

WINTER 2016

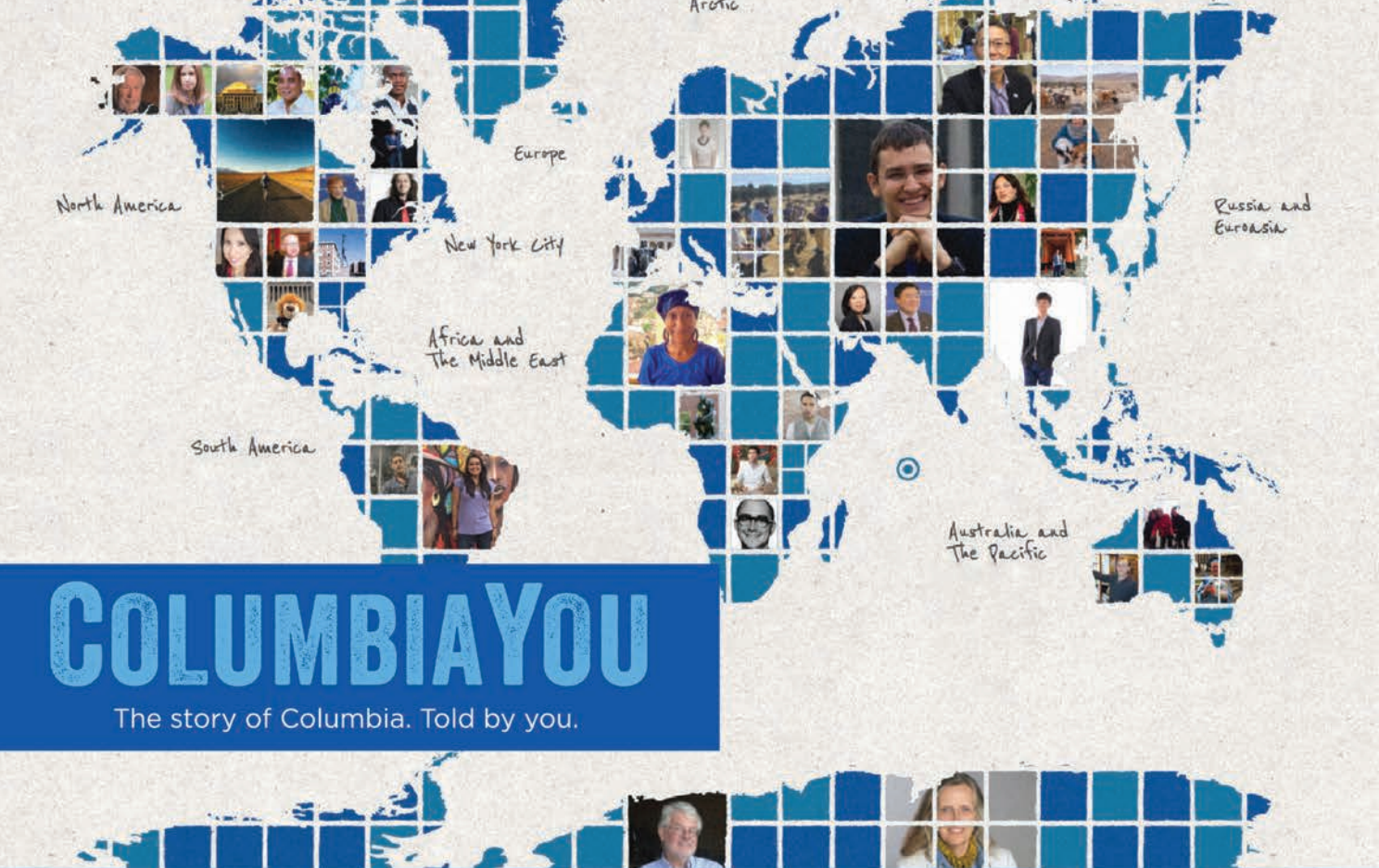
# COLUMBIA

MAGAZINE



## Your Beautiful Brain

DISPATCHES FROM THE FRONTIERS OF NEUROSCIENCE



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Chloe Arnold '02CC (left) and Maud Arnold '08CC

JORG MEYER

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 **COLUMBIA UNIVERSITY**  
IN THE CITY OF NEW YORK



## OPEN CUBA

Excellent article on Cuba in the fall issue (“Bridges to Cuba”). When I was a student at Columbia College in the early 1970s, spending half my food money every week at Laissez Faire Books, near NYU, I shared the comfortable belief that trade and tourism could reform an authoritarian regime. It sounded a lot easier than JFK’s promise that we would “pay any price, bear any burden.”

Unfortunately, the years that followed showed that the easy way didn’t work. South Africa ended apartheid not because we engaged with it, but because we embargoed and ostracized it. The Soviet Union changed because the Reagan administration put pressure on its every weak point simultaneously. In the meantime, engagement with China helped transform an authoritarian regime that was too poor to do much damage in the world into one that now has the wealth to do a great deal of damage.

In much the same way, it’s likely that opening to Cuba

will merely throw a lifeline to the ruling elite. Elites don’t reform because they want to but because they have to; and we’ve told them they don’t have to.

**Taras Wolansky ’74CC**  
Kerhonkson, NY

I was one of the students who listened to Fidel Castro’s speech on College Walk on April 21, 1959. But I was not seduced, since I knew about communism from my parents, who were refugees from the Soviet Union. Your article quotes President Obama as saying, in Havana, “I have come here to bury the last remnant of the Cold War in the Americas.” This is a naive statement. Cuba has a dictatorial communist regime, and so as long as there is no democracy in Cuba, there will be a remnant of the Cold War.

There is also no point in people-to-people engagement if the Cuban people have absolutely no power to change the government. SIPA professor Christopher Sabatini is quoted as saying, “There’s never been a democratic tran-

sition in a country under an embargo as tight as the one we have on Cuba.” But Cuba has been trading and has had full relations with Canada and Europe for decades, yet the Cuban communist government is as repressive and dictatorial as ever.

The writer of the article states that “the values that most Cubans want to preserve” are “universal health care, universal education, egalitarianism, anti-imperialism.” How does he know this? There is no democracy in Cuba, so there has never been an election to test what Cubans value the most. Even if you polled Cubans, people would not tell you their true feelings, since they are afraid of being arrested. How naive can you get?

**Roman George Kernitsky**  
’62CC  
Colts Neck, NJ

## ALWAYS FAITHFUL

I enjoyed your article “Leave Them Laughing,” about comedian Negin Farsad (Network, Fall 2016), but I noticed an incorrect term

# LETTERS

## LIT PARADE

Every issue of the outstanding *Columbia Magazine* seems better than the one before! I frequently feel nostalgic about, and am always grateful for, the classes taught by Mark Van Doren, Eric Bentley, and especially William York Tindall.

**Ellie F. Schmidt**  
’63GSAS  
Santa Rosa, CA

## Questions? Comments?

WE WELCOME THEM ALL!

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OR WRITE TO US:  
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Letters may be edited for brevity or clarity.

# Calling All Readers

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- Keeping up with Columbia and your alumni community?

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# LETTERS

being used. You quote Farsad as saying, “I always think about the ex-Marine who had been stationed in Afghanistan. He came in angry and left laughing.” As the daughter of a Marine who is a combat veteran of Vietnam, and as a cousin or friend to many Marines who served in Afghanistan and Iraq, I wanted to clarify that for Marines — as my dad always says — “once a Marine, always a Marine.” There are no “ex-” Marines — except, perhaps, in the case of a dishonorable discharge.

**Jillian Kelly '10SW**  
Brooklyn, NY

## REDESIGN REACTIONS

What happened to *Columbia Magazine*? Did some marketing guru tell you that you are not up-to-date, that we have short attention spans and have become a foodie nation? I used to read long, thoughtful, well-written articles. Now pictures have replaced text, and short, breezy, uninteresting articles dominate. The new look: glitz without substance.

**Peter Gibbon '80TC**  
Duxbury, MA

Good idea to have the caption contest, and nice changes to the magazine.

**Al McGovern '78SEAS**  
Naperville, IL

## 3 More Alumni TED Talks You Might Have Missed

Readers who enjoyed the fall issue's Network feature on alumni TED Talks sent in a few more suggestions for your viewing pleasure.

**Pamela Payne Foster '93PH**  
“Bridging civil rights and health care,”  
April 2015, TEDx

According to a study in the *American Journal of Public Health*, the number-one cause of death in the US isn't disease; it's poor education. To change this, physician and advocate Pamela Payne Foster seeks to build a “bridge” between social equality and health care.

**Mike F. Coffin '85GSAS**  
“Mass extinction,” January 2014, TEDx

Mike F. Coffin, a marine geoscientist, says that humans are dramatically accelerating the arrival of the planet's sixth “mass extinction” through climate change.

**Sczerina Perot '90CC**  
“Housing is a human right,” October 2013, TEDx

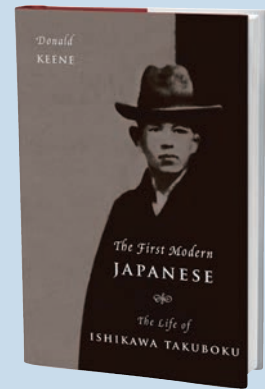
A civil-rights lawyer who fights for the universal right to “adequate” housing, Sczerina Perot calls for increased social awareness of the circumstances that can force people onto the streets, and calls homelessness a “moral outrage.”

*For those who wrote to express disappointment that your school was not listed in our fall issue's abbreviation key, we hear you loud and clear! We were experimenting with listing only the abbreviations of schools that appeared in a given edition, in an effort to save space. We're now reevaluating, and we appreciate your sharing your views. — Ed.*

### KEY TO ABBREVIATIONS

CODE	SCHOOL	CODE	SCHOOL
BC	Barnard College	NRS	School of Nursing
BUS	Graduate School of Business	OPT	School of Optometry
CC	Columbia College	PH	Mailman School of Public Health
DM	College of Dental Medicine	PHRM	School of Pharmaceutical Sciences
GS	School of General Studies	PS	College of Physicians and Surgeons
GSAPP	Graduate School of Architecture, Planning, and Preservation	SEAS	Fu Foundation School of Engineering and Applied Science
GSAS	Graduate School of Arts and Sciences	SIPA	School of International and Public Affairs
HON	(Honorary degree)	SOA	School of the Arts
JRN	Graduate School of Journalism	SPS	School of Professional Studies
JTS	Jewish Theological Seminary	SW	School of Social Work
KC	King's College	TC	Teachers College
LAW	School of Law	UTS	Union Theological Seminary
LS	School of Library Service		

New from  
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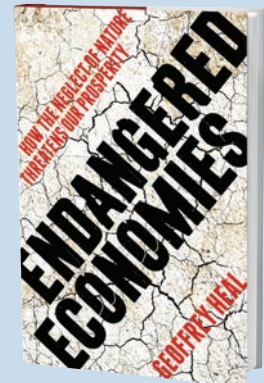
## The First Modern Japanese

*The Life of Ishikawa Takuboku*

**DONALD KEENE**

“Keene's finely wrought translations of Ishikawa's poems glimmer ever more brightly, sandwiched between the dark episodes of the young poet's short life.”

—*Japan Times*



## Endangered Economies

*How the Neglect of Nature Threatens Our Prosperity*

**GEOFFREY HEAL**

“In this passionate and readable book, Heal sets out the measures needed to reconcile economic progress with preservation of the planet. They are surprisingly simple and attainable. Heal demonstrates that . . . growth is not attainable over the long run without protecting the environment.”

—Joseph E. Stiglitz,  
Nobel Laureate in Economics

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# COLLEGE WALK

NOTES  
FROM 116TH  
STREET AND  
BEYOND



## Chord Curriculum

A musician-writer makes music to think by

It was the spring of 2015 and P. J. Sauerteig '15CC was searching for a voice. One day, while he was sitting in Columbia philosophy professor Philip Kitcher's class, Sauerteig's ears perked up: Kitcher was reading aloud from *Ulysses*, his voice gliding through the labyrinth of James Joyce's prose with mesmerizing clarity and direction.

Kitcher didn't know it at the time, but he was auditioning for a speaking role on Sauerteig's next indie album. The College senior had already put out three records under the name Slow Dakota, and now he was looking for someone to perform the spoken-word compositions on his fourth album. The professor's voice left him spellbound.

"Hearing that man read *Ulysses* could wake the dead," Sauerteig says.

Less than a year later, Sauerteig, now an alumnus, returned to campus, to the basement of Hamilton Hall, where he recorded Kitcher for *The Ascension of Slow Dakota*.

On the album's opening track, Kitcher recites an



allegory about a contest in which God judges original songs composed by angels. The narrator's song does not win the contest, but he's not disappointed, for he "received the greatest gift of all — a thoughtful listener." The message is an appeal, and perhaps even a subtle heads-up: *The Ascension of Slow Dakota* is rigorous and requires your full attention. Sauerteig, who wrote that allegory and also contributes piano, ukulele, mandolin, and percussion to the baroque-pop mix, leads you on a melodic, sometimes hypnotic expedition through ballads, hymns, poems, and requiems filled with literary allusions, with nods to Joyce, Walt Whitman, Virginia Woolf, and William Blake.

