient preventative care for Medicare and Medicaid patients, Spielberg says. It would also decrease reliance on emergency room services.

Urgent Wellness was awarded more than \$25,000 in April at the annual New Venture Competition, including taking home the \$15,000 first place prize.

"When I was working in urgent care, I would see people, and I wanted to take care of the whole person because I'm in family medicine, but I really wasn't allowed to," Spielberg says. "I had to get them in, get them out, take care of the acute care issue."

Thirty-two percent of Medicaid patients use the emergency room once a year at least, she says, and just over one-third of those visits are avoidable. When patients overuse these services, health care costs rise. The only way to improve this problem, she says, is by creating a system that can be paid for by insurance and provides a new kind of routine care.

"I see the need, and I see the solution, and we have the technology now to make this work so it's really just time," Spielberg says.

The Urgent Wellness team—

comprising Spielberg; Aubrey Villalobos, who is the director of comprehensive cancer control at the GW Cancer Center and a graduate student in the Milken Institute School of Public Health; Luigi Leblanc and John Barabino—was among 12 finalist teams that vied for more than \$300,000 in cash and in-kind prizes. Proposals ranged from new ways of thinking about food waste, an on-the-go makeup kit and technology that would allow gardeners to save money on irrigation by taking advantage of natural condensation.

The competition is put on by the Office of Innovation and Entrepreneurship and the Office of the Vice President for Research. In the past nine years, 40 percent of finalists have launched their companies and 26 startups have been formed, says Jim Chung, associate vice president for research, innovation and entrepreneurship.

Daniel Berg, a junior majoring in health and wellness and organizational sciences, was awarded the second place prize for his company Berg Bites, which produces a healthy snack marketed toward gym-goers with a sweet tooth.

The Berg Bites team took home

THE 12 FINALISTS

Technology Ventures

Bernik: A head-up display for motorcycles that projects critical information in the rider's forward vision, including rear view visibility and blind spots.

Led by: Nikolaos Beratis, BS '01, and Natalia Clementi (School of Engineering and Applied Science)

Clean Condense: Providing clean water to gardeners and growers to run their operations with an affordable and environmentally friendly option.

Led by: Charles Carlson (School of Business), Spencer Legred (Columbian College of Arts and Sciences), Dennis Marquis and David Meehan (GWSB)

Fourth Wave Studios: An app that will bring education material to life with augmented reality visuals and interactivity.

Led by: Joseph Schiarizzi (SEAS)

Opal: A comprehensive equipment management system that delivers the power and efficiency of condition-based maintenance to the health care sector.

Led by: Connor Roberts (SEAS)

New Ventures

Agaport: The first online platform to search, compare and book storage space in freeports, located within free-trade zones.

Led by: Tatiana Seikaly (CCAS), Mimi Shojai (CCAS) and Joshua Pulman (GWSB)

Berg Bites: With heart healthy oats and Omega-3 powerhouses like chia and hemp seeds, Berg Bites offers a delicious, but guilt-free, snack.

Led by: Daniel Berg (CCAS) and Marguerite Bottorff

drwr: An e-commerce platform for antiques and collectibles will improve the buyer/seller experience through an user-generated taxonomy system.

Led by: James Carbone (GWSB) and Rowland Zhang (Elliott School of International Affairs)

The Pocket Palette: A single-serve makeup kit that empowers women to focus on priorities and eliminate the need for bulky bags.

Led by Lynda T. C. Peralta (GWSB)

Social Ventures

Givebutter: A social crowdfunding platform designed for student organizations and nonprofits with a mission of inspiring people to give back.

Led by: Liran Cohen (SEAS), Max Friedman (GWSB), Ari Krasner (ESIA)

KnoNap: A discreet napkin with detector cells that test for the presence of date-rape drugs in various beverages.

Led by: Connor Varley (SEAS), Colten Eberhard (CCAS) and Danya Sherman (ESIA)

The Forgotten Fruit: Snacks that use misshapen produce discarded by U.S. agricultural systems to increase revenue for farmers and decrease overall waste.

Led by: Larry Gibbons, MBA '16, and Stephanie Westhelle (GWSB)

Urgent Wellness: Medical and preventative care clinics managed by community-based workers aiming to reduce costs while improving health for vulnerable populations.