Sauerteig understands that his project makes demands on an audience. "I realize that at times the album is impenetrable and full of arcane references," he says. "I've often asked myself, 'Why on earth would anyone in this day and age put out this kind of music?'"

To arrive at something of an answer, one must look at the portrait of the artist as a young student. Sauerteig became steeped in the Columbia music scene as a freshman, playing piano at Orientation and starting an experimental-folk band with four classmates. He says he was "amazed — even embarrassed" by the wealth of musical talent surrounding him, and resolved to collaborate with his classmates as much as possible. Indeed, when looking for a producer for *The Ascension of Slow*

*Dakota*, Sauerteig called on classmate Sahil Ansari '15SEAS, who had played in a "confessional avant-folk" band at Columbia called Tox and Guest.

Sauerteig's lyrics are a direct reflection of his course of study at Columbia. He majored in creative writing with the explicit purpose of sharpening his Slow Dakota compositions. His studies with poet Joseph Fasano '08SOA, who teaches graduate and undergraduate writing, made such an impression that Sauerteig asked Fasano to read the album's closing poem. And Barnard English professor Margaret Vandenburg '96GSAS, whose course on postmodern literature inspired many of the underlying themes of the album, reads a short allegory.

In contrast to the pristinely polished recordings of the album's musical tracks, each faculty performance was recorded on an iPhone, an intentional decision by Sauerteig to imbue these quiet moments of reflection with a raw timelessness. Turn the volume up and you can hear echoes from the Columbia halls and the muffled murmurs of students passing by. These can only be detected if you listen carefully, of course. Fortunately, *The Ascension of Slow Dakota* is so musically and lyrically layered that one has no choice but to put all else aside and commit, for sixty-one minutes, to being a thoughtful listener, which may, in the end, be Sauerteig's greatest gift of all.

— Eric Kester '15SOA



## THE SHORT LIST

**SEE** The Wallach Gallery presents *Finesse*, an exhibition that explores how younger artists negotiate the relationship between their work and the institution in which it is created. Curated by Columbia art-history PhD candidate Leah Pires. From January 19 to March 11. [columbia.edu/cu/wallach](http://columbia.edu/cu/wallach)

**SHARE** Did you know that Columbia now has its own set of emoji and GIFs? Download the free **C-moji** app on your smartphone to send lions, landmarks, or even a slice of oversized pizza. Available in the iOS and Android app stores.

## EXPERIENCE

Richard Price '76SOA, author of the novels *Clockers* and *Lush Life*, and screenwriter for HBO's *The Wire*, is known for his gritty tales of city living. On January 25 he will host **Selected Shorts**, public radio's long-running program of theatrical storytelling, recorded live at **Symphony Space**, on the Upper West Side. [symphonyspace.org](http://symphonyspace.org)

**LISTEN** The **Marcus Roberts Trio** takes the stage on February 4 as part of Miller Theatre's annual jazz series. Roberts, who lost his sight at age five, began touring with trumpeter Wynton Marsalis '96HON at twenty-one. Now fifty-three, Roberts runs a uniquely democratic trio: each player gets equal time to lead. [millertheatre.com](http://millertheatre.com)



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A depiction of the purchase of Manhattan in 1624, artist unknown.

## THE MANAHATA PROJECT

Honoring the island's first inhabitants

**W**hen Julian Brave NoiseCat '15CC arrived at Columbia in 2011, he saw the pride with which the great institution marked its history — a plaque commemorating the Battle of Harlem Heights, a statue of Alexander Hamilton, a bust of John Jay. But as he walked the quads and corridors, he felt that part of the story was missing.

NoiseCat, who belongs to the Secwepemc and St'at'imc Nations in British Columbia, felt there should be, on campus, a monument to the Lenape people, who were living on Manahata (“island of hills” in their Algonquian language) at the time a Dutch ship disgorged the first European settlers, in 1624.

In his sophomore year, NoiseCat brought his idea to the Native American Council (NAC), an undergraduate group of some fifteen students (there are now about thirty). NAC was all for it. NoiseCat then posted a petition on Change.org calling on Columbia to recognize the

Lenape people, who were “the victims of disease, warfare, dishonest agreements, and destructive policies.” The petition got a thousand signatures. The website *Indian Country Today* picked up the story, as did the *Spectator*.

In 2013 NoiseCat, a history major, wrote an op-ed in the *Spectator* advocating for a plaque. That caught the attention of the Student Council, which held a hearing on NoiseCat's proposal and unanimously endorsed it. Over the next year, the process of talking to the Trustees, hammering out the language, and getting funding was slowed by administrative turnover and the painstaking business of getting the wording just right. Then, in 2015, law professor Suzanne Goldberg, the newly appointed head of the Office of University Life, got behind the campaign and became a crucial ally.

“There was a big pull and push between the administration and students on particular parts of the language so that the plaque would have exactly the appropriate message,” NoiseCat says. “Professor Goldberg helped us navigate

that, and after I graduated, the current students really brought the effort to completion.”

And so, on the second Monday of October in 2016, a day celebrated throughout North America as Indigenous Peoples' Day (the same day as Columbus Day), Julian Brave NoiseCat, coming straight from his job downtown with the city housing department, returned to campus for the plaque's unveiling.

Under a blue late-afternoon sky, in golden light, NoiseCat walked to the shaded green quad in front of John Jay Hall, where 150 students, alumni, faculty, and administrators, including Goldberg and President Lee C. Bollinger, had gathered. The ceremony began with a thanksgiving by the SilverCloud Singers, an intertribal singing group from New York. They pounded a drum and chanted, the spiritual sounds evoking landscapes that predated the nearby neoclassical buildings, tinging them with a fleeting incongruity.

When the prayer ended, the co-presidents of NAC — Michelle Crowfeather, of the Standing Rock Sioux and Chippewa Cree Nations, and Breanna Leslie-Skye, of the Cayuga Nation — stepped to a lectern on the walkway. Beside them, on the ground, amid the flowers at the path's edge, rested a plaque that read:

IN HONOR OF THE LENAPE PEOPLE

The Lenape lived here before and during colonization of the Americas. This plaque recognizes these indigenous people of Manhattan, their displacement, dispossession, and continued presence. It stands as a reminder to reflect on our past as we contemplate our way forward.

The plaque, said Crowfeather, represents Columbia's “willingness to recognize and validate the way traditional homelands and community are thought about by indigenous peoples.” She called on Columbia to recruit more Native American students, especially from rural communities and reservations, and

appealed for the campus community to respect the plaque's message. "Continue to recognize the Lenape as you walk these grounds," she said. "They were here, they are here, and we will continue to honor them."

NoiseCat spoke next. He greeted the audience in the Secwepemc language, which has fewer than two hundred remaining fluent speakers. He offered his gratitude to students and faculty, and to Bollinger, Goldberg, and Melinda Aquino '12SPS, associate dean of multicultural affairs. Calling the plaque "an amazing victory," he focused attention on the extreme poverty and miserable social conditions of indigenous people, "the most easily forgotten people in the nation."

Afterward, at a reception in John Jay Hall, attendees heard from NAC political

co-chairs Tristan Stidham, of the Big Pine Paiute Tribe, and Noah Ramage, of the Cherokee Nation; Barnard history professor Andrew Lipman, whose research informed the plaque's language; and Columbia history professor Karl Jacoby, who described a "powerful inversion" enacted by the European settlers. "The newcomers reimagine themselves as the new natives of the given territory, while the preexisting indigenous people are recast as an alien and foreign presence," Jacoby said. "This certainly was the experience of the Lenape, whom settlers came to term the Delaware." Today, said Jacoby, most of the Delaware Nation is scattered in Canada and Oklahoma, a testament to "the vast geographic scope of the displacement that dominated US Indian policy."

NoiseCat mingled with old friends and teachers. He, too, wanted Columbia to compete more aggressively with peer institutions for the small number of Ivy-eligible indigenous high-school students. "Obviously, Indian country needs more young, educated intellectual leaders," he said.

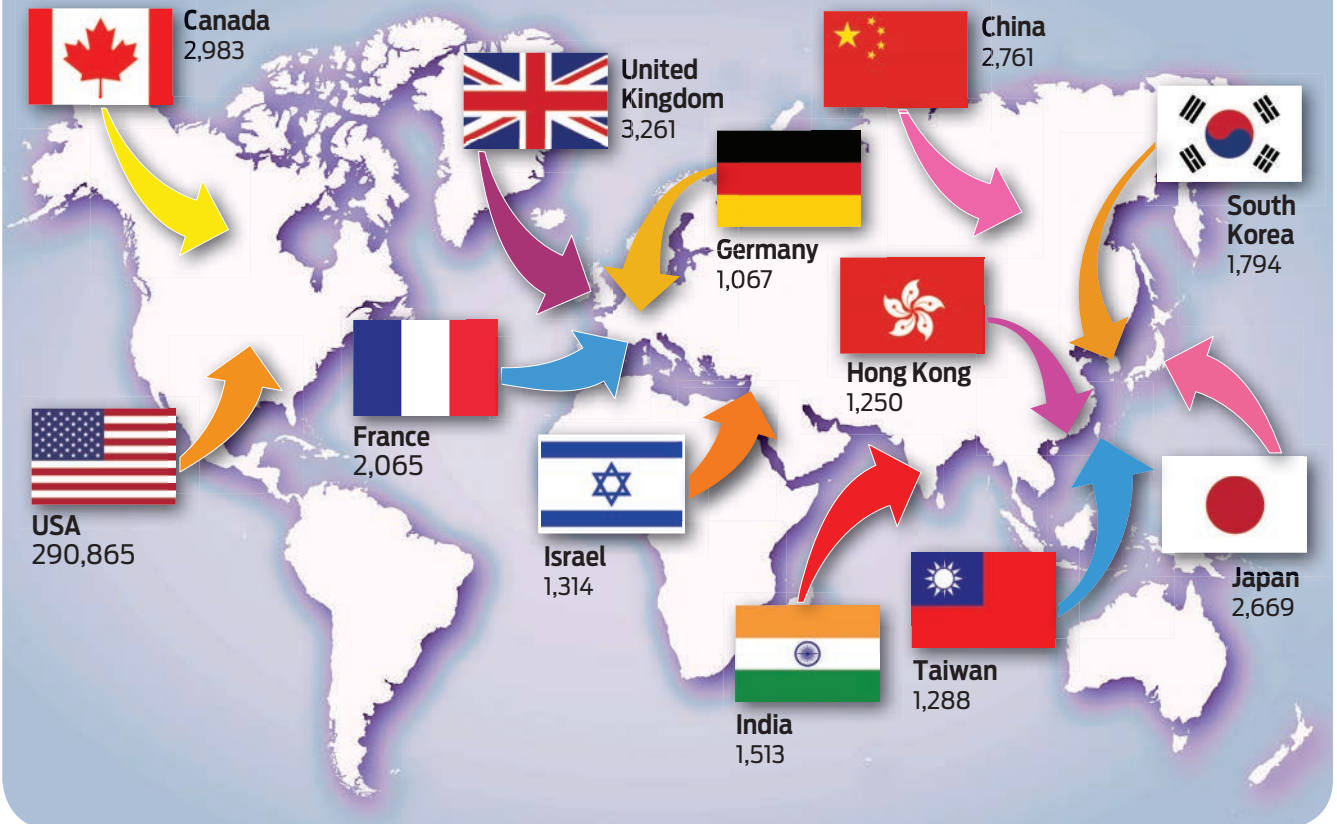
He hoped the plaque would help draw those minds to Columbia, and build a place where more indigenous people would be seen at every level of University life.

"Maybe someday," he said, "I'll take my kids up to Alma Mater and show them all the usual stuff, then show them the Lenape plaque and tell them that I was a part of the student community that made it happen. That would be super cool."

— Paul Hond

## WE ARE THE WORLD

Columbia's 329,505 alumni live in 189 countries and territories. Here are the top twelve.



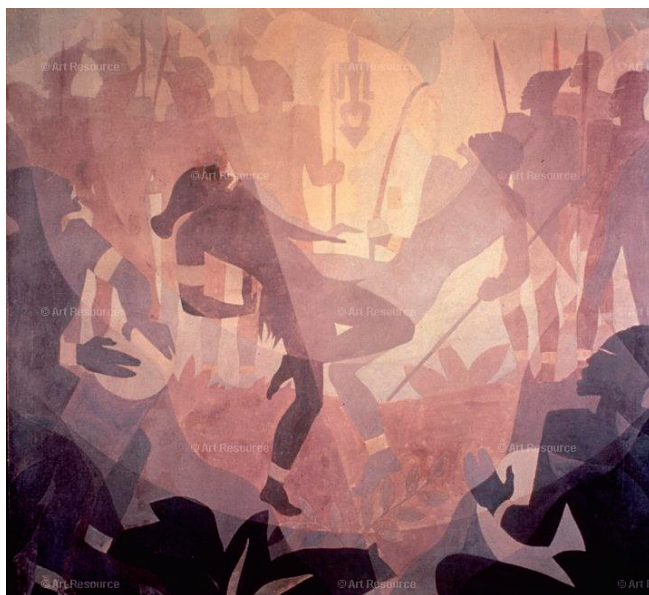
## BITTERSWEET

Two scholars of Harlem take in the view from Sugar Hill

If the story of Manhattan is a story of real estate, it was fitting that a recent forum about Sugar Hill, the middle-class Harlem enclave that from the 1930s to the 1950s was home to cultural heavyweights like Duke Ellington '73HON, Paul Robeson '23LAW, and Zora Neale Hurston '28BC, should honor the legacy of two apartment buildings: 409 and 555 Edgecombe Avenue.

These World War I-era towers stand six blocks apart, at West 154th Street and West 160th Street, on a bluff overlooking the Harlem River and the South Bronx. In 409 lived painter Aaron Douglas '44TC, NAACP leader Walter White, and polymath scholar W. E. B. Du Bois. And 555 was the address of Robeson, Count Basie, and the boxer Joe Louis.

Less than three miles south of these citadels, two historians — author David Levering Lewis '59GSAS, '15HON, and Mark Naison '66CC, '76GSAS, a professor of African-American studies and history at Fordham — discussed the activism that sprang from the two buildings. The talk was part of “When Sugar Hill Was Sweet,” a day of panels and performances held this fall in Barnard Hall, sponsored by Barnard’s Department of Africana Studies, Columbia’s Heyman Center for the Humanities, and the Institute for Research on Women, Gender, and Sexuality.



“The people living at 409 and 555 had the option of insulating themselves from the daily struggles of the poorest Harlemites or addressing them from the distant perch of noblesse oblige,” said Naison, who grew up in Crown Heights, Brooklyn. “Some chose that path. But others chose to merge their fate with the Black working class and poor, and the working class of all nationalities, in ways that still challenge us today.”

Levering Lewis, whose two-volume biography of W. E. B. Du Bois won two Pulitzers and a Bancroft Prize, focused on number 409’s loftiest figure. He recalled the day in 1948 in Wilberforce, Ohio, that Du Bois, then eighty years old, spoke to the annual meeting of the Boulé, an exclusive society of African-American professional men that Du Bois felt had grown snobbish. There, Du Bois retracted his

construct of the “Talented Tenth” — an idea he had laid out in 1903, calling for the most intellectually gifted Black men (one in ten) to receive a classical education and form a leadership vanguard.

“Du Bois said that the idea had been that ‘to those of us to whom much is given, much is rightly expected’; and that this leadership concept was not elitist, but simply a demand that people with education, resources, and awareness would take a leadership role that would result in time in the uplift of the race,” said Levering Lewis, who attended the ‘48 speech (he was twelve; his father was dean of the Wilberforce University divinity school). On that day, Levering Lewis said, Du Bois, whose thinking was ever more influenced by Karl Marx, proposed, in lieu of the Talented Tenth, a “Guiding Hundredth”: an appeal to

grow the Boulé membership from 440 families to thirty thousand, representing a hundredth of the Black population, across class lines. “The new generation,” Du Bois said, “must learn that the object of the world is not profit but service and happiness.”

That same year, Du Bois was pushed out of the NAACP, which he had helped found in 1909. He wasn’t the only Edgecombe Avenue habitué to pay a price for reproaching capitalism during the Cold War. Naison named three other residents who tied

Aaron Douglas, *Aspects of Negro Life: The Negro in an African Setting*, 1934.

racism to economic exploitation and took bold stands against both: activist Louise Thompson

(later Patterson), journalist Marvel Cooke, and Robeson, the singer-actor-activist who moved to 555 Edgecombe in 1939 with his wife, the anthropologist Eslanda Goode Robeson '20TC. Not coincidentally, all three were associated with, or members of, the American Communist Party (Du Bois would join in 1961).

“The CPUSA carved out a powerful niche in the Black intelligentsia in the early Depression years by making the battle against white supremacy a central component of the struggle for economic justice,” Naison said. Though Robeson was not a card carrier, he had strong affinities and would be blacklisted during the McCarthy era. “Before he was silenced and demonized during the Cold War, Robeson was among the highest paid entertainers in the world,” said Naison. “Yet he devoted half his schedule to free public

appearances for labor unions, civil-rights organizations, and striking workers. He spoke and sang for miners, textile workers, and sugar-cane cutters in places as far apart as Hawaii, Wales, and North Carolina, sometimes at great risk to his health and safety.

“Is there anyone like him today? People at the pinnacle of their artistic careers willing to donate their time, much less risk their lives, to help the most embattled and marginalized people, here and around the world?”

The question hung in the air, adding to the melancholic sense of times past. Finally, it all came back to real estate. Naison had already portrayed the history of Harlem as being “threatened by gentrification and unchecked development,” and now Levering Lewis recalled an interview he’d done on French radio, in which he said that when former president Bill Clinton moved his office to West 125th Street in 2001, it “betokened the inevitable transformation of Harlem.” The historian had predicted that Black Harlem in a few years would be all but vanished, with a plaque on every street memorializing society’s regret over the loss.

“Rents are rising; historic buildings are coming down,” wrote Michael Henry Adams in a 2016 *New York Times* op-ed titled “The End of Black Harlem.” But 555 Edgecombe will survive. Registered as a New York City Landmark in 1993, it is officially called the Paul Robeson Residence, and word is that you can find a one-bedroom there for \$1,800 a month.

— Paul Hond

# LET’S GO CLUBBING

Activity-minded students indulge their special interests

**S**wathed in streaming plumage and wearing papier-mâché masks as if fresh from a Chinatown street festival, a couple of members of Columbia University Lion Dance bobbed and weaved to an insistent drum on College Walk. On South Lawn, a young woman from Whitewater Kayaking perched precariously atop a table, scrunched in her craft, paddle at the ready.

Over at the Art Collective, the display swarmed with multicolored Post-its on which passing students had doodled. Nearby, two sparkly stalwarts of CU Bellydance — one dressed in red, one in green — went through their jingly gyrations.

“There’s a *neuroscience* society?” said a nearby student, as he admired a model of a human brain.

On a sunny day at the start of the school year, the activities fair was going strong. At this annual recruiting drive, many of the University’s five-hundred-plus undergraduate extracurricular clubs do their best to attract new blood, mainly that of eager first-years.

A generation or so ago, all the commotion could be crowded into a couple of wings of the now-vanished Ferris Booth Hall. But the burgeoning diversity, as well as the sheer size, of the student body has made the activities fair into something considerably more colorful and sprawling. This year, more than three hundred clubs participated. Such time-honored outlets as the

Varsity Show, WKCR, and the CU Marching Band were joined by newer entries like the Columbia Vegan Society and Camp Kesem, for children of parents who have cancer.

By way of inducement, many tables came laden with Tootsie Pops, doughnuts, candy bars, and chocolate-chip cookies. There were

handouts galore: flyers, cards, papers, and pamphlets. Literature from the Residence Hall Leadership Organization pledged to offer “the unique opportunity to lead where you live — polish your leadership skills, advocate for fellow residents, and plan impactful programs to build a stronger community.” The Atheist and Agnostic Students Society declared, “We were bummed that there was no group representing nonreligious students. With forty religious groups dominating discussions of faith on campus, we truly felt rear-ended.”

The day was also a time to fine-tune principles and build on lessons learned. The *Jester* crew stressed that their august humor magazine would be less smutty and more like the *New Yorker*. AllSex, a sexuality discussion group formerly known as FemSex, explained its name change as an effort to signal more inclusiveness. And the Black Students’ Organization was hoping to capitalize on the national mood around racial injustice. “Black Lives Matter has galvanized and mainstreamed the movement,” said president Damon Hart.

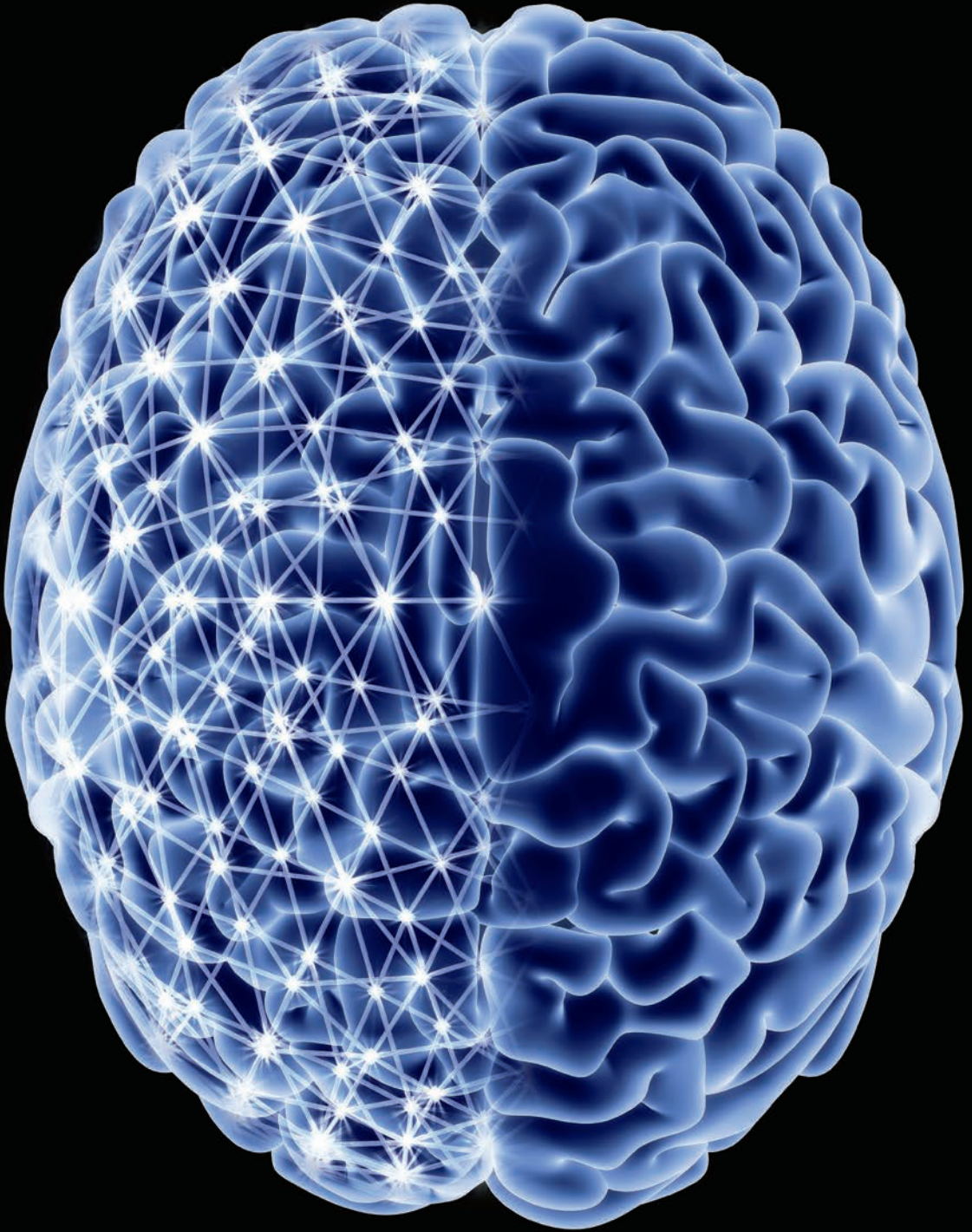
Meanwhile, the Columbia University College Republicans — who distributed Frisbees along with copies of the US Constitution — were declining to endorse a presidential candidate in the coming election. “I’m a little nervous,” said club president Annie Ninivaggi, “but I think it will be an exciting year to grow the club.” An hour and a half into the festivities, about thirty potential initiates had signed up.

Long before the four-hour event had wound down, engineering student Yifan Zhao was clutching a fistful of flyers from Women in Computer Science, Columbia University Bhangra (Punjabi dance), the *Columbian* yearbook, and Let’s Get Ready, which recruits students to help low-income kids with test prep. “I heard there was a coding club,” Zhao said. “I’m trying to find it.” Almost immediately, she turned around to see two students wearing blue T-shirts adorned with strange white symbols and a third hoisting a sign asking, WANT TO LEARN HOW TO CODE?

“Oh!” she said. “It’s this one!”

— Thomas Vinciguerra '85CC, '86JRN, '90GSAS





**YOUR  
BEAUTIFUL  
BRAIN**

DISPATCHES  
FROM THE  
FRONTIERS OF  
NEUROSCIENCE

**BY BILL RETHERFORD**

**P**eer into the human skull, probe the brain's tofu-like texture, and there, in that microscopic terrain, the neurons exist, nearly infinitesimal. Fifty of them would fit on the period at the end of this sentence. Most form before birth and stay with us until death, although some, due to disease or disuse, eventually shrink, slow down, or succumb. The brains of frogs hold sixteen million neuronal cells; fox terriers, one hundred sixty million. Yet the human brain, with its eighty-six billion neurons, still doesn't house the most. The African elephant has three times as many, and blue whales likely have billions more, though no one is certain.