Led by: John Barabino; Luigi Leblanc; Freya Spielberg, an associate professor at the Milken Institute School of Public Health; and Aubrey Villalobos (GW Cancer Center and Milken SPH student)

FROM LEFT Aubrey Villalobos presents alongside the first-place team, Urgent Wellness; Rowland Zhang from drwr; Lynda T. C. Peralta of The Pocket Palette; and Charles Carlson of Clean Condense

\$25,000—the \$10,000 second place prize, \$10,000 for the best undergraduate proposal and \$5,000 for making it to the finals, plus in-kind prizes.

Receiving the awards, Berg says, was a bit surreal.

“As I was rolling these bites in my house, in my apartment this year, I could never have imagined we would have gotten this far so fast,” he said. “I never really could even imagine anything happening like this. I’m very grateful especially to GW for having such an awesome event like this.”

As a health conscious middle schooler, Mr. Berg decided one day his family needed to get rid of all the candy and sweets in their New York home. They came up with energy bites made from oats and coined them Berg Bites.

A project called Agaport came in third, with its plan for the first online platform to locate, compare and book storage in freeports, located within free-trade zones. The team, made up of students Joshua Pulman, Mimi Shojai, and Tatiana Seikaly, was awarded \$22,500 in cash. And The Pocket Palette, a single-serve makeup kit from student Lynda T. C. Peralta, came in fourth place, taking home \$7,500 in cash prizes. GWR

SPACES

A RENOVATION FOR INNOVATION

A new innovation hub is offering students and others on campus a place to kick around business ideas, huddle with mentors, take in speakers and workshops, and maybe even launch their ventures.

“To build an innovative culture, we must have a physical space where like-minded people from across the university can creatively and collaboratively address the same social or commercial issue,” says Annamaria Konya Tannon, the School of Engineering and Applied Science’s chief evangelist of innovation, entrepreneurship and invention.

The Tompkins Hall Innovation Center, a nearly 1,000-square-foot room that once housed a student machine shop, is jointly led by engineering school Dean David Dolling and the Office of Innovation and Entrepreneurship, part of the university’s Office of the Vice President for Research.

Even as the center is under renovation—building out the winning submission from a design competition held among teams from GW’s Corcoran School of the Arts and Design—the Office of Innovation and Entrepreneurship has still continued offering programming, and the space is being used by students, faculty members and mentors-in-residence, who hold daily office hours.

The goal is to “provide a continuum of support with the innovation center, so we can take innovation from ideas to nascent companies,” says Lex McCusker, director of student entrepreneurship programs for the Office of Entrepreneurship and Innovation. “We need this space to be able to do that, and then we can bring

investors in.”

One crucial element of the center is the opportunity for like-minded students to build cross-school collaborations, says Jim Chung, associate vice president for research, innovation and entrepreneurship.

“Because the world is becoming increasingly complex, innovation is coming more and more from the collisions between different disciplines,” he says. “The innovation space provides the intersection for great ideas to form from those collisions.”

This summer the center will offer initiatives to help foster creation of those interdisciplinary ideas, including the new SEAS course, New Venture Creation Using Design Thinking, which will focus on public health issues in D.C. The innovation center also will be hosting 10 female entrepreneurs from North African countries in conjunction with the World Bank’s WeMENA business plan challenge.

“We want to welcome everybody in the GW community, faculty, staff, students, alumni to come down and visit,” McCusker says. “Drop in, have a cup of coffee, sit with students and kick around ideas. Network and meet other people, that’s what this space is for.” GWR

“Because the world is becoming increasingly complex, innovation is coming more and more from the collisions between different disciplines.”

\$3.45M

The five-year funding renewal awarded in the fall by the National Science Foundation to continue the D.C.-area NSF Innovation Corps node. Under the program, GW and partner universities have trained thousands of entrepreneurial student and faculty researchers.

\$500,000

The amount, approximately, awarded to GW by the National Science Foundation over the next five years to create an Innovation Corps site at the university. As opposed to an I-Corps node, which provides education, the GW I-Corps site will award micro-grants to at least 50 teams of entrepreneurs each year to help accelerate their transition to the marketplace.

Associate Vice President for Research, Innovation and Entrepreneurship **Jim Chung** for a second consecutive time was named to *Washingtonian* magazine’s biennial list of D.C.’s “Tech Titans,” who the magazine bills as “the people shaping the future of not just technology but potentially the city itself.”





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