Individual neurons are not self-aware. They do not know what they are, where they are, or who you are. They do not think. Rather, they permit us to think. Like the frenzy within a pinball machine,

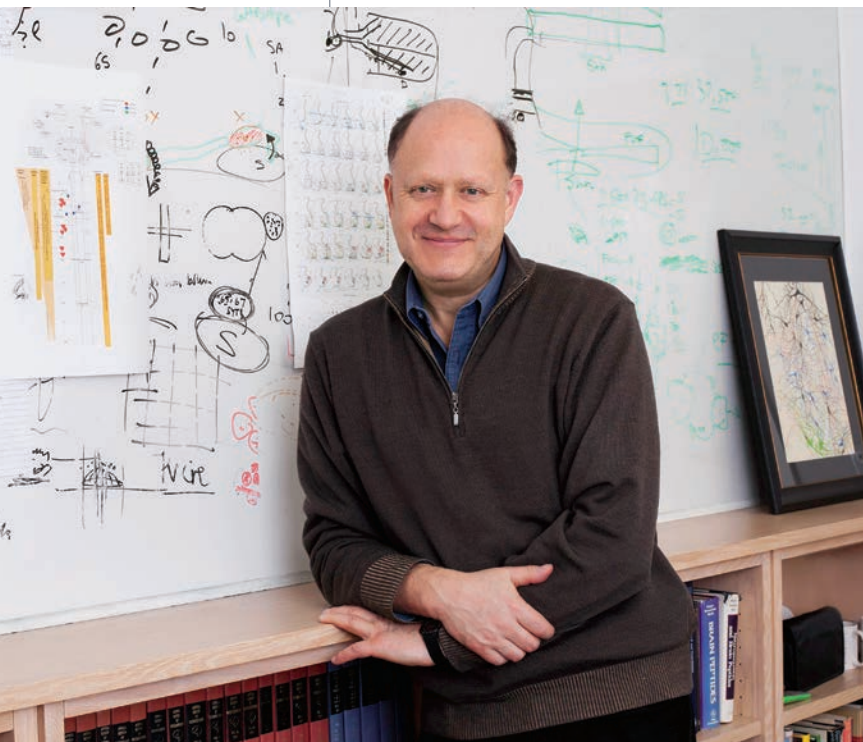
Each neuron typically links to thousands more, perhaps up to fifteen thousand more, drawing on the measliest of electrical currents (0.07 volts — an AA battery carries twenty times as much). Those currents, moving neuron to neuron, sprint through a phalanx of connectors, called synapses, at speeds up to almost three hundred miles per hour. Signals from the brain's motor cortex, for example, rush through the central nervous system to the neuronal networks in the legs. Those electrical pokes regulate balance, direction, stride, and speed, along with dozens of other things; such is the abridged neurological backstory to taking a single step. By the end of adolescence, the neurons will have engineered five hundred trillion connections. Take those connections — from just one brain, mind you — string them along Interstate 95 somehow, and they would stretch from Columbia University to Columbia, South Carolina.

Neurons are colloquially called the brain's "basic building blocks." And we do know the basics about how individual neurons work. But fathoming how trillions of them talk across seventy-eight compartments of brain topography is a conundrum. And repairing flawed networks to conclusively cure brain disorders, like autism or Alzheimer's, remains an enigma — looming, daunting, slow to undrape itself. "I don't want to make it sound like we know nothing," says Michael Shadlen, a professor of neuroscience at the Columbia University Herbert and Florence Irving Medical Center (CUMC). "But there are basic, basic phenomena that we know nothing about. Everything we discover provokes deeper questions."

Wrapping one's head around the human mind is very hard. Figuring yourself out always is. "The greatest scientific challenge we are now facing," says Charles Zuker, professor of biochemistry, molecular biophysics, and neuroscience at CUMC, "is to understand the workings of the brain."

**The glass building awaits in West Harlem**, at the intersection of Broadway and 129th Street, thirteen blocks north of the Morningside Heights campus gates. Overshadowing a space previously occupied by long-abandoned warehouses, it was the first structure erected on the school's new seventeen-acre Manhattanville campus. A \$250 million gift helped make it happen — from the Renzo Piano '14HON design to the construction of the building's more than fifty laboratories.

Dawn M. Greene '08HON, the philanthropist, bestowed the gift in 2006. Her husband of nineteen years, Jerome L. Greene '26CC,



Thomas M. Jessell likes to call the Jerome L. Greene Science Center a place for "the collision of ideas."

the neurons fling directives back and forth, ceaselessly communicating and connecting with other nerve cells. These neuronal networks control every thought, feeling, sensation, and movement. They are the conduits that lead to consciousness; they make sense of our senses. Only because of them do our brains and bodies work. Minus the networks, our minds would be slush, gibberish. Phantasms would replace perceptions.



'28LAW, '83HON, was an attorney, real-estate developer, and billionaire; he graduated from Columbia Law School just before the Great Depression began. Over the next seventy-one years, he would give hundreds of millions of dollars to charitable causes. He died in 1999, age ninety-three, one of New York City's most powerful figures. Even after death he endures: the name on the building is the Jerome L. Greene Science Center.

The building's approximately eight hundred tenants will include scientists, principal investigators, lab managers, postdocs, graduate students, and staff from Columbia's Mortimer B. Zuckerman Mind Brain Behavior Institute, itself relatively new. The institute was established in December 2012 with a \$200 million gift from Zuckerman '14HON, owner of the New York *Daily News* and chairman of *U.S. News & World Report*. Says Thomas M. Jessell, one of the Zuckerman Institute's three codirectors and a Columbia professor of biochemistry, molecular biophysics, and neuroscience: "Our simple task now is to create the best institute for neural science in the US, and, arguably, in the world."

The move into the Greene Science Center kickstarts that assignment. "Really great science is going to come from it," says Shadlen, a Zuckerman Institute principal investigator. A place for "the collision of ideas," as Jessell likes to say. Right now, the institute's scientists are largely disconnected, geographically speaking; they're spread across six buildings throughout the Morningside Heights and medical center campuses. "We've really been constrained, hindered, slowed down by all these labs that have similar interests, scattered all over," says Randy Bruno, another Zuckerman Institute investigator.

Just as neurons need to commingle, apparently so do scientists. The stereotype of a lone researcher experiencing a eureka moment in a secluded little lab survives only as a science-fiction trope. In real life, discovery hardly ever happens that way. "These are complex problems, and we have not broken them," says Richard Axel '67CC, a Zuckerman Institute codirector and Columbia professor of biochemistry, molecular biophysics, pathology, and neuroscience. "The ability to understand will require looking at a problem through a multiplicity of eyes." The relocation to the Greene Science Center collects researchers from more than twenty disciplines throughout Columbia: neuroscientists, data scientists, molecular biologists, stem-cell biologists, electrical

engineers, biomedical engineers, psychologists, mathematicians, physicists, theorists, and model builders. "If you only talk to people who work on the exact same thing you work on, you probably don't generate as many new ideas as you could," says Bruno. "Getting together

## The stereotype of a lone researcher experiencing a eureka moment in a secluded little lab survives only as a science-fiction trope.

people with different expertise, very different research programs, but a common purpose of understanding the mind — yeah, that's fabulous."

Scientists don't necessarily put a premium on luck, but they do subscribe to serendipity — of which proximity is a catalyst. "Science is a completely social interaction," says Eric Kandel, the third Zuckerman Institute codirector, and a professor of neuroscience, psychiatry, biochemistry, and biophysics at CUMC. "I met Richard Axel in the late seventies. He became interested in the brain and nervous system. I wanted to learn molecular biology. Axel knew nothing about the brain. I knew nothing about molecular biology. And so we started to collaborate. He moved full-time into the brain, and I became comfortable with molecular biology." Since that collaboration began, both men have become Nobel laureates.

At the Greene Science Center, a neuroscientist could, and almost certainly will, run into an electrical engineer or stem-cell biologist in a hallway, engage in conversation, and — eureka, ideas collide — that brief exchange may kindle new research, which may lead to collaboration, and after years or decades, maybe a cure. Like neural connections, discovery happens for one reason. Someone gets excited.

**Kandel, eighty-seven, has been at Columbia forty-three years.** On his office desk sits *Principles of Neural Science*, a textbook he coauthored in 1981, and now in its fifth edition. This particular copy, hardly conspicuous, lays beneath his computer monitor and serves as a screen booster.

"Look, I've been in the field for sixty years," says Kandel. "We've made a lot of progress. But we're at the beginning."

Back in 1952, when Kandel was an NYU medical student, science really, *really* didn't know much about the brain: "We didn't know how smell worked. How taste worked. We knew nothing about learning and memory and emotion." During the fifties, says Kandel, the only major brain lab in New York City was Columbia's. Even the word "neuroscience" wasn't coined until 1962. He recalls the first annual meeting of the Society

**"There are so many psychiatric and neurological diseases that we just don't understand and don't treat successfully."**

for Neuroscience in 1971; 1,400 scientists showed up. Today, more than thirty thousand from eighty countries attend. "And now you can't walk down Broadway without running into a half dozen brain researchers," Kandel says, half joking. He joined Columbia in 1973, but even then: "So little was known. Almost everything you learned was something new."

That is still true today. "There are so many psychiatric and neurological diseases that we just don't understand and don't treat successfully," says Kandel. "This is a phenomenal problem facing humanity." Among the more common brain disorders: Parkinson's, Huntington's, Tourette's, epilepsy, narcolepsy, depression, panic attacks, anxiety, ADHD, OCD, and PTSD (there are hundreds more). "You have to be an optimist in this field," says Jessell. "It's big and it's complicated. It'll take time to achieve satisfying answers to some of the bigger questions."

But an imposing technological apparatus, which may help fast-track potential treatments, is arriving.

One example: in the basement of the Greene Science Center will be an array of eighteen two-photon microscopes. With them, scientists will see neuronal communities talk to each other in real time; researchers will record those glinting images and replay them endlessly for study. Five years ago, none of this was possible. The amount of data generated by the two-photon is immense,

even when the experiment is a simple one. Put a lab mouse on a treadmill, scan the neurons twinkling in its hippocampus for a half-hour — and a terabyte of information emerges, enough to keep Zuckerman Institute mathematicians and statisticians decoding for weeks.

Two-photon microscopy is state-of-the-art, but perhaps only for the moment. Fortified with a \$1.8 million grant from the National Institutes of Health, Zuckerman Institute principal investigator and biomedical engineer Elizabeth Hillman is developing SCAPE, a microscope that widens the view from small neuronal groups to whole brains. "With SCAPE, we can see the entire brain of an adult fruit fly in real time as it walks, crawls, even as it makes decisions," says Hillman; SCAPE's three-dimensional images generate ten to one hundred times faster than the two-photon. "This advance," says Jessell, could "unlock the secrets of brain activity in ways barely imaginable a few years ago."

And it could lead to cures. Already, researchers routinely manipulate individual neurons with electronic nudges, and can even turn off the genes inside a fruit fly's motor neurons (a nifty trick, given that a fruit fly's entire brain is barely bigger than the tip of a toothpick). Now, after shutting off the relevant genes, scientists may use SCAPE to look for the fly's motor impairments, identify its faltering genes — then (one day) map the results onto the counterpart human genes. Somewhere therein could be clues to curing ALS, a grim and currently irreversible motor-neuron disease. "Science goes schlepping along," says Zuker. "Then breakthroughs come that let you jump the steps. You go *boom*, you jump — *boom*, you jump — and a mega-barrier is lifted. How soon can discoveries be brought to patients? I cannot tell you. But we are far closer than we were before."

Even with extraordinary tech advances, basic research — the day-to-day slog work — is indispensable. Without it, scientists will never unleash the miracle treatments awaited by millions. "You can't fix a car if you don't know what's under the hood," says Rudy Behnia, a CUMC assistant professor of neuroscience and a principal investigator at the Zuckerman Institute. "To cure problems of the brain, we first need to understand it." By gradually mapping those trillions of neuronal circuits — by looking under the hood — Columbia scientists will eventually grasp how the engine runs; effective treatments for neurological and psychiatric diseases will



Eric Kandel says that when he came to Columbia, in 1973, "almost everything you learned was something new."

ultimately follow. And that, really, is the crux of the institute's mission. "Understand first how the normal brain works, and then you have a much better chance of assessing how abnormalities arise," says Jessell.

That is where the slog work comes in. Cultivating stem cells in a petri dish, then tweaking them so they'll morph into certain kinds of neurons, is a comparatively modest enterprise, but often takes months. Learning how to record the neural activity in a mouse brain could require years. And a grad student within any of the neuroscience disciplines could spend more than a half decade exhaustively scrutinizing what appear to be minutiae. "There's a lot of labor pain in science," says Behnia.

Frequently, the basic research goes nowhere. Science, seldom a linear excursion, typically sputters ahead in spasms and is routinely cratered with crash landings and wipeouts. "You put a lot of time and effort into something, and you have to be OK with it not giving you anything," says Behnia. "It happens to everyone. You have to let it go and start all over. It's hard. You learn through your failures. But nothing really fails, because you learn what doesn't work." The converse is also true. As Jessell says to every last one of his graduate students: "You'll probably discover something no one else in the history of mankind ever realized. It may not be a big thing. But if you enjoy the clarity that arises from small discoveries, then you're attuned to being a scientist."

Those "small discoveries" may someday lead to cures, and perhaps sooner than you might think. "These may be the early days," says Bruno. "But some of the most fundamental discoveries will be made in the early days."

**Sarah Woolley, a Columbia professor of psychology and a Zuckerman Institute principal investigator,**

has been studying songbirds for more than twenty years. Take the zebra finch, for example, one of five thousand species of songbird and one of the few that sing only one song. "They breed in the lab," she says. "They sing, they court, they mate for life, they make a nest, they raise babies, all in the lab."

What attracts Woolley is the singing part — and the similarities between how songbirds and people learn to vocalize. That's something almost no other animal does: just humans, parrots, hummingbirds, dolphins (probably), bats (maybe), and songbirds. "An ape does not *learn* to vocalize," says Woolley. Dogs don't learn to bark, and cats don't learn to purr either. Those sounds surely



convey a message — a monkey shrieks to let its troop know a snake is coming. "But that's not learned," says Woolley. "Those are calls built into the brain."

A baby zebra finch, however, learns to sing by listening to its father. That's pretty much the way people learn to speak; infants access language by listening to and socializing with their parents — or whoever's around them the most. Sure enough, when Woolley slips a baby zebra finch into the nest of another species (the Bengalese finch), the baby learns the foster dad's song. "That shows the power of live social interactions for baby birds to learn how to communicate," she says. In both humans and songbirds, Woolley theorizes, a set of neurons in the brain rouse a distinct kind of learning, one stimulated by social relationships. Those neurons, she suggests, "may send signals that say, 'OK, learn this, this is important, this matters.'"

Now the kicker. Woolley suspects those corresponding neurons in humans somehow malfunction in autistic children. For them, acquiring language is often an enormous obstacle. "Maybe the signals that say 'learn' do not go to the auditory system or the brain circuits that form memory," she says. What is known: sensory processing is glitchy in autistic kids. A touch on the shoulder may repel them, a direct look might make them shudder, and a loud sound is often excruciating. No wonder so many of them avoid social interactions. Bonding may induce learning, but if bonding is painful, then so is learning — and it doesn't happen. "But if we can figure out in our birds what makes their brains able to learn based on social interactions," says Woolley, "then we might be able to find ways to help the autistic brain."

In some ways, human brains and bird brains are unnervingly alike. "As we study the auditory

Sarah Woolley's studies of songbirds may shed light on why autistic children find it difficult to communicate.

cortex of the zebra finch, we find similarity after similarity after similarity after similarity,” Woolley says. If she can identify those neurons in the baby zebra finch, then Woolley can predict the approximate location of the comparable human neurons. “I can map my bird’s neurons onto a mammal’s neurons,” she says, “and thus onto a human’s neurons.” Someday, Woolley’s displaced baby songbirds might help millions of autistic children reconnect.

### For decades, scientists readily swallowed the notion that a “taste map” partitions your tongue

— sweet at the front, salty at the sides. “It’s all incorrect,” says Charles Zuker, the Columbia neuroscientist, who has spent the last fifteen

years studying how we perceive taste. “There’s no taste map.” Instead, he says, thousands of taste buds are scattered around your tongue, with sweet, salty, sour, bitter, and umami receptor cells throughout.

Nor do our taste buds actually decide how the food tastes. They do the detection work, definitely, but they serve primarily as relays, dispatching signals directly to the brain. “Sweet taste cells in the tongue talk to sweet neurons,” says Zuker. “Salty to salty. Bitter to bitter.” Within those micro-groups of neuronal constellations, the taste is given a definition. That’s how you know the difference between strudel and sauerkraut.

When humans are hungry, or thirsty, those neurons will ping us to eat something, or to get a glass of water. “Evolution is smart. Clean, clear, and simple,” says Zuker. “This is what innate hardwired circuits are all about.” Now Zuker and his lab of twenty-two researchers want to map precisely where the taste and thirst neurons are located in the human brain. Finding them

could lead to clues in controlling our cravings. In research with mice, Zuker’s team shined a fiber-optic light over their thirst neurons. The mice instantly sprinted to the water spout. “Even if the mouse is not thirsty, the mouse will think it’s thirsty, and look for water to drink,” he says. “Isn’t that remarkable?”

The same seems to apply to taste. The messages from the mouse tongue travel directly to its taste neurons. Just as in humans, those nerve cells are dedicated strictly to the five basic taste qualities. Activate the bitter neurons while a mouse drinks regular water, and it’s repelled. (The mouse squints, shudders, and jiggles its head, just like someone who bit into a lemon.) But silence the bitter neurons, and the mouse will slurp bitter liquid.

The inferences are dumbfounding. Could physicians someday manipulate neurons to regulate diet, consumption, and sugar cravings — perhaps with a pill? “There are amazing implications,” says Zuker. “I think the field is poised to do something very special.” Then, reigning it in: “There are challenges — making sure [a pill] acts on the right group of cells, that it targets the right circuit.” And a reminder: “We are still doing basic neuroscience. We are still at the stage of uncovering fundamental logic and principles.” Yet from his lab’s ever-accumulating data, one can extrapolate the prospective human applications — controlling anorexia, obesity, and diabetes.

More than one-third of adult Americans today are obese, and at increased risk for heart disease, stroke, and cancer. Thirty million Americans have diabetes, and three hundred thousand die from it annually. Overeating and excessive sugar consumption are the causes of both obesity and diabetes. Finding a way to govern them with pharmaceuticals would be a miracle. “And now we can begin to ask,” says Zuker, “if we can control feeding and sugar craving to make a meaningful difference. I believe the answer will be yes.”

**The decades-old “left brain–right brain” paradigm**, although not completely discarded by researchers, now survives considerably diminished, a moldy scientific chestnut (left-brainers, supposedly, are analytical and good at math; right-brainers, emotional and hyper-imaginative). “There is some truth to it,” says Randy Bruno, a CUMC associate professor of neuroscience. “But not all functions are completely one side or another. Some things are not lateralized at all.” Instead, Bruno’s research



Charles Zuker and his research lab plan to map the taste and thirst neurons in the human brain.

reveals something much more tantalizing: “What we’re working on now is top brain and bottom brain.”

For more than twenty years, Bruno has been investigating the cerebral cortex, an outer sliver of brain barely thicker than a credit card and critical for higher-order functions like perception and attention. In mammals, the cortex envelops nearly the entire organ, and divides into “upper” and “deeper” layers. Our deeper layers, evolutionarily older, faintly evoke the reptilian brain. Indeed, today’s alligators, turtles, and snakes have only the lower layers. “There’s a really good reason for why mammals developed the upper layers,” says Bruno. “But I don’t know what the answer is.”

Neuroscientists long assumed the upper cortex transmitted its sensory data — that’s everything you see, hear, smell, taste, and feel — directly to the deeper cortex. Without that, researchers believed, the lower region in mammals would never detect an outside world. But in 2013, Bruno and his team shut off the upper cortex in a mouse. What happened (or what didn’t happen) startled everyone, not just in Bruno’s lab, but in the scientific community worldwide.

“Nothing changed,” he says. Turns out the deep layers weren’t relying on the upper cortex at all; they still received the incoming sensory information. The two cortex regions, Bruno discovered, can operate independently of each other. Independent yet intertwined: “They do work together,” he says. “But they also look like they have different jobs. What’s the job of this half of the cortex versus the other half? I don’t know.”

But he already has a hypothesis. Perhaps, Bruno says, the upper layers mediate “context-dependent” behaviors, and make sense of intermingling and often conflicting situations. (A rabbit is hungry. It sees wildflowers nearby. But a hawk hovers overhead. Does the rabbit chance it and go for the wildflowers? Or take off and go hungry?) The computations performed in the upper layers, suggests Bruno, are good at evaluating conflicting data in context. They decide what to do.

If that’s so, then another theory, even more provocative, surfaces. Psychiatric patients often have problems making decisions that involve context. “Schizophrenics are an example,” says Bruno. “Interpreting sensory signals in context is difficult for them. They really struggle with it. They can’t deal with it.” Which raises the question: could the malfunctioning neuronal



Randy Bruno is investigating why mammals have “upper” brain layers that reptiles lack.

networks that cause schizophrenia and other psychiatric disorders reside somewhere in the upper layers?

Determining that — the approximate vicinity of the faulty networks — is huge. “We would know where to start looking,” says Bruno. “We could narrow down the places where the actual biological defect is occurring.” If researchers could then pinpoint those dysfunctional neurons and target them with drugs, effective treatments for psychological disease could eventually result.

Lots of ifs. “Until we finish the science, that part is still science fiction,” Bruno says. “But that’s the hope, right?”

**Nearly no one knows this about the nose**, but “most odors,” says Richard Axel, “do not elicit any behavioral responses without learning or experience.” That means your reaction to smell is tightly twined to memory. Whether garlic

**“Evolution is smart. Clean, clear, and simple. This is what innate hardwired circuits are all about.”**

or gasoline, cologne or coffee, just-cut grass or just-smoked grass, your brain, not your nose, determines if you like or loathe the smell. Aromas transport you to memories that your brain has catalogued as pleasant or unpleasant; you respond accordingly. This is the core of Axel’s current research. “We are interested in how meaning is imposed on odor,” he says.

Already, at literally a neuronal level of detail, Axel has essentially explained why we can smell; he has identified more than one thousand receptor cells in the nose that talk to the olfactory bulb, the

brain's first relay station for smell. There, the odors are fine-tuned, processed, and propelled to other parts of the brain ("to at least five higher olfactory centers," he says). For his seminal mapping of the smell system's molecular bedrock, Axel won the 2004 Nobel Prize in Physiology or Medicine.

"A given odor will call forth different experiences and produce different emotional responses for different individuals," he says. Those flexible behavioral responses — fashioned between the olfactory bulb and the hippocampus, where we collect memories — are more robust with smell than with any of the other four senses.

Even the fragrance of jasmine, supposedly the most sensual of scents, is contingent on context, says Axel. Breathe it in while spending an evening with someone you love. "Then jasmine would elicit a very pleasant response," he says. But that could change, based on new experience: "Suppose that same person turned around and hurt you seriously. Then jasmine no longer will have the same effect on you."

In simpler brains, many aromas provoke an instinctive and unalterable response. When mice get a whiff

of fox urine, their hardwired neural pathway sends them running. "That's because mice, for a long time, have been prey to foxes," says Axel. Only a few scents, however, are hardwired in humans. Smoke, probably, is one. Anything rotting is another (the stench of sulfur, akin to rotten eggs, is revolting to most everybody). But that's about it. Says Axel: "It's very hard to conjure up odors that elicit innate responses in people."

After four decades of foundational work, Axel recognizes the connection between his fundamental research and the furthest cures. Discovering what's under the hood could help clarify the latest curiosity about Alzheimer's: for many patients, an early symptom is losing their sense of smell. "What can emerge from an

experiment designed to understand one aspect of science can open up something more profound," he says. "You go in, not knowing what is going to come out."

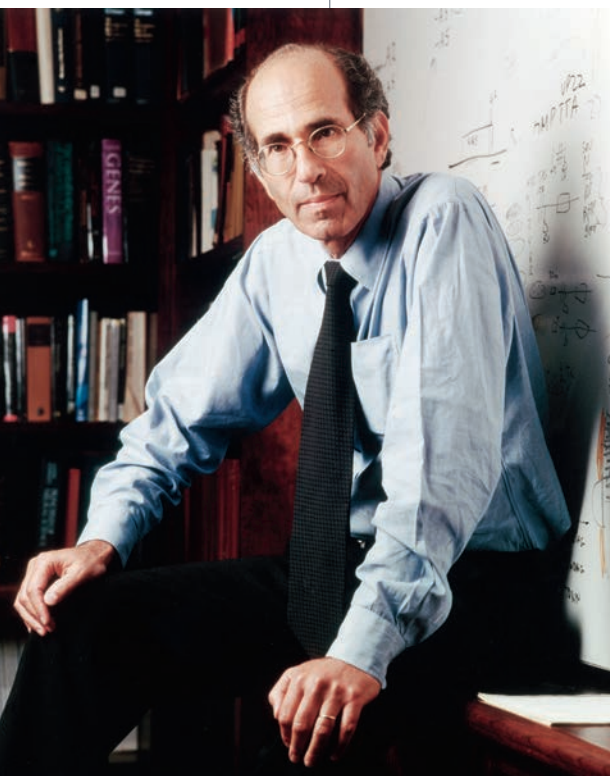
### In 1962, Eric Kandel commenced research on *Aplysia* — the sea hare — a blobby mollusk with protruding feelers that resemble rabbit ears.

Studying sea hares, friends and colleagues warned, was a calamitous blunder; fifty-four years later, Kandel remembers their disapproval. "Everyone thought I was throwing my career away," he says. But *Aplysia*, with only twenty thousand neurons in its central nervous system, became Kandel's odd little portal into the human brain: "It has the largest nerve cells in the animal kingdom. You can see them with the naked eye. They're gigantic. They're beautiful." Four decades later, Kandel won the 2000 Nobel Prize for Physiology or Medicine. He had discovered how those neurons in *Aplysia*'s brain constructed and catalogued memories.

Today, as neuroscientists worldwide pursue remedies for Alzheimer's and age-related memory loss, Kandel's half century of findings are considered indispensable. Substantive therapies for Alzheimer's in particular are "poised for success," says Jessell, a colleague of Kandel's for thirty-five years. "We're on the cusp of making a difference." But accompanying that claim is a caveat; the fledgling remedies are not panaceas. "We're not necessarily talking about curing the disease," he says. "But we are talking about slowing the symptomatic progression of the disease so significantly that lifestyles are improved in a dramatic way. If in ten years we have not made significant progress, if we are not slowing the progression of Alzheimer's, then we have to look very seriously at ourselves and ask, 'What went wrong?'"

Breakthroughs could happen sooner, however. Some of the Alzheimer's medications available now "probably work," says Kandel, except for one obstacle: "By the time patients see a physician, they've had the disease for ten years. They've lost so many nerve cells, there's nothing you can do for them." Possibly, with earlier detection, "those same drugs might be effective." That's not a certainty, insists Kandel, only a "hunch."

Years ago, Kandel had another hunch — that age-related memory loss was not just early-stage Alzheimer's, as many neuroscientists believed, but an altogether separate disease. After all, not everyone gets Alzheimer's, but "practically everyone," says Kandel, loses some aspects of



Richard Axel has identified more than one thousand receptor cells in the nose that convey data to the brain.

memory as they get older. And MRI images of patients with age-related memory loss, as demonstrated by CUMC neurology professor Scott Small '92PS, have revealed defects in a brain region different from those of the early-stage Alzheimer's patients.

Kandel also knew mice didn't get Alzheimer's. He wondered if they got age-related memory loss. If they did, that would be another sign the disorders were different. His lab soon demonstrated that mice, which typically have a two-year lifespan, do exhibit a significant decrease in memory at twelve months. With that revelation, Kandel and others deduced Alzheimer's and age-related memory loss are distinct, unconnected diseases.

Then Kandel's lab (again, with assistance from Small) discovered that RbAp48 — a protein abundant in mice and men — was a central chemical cog in regulating memory loss. A deficit of RbAp48 apparently accelerates the decline. Knocking out RbAp48, even in a young mouse brain, produces age-related memory loss. But restoring RbAp48 to an old mouse brain reverses it.

Now what may be the eureka moment — this from Gerard Karsenty, chairman of CUMC's department of genetics and development: bones release a hormone called osteocalcin. And Kandel later found that osteocalcin, upon release, increases the level of RbAp48.

"So give osteocalcin to an old mouse, and *boom!* Age-related memory loss goes away."

The same may prove true in humans. A pill or injectable could work, says Kandel: "Osteocalcin in a form people can take is something very doable and not very far away." In less than a decade, age-related memory loss might be treatable. "This," he says, "is the hope."

**As the ambitions of neuroscientists accelerate**, the field has moved its goalposts to a faraway place. "We're trying to understand behavior," says Bruno. "Behavior is not straightforward. It's an incredibly ill-defined problem."

Behavior encompasses everything. Perception, emotion, memory, cognition, invention, obsession, infatuation, creativity, happiness, despair. To completely understand how the brain governs behavior, to neurologically plumb the wisps of human thought, one must unshroud innumerable obscurities at the subcellular level. "How do you define happiness or beauty? Somehow it's based on connections in the brain," says Jessell. Always, it gets back to the ever-pinging networks:

"Without knowing the links between these eighty-six billion neurons that exist within the human brain, we don't have a hope of understanding any aspect of human behavior."

Decipher those links, and we will have figured out how we figure things out. How brain connections, for instance, ignite love connections. We could, conceivably, fathom ourselves practically down to the last neuron. Says Axel: "Do we understand perception, emotion, memory, cognition? No. But we're developing technology which might allow us entry into these arenas for the first time. Perhaps we will get there. Perhaps."

"We are tackling infinity," says Bruno. "Behavior is this infinite space of ideas. Oh, probably not truly infinite. We're finite beings. Only so many neurons are in our heads. But think about all you can do, and the vast realm of possibilities you can react to. Think about how large a set that is. I mean, you can't count all of those things. The range of human possibility is staggering."

Acknowledge this, and one could easily argue we've barely begun to know the brain. "We really are at the very beginning," says Bruno. "How far along? I'd say 5 percent. We're trying to tackle a collection of problems and questions that put us on the 5 percent end."

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**"I think we have at least fifty years before we can explain every aspect of human behavior."**

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Learn the rest — the remaining 95 percent — and we will quite literally understand ourselves. But this will take time. "We have a very fragile understanding of the principles by which these things work," says Jessell. "I think we have at least fifty years before we can explain every aspect of human behavior." Or possibly longer. Says Kandel: "On this — to have a satisfying understanding of the brain — I think we're a century away."

So little is known. Almost everything we learn is something new. What now? Tackling infinity, of course. "What could be more important," says Axel, "than to understand the most elusive, the most complex, the most mysterious structure that we know of in our universe? That's pretty damn important." The answers, always within, now lie ahead. 📖

# being there

In more ways than one, Columbia professor Sarah Sze is the artist of the moment

by Paul Hond

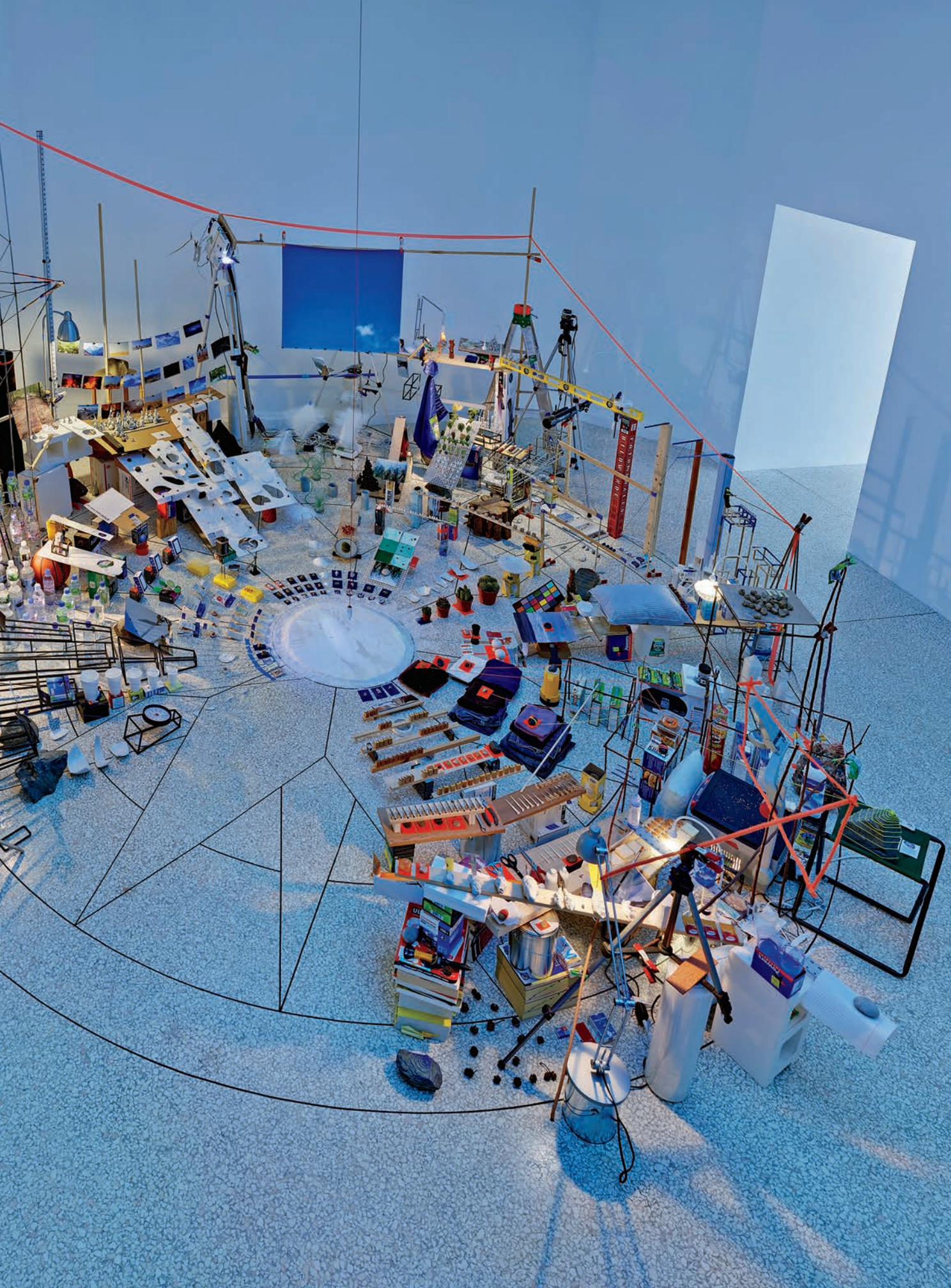
**Y**ou go to Sarah Sze's studio in Midtown Manhattan, not really knowing what to expect. Maybe you've seen her work — her installation *Still Life with Landscape (Model for a Habitat)*, a bird-and-butterfly sanctuary of steel framework and wooden boxes, was perched on the High Line for a year starting in June 2011. Five years earlier, *Corner Plot*, in which a single corner of bricks and windows jutted from the pavement, suggesting a sunken apartment building, attracted passersby at Fifth Avenue and 60th Street. Or maybe you were at a party recently and saw, on a coffee table, Sze's new monograph, with its cover image of *360 (Portable Planetarium)*. That sculpture, a skeletal sphere of fragile, possibly rickety construction, is crossed with radiating strings and spindly scaffolding, slung with random objects, and pierced with light — a cosmic meditation.



Inset: Photo of Sze by Sara Krulwich/The New York Times/Redux. At right: *Triple Point (Pendulum)*, 2013. All photos of artwork courtesy of the artist and Tanya Bonakdar Gallery, New York.







Or maybe you've never seen Sze's work, and are more aware of her reputation. She received a 2003 MacArthur Foundation "genius grant" and was the US representative to the 2013 Art Biennale in Venice. The sublimities of her art led the late Columbia philosopher and art critic Arthur Danto '52GSAS, '04HON to write that her concern as an artist is "to feel her way into the future, into art that had yet to be imagined." And the sculptor Richard Serra told the *New Yorker* that Sze "is changing the potential of sculpture."

Ascending the elevator to Sze's workshop, you realize you're still holding a cup of coffee. With a chill you ponder what Sze (pronounced Zee) will make of your bringing a spillable liquid to her studio door. Of course you will apologetically surrender it before entering. And, reflecting on Sze's use of everyday items in her work — light bulbs, Q-Tips, cereal, lamps, aspirin, fans, plastic flowers, plastic spoons, electric lights, socks, notepads, candies, thimbles, milk cartons, disco balls, toilet paper, and yes, coffee cups — you muse that maybe she'll end up incorporating it . . . until you remember that Sze doesn't use trash in her work. That's because trash has a past: she uses the unused, the fresh-bought, things without history or nostalgia; the object as tabula rasa.

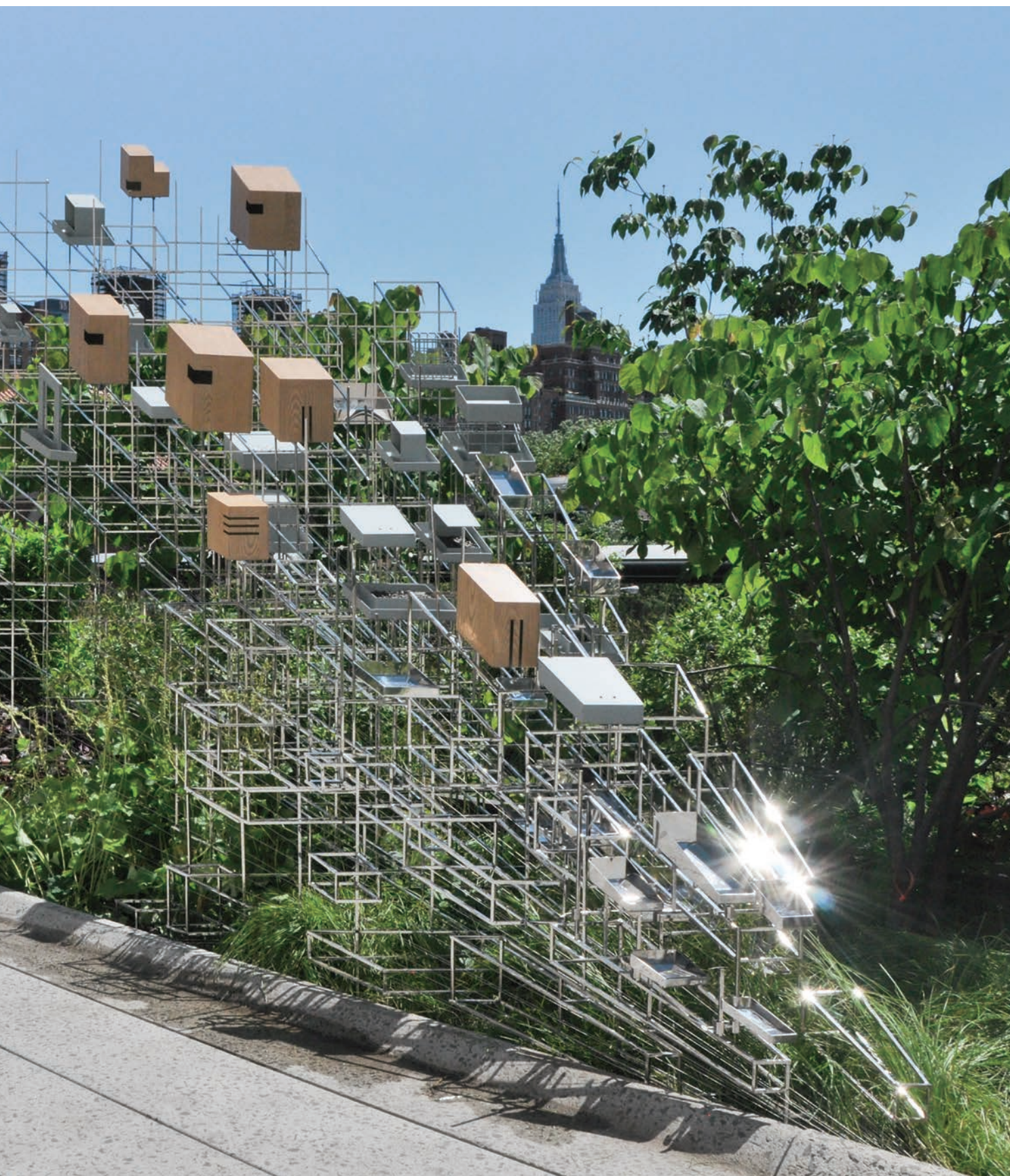
The elevator opens and you step into a large, sunny loft, where Sze, forty-seven, warmly welcomes you. Dressed in black, her dark hair coiled in a bun, she imparts the easy self-possession of someone in pure synchronicity with the ticktock of creative life. She assures you that your coffee cup is no problem, and lets you set it on one of the worktables, which is covered with color photos from magazines. On the floor, lunchbox-sized blocks of clay have been cut into thick slices, and the walls are plastered with pictures that feed Sze's current interests: fourteenth-century step wells in Delhi; a rock formation in Northern Ireland of basalt columns, shaped over millions of years; a Japanese print in which the white of the paper is articulated into a snowy field by spare strokes of blue.

Sze is a seeker and processor of data, a metaphysical alchemist, mining magical effects from the inanimate, the mundane. Her canvas is time and space, her work a discourse with the physical world, an elaborate dance with instability and demise. "That we question permanence when we see a work is very important to me," she says. Because her work is often site-specific and imbued with spontaneity, it is impossible to duplicate: the works are sculptural accounts of ephemerality itself, with objects rambling, colonizing, and dispersing at once, suggesting a volatile state of being made or unmade, of growth or decay. Within all this lies the question of how objects acquire value, and the ways in which arranging common items outside their usual contexts can change their meaning.

"How do we create value in an object?" Sze says. "Objects are less valuable than life, because life ends, so the idea was to make work that felt like it had a life to it, and had a life-support system that must be cared for; that gave a sense that if you left it and came back in an hour, it might be different; that it won't ever exist elsewhere, and that this exact experience won't exist again."

**Sze** was born in Boston in 1969. Her father, whose family had come to the US from China when he was four, was an architect, and the house was like an extension of his office, with drawings everywhere. Her mother taught nursery school, and come vacations she'd bring home the class pets, so that Sze and her brother grew up with a turtle and a bird ("Our





Above: *Still Life with Landscape (Model for a Habitat)*, 2011. Next spread: *Timekeeper*, 2016.





house was very animated,” Sze says). The family shared a love of art, music, and dance, and Sze discovered early on that creativity was a way to grasp the world and communicate with it. “I made art all the time, drawing and painting and making things,” she says. “It was definitely where I found joy.”

She studied painting and architecture at Yale and later switched to sculpture, making her first splash in 1996 at a show in New York. There, she covered the surfaces of a narrow store-room space in SoHo with hundreds of figurines made from single squares of toilet paper. She came to Columbia’s School of the Arts to teach in 2002 and was made a full professor in 2009. She lives downtown with her husband, Siddhartha Mukherjee, a Columbia oncologist and assistant professor of medicine, and the author of the Pulitzer Prize-winning *The Emperor of All Maladies*. They have two young daughters.

Sze teaches in the spring, and she administers the same care to her students that she does to her art. For graduate critiques, she’ll go into the artist’s studio and look at the work in silence, thinking

## Her canvas is time and space, her work a discourse with the physical world, a dance with instability and demise.

about what needs to be said and how to say it. “I emphasize information over affirmation,” she says. “I want to give people tools to think about what they’re doing. My goal is that when I leave the studio, the artist wants to dive into the work.” For group classes, it’s the same: “We don’t talk about liking or not liking something. It’s not about taste. It’s about allowing the person being critiqued to learn about his or her process without feeling debilitated.”

Art school, says Sze, should be a place where you can make mistakes and get feedback. “You can create this incredible dialogue, which can accelerate the work so quickly,” Sze says. “It’s such a miracle when you see someone’s work develop in two years, which is nothing — that’s why I love teaching the Columbia MFA students: they’re so wonderful, thoughtful, intense, and committed.”

Sze enjoys her undergrads, too. “They are super smart and totally open creatively,” she says. “There’s this willingness to learn, and a joy in exploration. I love the dialogue. I learn so much from them. I love going up there. Every time I leave, I’m totally energized.”

At the back of Sze’s studio is a sliding door: Sze opens it and steps into a dark room. In the middle of the room is a thing, a structure, the sort of eccentric, spectacular creation that only genius could produce. It’s humming and blinking, and your first thought is: *it’s alive*. You move toward its glow, around its curvature, pulled by a shuddering sense of revelation.

Now it appears: a crystal city of information, of mirror shards and torn photographs and desk lamps and assorted fragments, the galaxy of it caught in a fragile and complex anatomy. Sze points out the two worktables that form the base of the opus, obscured in a jumble of objects that has proliferated from the site of its making with an almost biological compulsion. Video screens ripple with oceans and fires before pixelating, disintegrat-

ing; while on the ceiling there plays a fuzzy, flickering light, cast there by the collusion of a tray of water, a fan, and a mirror, and suggestive of film. Sze has been thinking about the origins of film, and “how film marks time, how it feels in the memory.”

It’s a lot to take in — which is part of the point.

“I’m playing with this idea of this onslaught of images, and images as debris, juxtaposed in ways that you don’t imagine,” Sze says. “Though it can be overwhelming, we’ve been conditioned to learn how to read this much information at once.” You then notice animals on the walls, circling the room at varying speeds: a peregrine falcon, followed by a cheetah and other creatures. The images are beamed from a rotating projector within the sculpture, in plain view (Sze hides nothing: the curtain is always pulled back). The swirling projection, Sze says, “makes the architecture become this cocoon that encircles you.” You are in the sculpture, and perhaps have become its plaything.

“I want the feeling that you are having a moment in time that is fragile and you’re experiencing it live,” Sze says. “Very few moments

are marked in time anymore, because we can now access so many things out of time. It’s about the moment of being there.”

So you stand at this altar of ingenuity, delicacy, intricacy, craft, caprice, ideas; this fragile ecosystem, this cracked mirror of civilization. Its title is *Timekeeper*. It took six months to complete, and, like much of Sze’s work, it will be dismantled.

**Nothing** lasts forever, but some things last longer than others. This winter, the long-awaited, long-delayed Second Avenue subway line is scheduled to open with three stations. In a bold scheme, the MTA handed each station to a single artist — 72nd Street to Vik Muniz, 86th to Chuck Close, and 96th to Sze — a canvas as big and public and challenging as one could dream of, and, in some ways, says Sze, “as permanent as you can get.”

The station at 96th Street is two blocks long, with three entryways. Sze has anointed it with vast violet-blue drawings that she fabricated in porcelain-enamel panels. “It’s all based on the idea of blueprints, of drawing as a tool to understand three-dimensional space,” she says. As ever, Sze brings an architect’s concern for the viewer’s experience of encountering the art — how one enters and leaves, how things unfold. “When you go into the station, it’s an entirely immersive environment,” she says. “You experience it coming down.” She points to a picture of the steep gradient of the escalator, with its blue wall and fine white lines and ripples and marine-like shapes. “You’re in this narrow space on the escalator. You’re in a void, and then you get this intense vertical landscape.”

Another picture shows the wall above the track bed, the part that’s still visible when a train pulls in. It bears Sze’s arresting abstractions in blue and white, a distinctive signpost for the weary straphanger. “When you come to that station,” Sze says with a laugh, “you’ll know exactly where you are.” 🐘



# THE SECRET LIFE OF VOLCANOES

Can a Columbia-led expedition to South America uncover the forces that drive one of its largest volcanoes?

STORY AND PHOTOGRAPHS BY KEVIN KRAJICK '76GS, '77JRN

On a ledge just inside the lip of the crater, Philipp Ruprecht was furiously digging a trench. A thousand-foot drop loomed yards away, and the wind was whipping the dust off his shovel. But Ruprecht was undaunted. Here, at the top of Chile's Quizapu, at an elevation of ten thousand feet, the scientist had found a spot topped with undisturbed layers of powdered rock that the volcano had vomited from the deep earth eighty-four years earlier. These were the samples he'd been searching for.

In 1932, Quizapu (kee-SAH-poo), located about 150 miles south of Santiago in the Chilean Andes, produced one of South America's largest recorded volcanic explosions, expelling a fiery plume of ash-to-boulder-sized material that instantly turned some four hundred square miles to desert. Today, the region is a volcanic wonderland: a barren landscape of hard-

ened lava flows, hot springs, and pumice that has been left relatively undisturbed by human activity.

Ruprecht, an adjunct associate research scientist at Columbia's Lamont-Doherty Earth Observatory who also teaches at the University of Nevada, has been studying Quizapu for more than a decade. Earlier this year, he brought along six other American and Chilean scientists and a dozen students. The purpose of the weeklong expedition (supported by the Columbia Global Center in Santiago and the President's Global Innovation Fund) was to better understand the forces that drive Quizapu and other volcanoes in the region.

In recent years, scientists have become more adept at monitoring volcanoes to anticipate their eruptions. But they struggle to predict the type and intensity of these events, and there are plenty of



Scientists traverse the rim of Chile's Quizapu volcano. The crater is about a half mile wide and one thousand feet deep.





false alarms. Quizapu is an interesting case study because it has erupted in different ways at different times. In 1932 it exploded with massive force, but in 1846 it simply bled out a river of relatively slow-moving lava.

“If you’re trying to decide how many people to evacuate from around a volcano, you really want to know what that eruption is going to be like,” says Ruprecht, noting that while lava flows may destroy property and wildlife, they are rarely deadly. “If you tell people to flee because the next big one is coming, and then only a minor eruption occurs, they may not believe you the next time you warn them.”

By reconstructing Quizapu’s past eruptions, Ruprecht and his colleagues aim to more accurately interpret the volcano’s seismic vibrations. They approach their work like forensics experts at a crime scene. By inspecting the mineral composition of lava deposits, for instance, they can determine the depth from which the magma originated, and the speed with which it ascended to the earth’s surface.

“One of the things we look for is the presence of crystals that form very deep in the earth,” says Ruprecht. “This is a sign that the eruption was fueled, at least in part, by magma that came from miles underground.”

On previous trips to Quizapu, Ruprecht made a surprising discovery: hardened lava from the relatively mellow 1846 eruption is chock-full of well-preserved remnants of this deep-earth magma. This was unexpected, because volcanologists have long assumed that whenever a large volume of magma shoots up from the earth’s mantle, an explosive eruption will occur. To explain the discrepancy, Ruprecht has come up with another theory. He suspects that if rapidly ascending magma encounters cooler pockets of magma on its way to the earth’s surface, it may release certain stored gases — thus giving the lava less explosive kick when it emerges.

“A major factor in an explosive eruption is the buildup of gas pressure within the magma as it accumulates just below the earth’s surface,” Ruprecht says. “When the magma eventually bursts out as lava, it’s like soda spraying out of a shaken bottle.

But if the magma has lost all its gas, it may just pour out in a benign fashion.”

To test this theory, the members of Ruprecht’s expedition gathered dozens of lava samples, which are now being analyzed to determine their composition.

“We want to see if the lava from the 1846 eruption had unusually low concentrations of gas,” says Lucy Tweed, a Columbia graduate student in earth and environmental sciences who was a member of the expedition. “This is tricky, because the new lava that shot up from deep within the earth mingled with lava that had been slowly accumulating for years right beneath the volcano. So we need to look very carefully at the crystallization signatures within the different magma flows.”

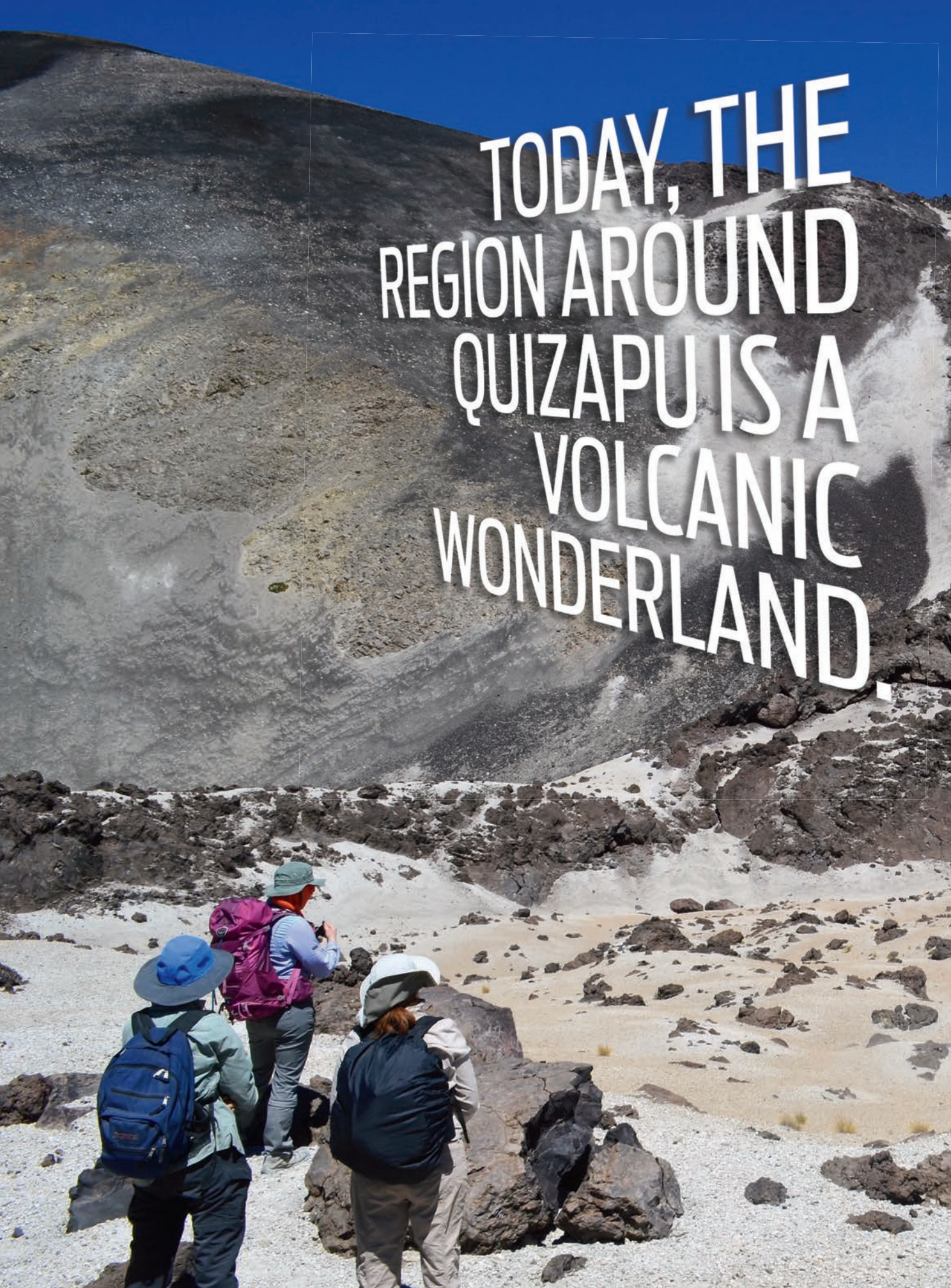
During the trip, Einat Lev, an assistant research professor at Lamont-Doherty who studies the fluid dynamics of lava, and Elise Rumpf, a postdoctoral research scientist at Lamont, flew a drone over Quizapu to create the first comprehensive photographic survey of the lava deposits around the volcano. Lev says that their maps, together with her colleagues’ geochemical analysis, will provide insights into how lava flows produced by different types of volcanic eruptions behave on land.

“Lava flows aren’t a huge concern around Quizapu, since the immediate area is sparsely populated, but there are dozens of other volcanoes in South America and in places like Japan, Hawaii, the Philippines, and Italy that threaten major towns and cities,” Lev says. “The people who live there need to know: if a big lava flow occurs, how fast will it come down? What direction is it likely to go in? Should we construct protective barriers in certain areas to redirect the flow? By piecing together how volcanoes have erupted in the past, we’re starting to be able to answer these questions.”

**From top:** Columbia volcanologist Philipp Ruprecht examines a chunk of hardened lava; Elise Rumpf, another Columbia volcanologist, retrieves a camera-equipped drone that will help create a detailed map of the volcano’s lava flows; University of Michigan geologist Adam Simon bathes in a hot spring. **Opposite page:** Members of the research team hiked for two days to reach Quizapu.



TODAY, THE  
REGION AROUND  
QUIZAPU IS A  
VOLCANIC  
WONDERLAND.



# SYNCOATED SISTERS

TAP-DANCE ENTREPRENEURS  
CHLOE AND MAUD ARNOLD  
ARE READY TO CLICK WITH A  
NEW GENERATION — AND  
HEAL THE WORLD THROUGH  
RHYTHM AND SHOES

BY PAUL HOND \ PHOTOGRAPHS BY JORG MEYER

It's five days before the show, and Chloe Arnold '02CC is rehearsing her New York tap-dance troupe, Apartment 33, onstage at City College's Aaron Davis Hall in Harlem. The dancers listen carefully as Chloe, wearing an Ivy Park hoodie and blue jeans, prepares them for the next number, set to Rihanna's song "Work."

"Do it with passion or not at all," Chloe says, her voice firm and supportive. "You can never fake it, ever." The dancers nod and get into formation.

The music starts, a mellow synth-pop groove, then *crack!* — the concussion of metal upon the floor, blunt force, and twelve bodies move as one, arms and legs and hips and hair, toes and heels banging out rhythms that vibrate the senses: sound as movement, sound made visible.

And now Maud Arnold '08CC comes through the auditorium doors, carrying a white shopping bag. She's been running around as usual. She's a mover, a deal-maker, the social and business spark of Chloe & Maud Productions.

The dancers take a break, and Maud walks onto the stage and brings the bag over to Chloe.





Chloe

Maud

“This is very exciting,” Chloe says, watching as Maud pulls a white shoebox from the bag. “We’re creating an affordable tap shoe for the nonprofessional. The shoes we wear cost hundreds of dollars.”

“These are in the seventy- or eighty-dollar range,” says Maud proudly.

“Maud and I wanted to create something for people who can’t afford top-of-the-line shoes but want to get into tap.”

“And that could be anyone.”

“From two to ninety-two,” says Chloe. “There was a guy who came to my class with a walker. You could be in a wheelchair. If there’s a way to create percussion

street corners, chorus lines, and concert halls. It is aural, visual, and dramatic: it can tell a story about people, places, and emotions, or about rhythm, movement, and a body talking to no one but itself.”

Tap has its origins in Colonial times in the contact between enslaved Africans and Irish and English indentured servants. According to dance historian and tap dancer Margaret Morrison ’83BC, who teaches at Barnard, “The rhythmic imperative of African dance and drumming styles interacted with Irish and English clog dances. By 1900, all of that was fused.”

Gregory Hines, the nineteen-year-old prodigy Glover, and the fabled Nicholas Brothers. Also onstage was a twelve-year-old girl named Chloe Arnold.

That night, Chloe saw what it meant to be a professional tap dancer. She’d been dancing since she was six, and now she dreamed of someday leaving her own footprint on the field.

She lived in Washington with her kid sister, Maud, and their brother, Tadeo, who “always had our backs,” Chloe says. Their father, Eddie, was a Vietnam veteran and jazz connoisseur who worked in public relations. Their mother, Barbara,



with your feet, there are no limits to who can do it.”

No limits: that could be the sisters’ tagline. Tracing their arc from where they started to where they stand, they are the embodiment of Sly and the Family Stone’s “You Can Make It If You Try,” mixed with a little “We Are Family” by Sister Sledge. Like many of their peers, the sisters want to create change, but in their own fresh, offbeat way: through a traditional American art form that is perhaps more enjoyed than understood.

As Margo Jefferson ’71JRN, a Pulitzer Prize-winning cultural critic and Columbia School of the Arts writing professor, has observed, “Tap is a quintessential multipurpose form. It is dance, music, and theater, suitable for clubs, studios,

For many, the word “tap” evokes Fred Astaire or Bill “Bojangles” Robinson, minstrel shows or vaudeville — something, at any rate, anachronistic. But for Chloe and Maud, tap is as *now* as your own pulse.

“Tap has the ability to always stay current because of the choice of music,” Chloe explains. “In the 1980s, Gregory Hines danced to funk, and that’s what connected it to the people. When we tap-dance to the music I listen to, like Beyoncé and Rihanna and Prince, the public responds, because it’s what *they’re* listening to.”

In 1993, some of the greatest tap dancers in history gathered at the John F. Kennedy Center for the Performing Arts in Washington, DC, as part of Savion Glover’s DC Crew. The lineup included

who was born in France, where her mother hid during the Holocaust, was a high-school teacher.

Around the time of the Kennedy Center show, Chloe took a bus trip to New York to see *Jelly’s Last Jam*, a Broadway musical about the jazz composer Jelly Roll Morton. The show starred Hines and Glover, with choreography by Hines and tap guru Ted Levy. The whole scene captivated Chloe. “When it’s my time, I’m going to live in New York,” she thought. “I’m going to college in New York.”

But things were tough at home. When Chloe was thirteen, Barbara moved the kids to a small apartment in northwest DC. “Our mom was the only white person in the neighborhood,” Maud says. Money was tight. Barbara took extra work as a

waitress and translator. The sisters were inseparable. They shared a bedroom, and Chloe, now Maud's babysitter, also became her dance teacher.

At fifteen, Chloe went back to New York to see the Glover vehicle *Bring in 'da Noise, Bring in 'da Funk*, a tap odyssey of African-American history. After the matinee, she wanted to check out Columbia. Some dancers from the show took her uptown. "I saw the campus and said, 'This is going to be my life,'" Chloe says.

The next year, she got a part in a dance musical in DC directed by Debbie Allen, the dancer, singer, choreographer, director,

found this clip in a magazine that said, WHAT IF HARVARD WAS YOUR SAFETY SCHOOL? She cut it out and taped it to our door so that it was the first thing I saw each morning." Chloe got into Harvard, and all the other Ivies. But her heart was set on Columbia.

Chloe applied for every scholarship available. The most substantial one she received was a Kluge Scholarship, a program endowed in 1987 by businessman John Kluge '37CC, '88HON, a German immigrant who had himself attended Columbia on grants.

**"I WANT THESE WOMEN TO FEEL THAT WE ARE LIFTING EACH OTHER UP."**



and producer who played a tough-love dance teacher in the film and TV versions of *Fame*. Allen saw Chloe's promise and became her mentor.

Meanwhile, at school, Chloe, Ivy-minded, signed up for everything: clubs, peer mediation, sports. She even got elected class president. Still, in her senior year, a teacher told her she would never get into Harvard. Chloe had no designs on Harvard, but the comment stung, and her smoldering mental response was *Ohhh, you watch me*. With the encouragement of Barbara and Tadeo (who would graduate from the University of Pennsylvania), Chloe applied to *all* the Ivy League schools.

"My mom was avid about our education and motivating us," Chloe says. "She

At college, Chloe took classes from 9 a.m. to 2 p.m., and then at night she'd pack up her portable tap-dancing floor and go down to Greenwich Village for a jazz-club jam session. "Can I jump in?" she'd say, and she'd drop her board and ad-lib with the band. Tappers are percussionists, and to develop musicianship "you have to play with musicians," Chloe says. Afterward, she'd go back to campus and do her schoolwork.

She majored in film and was singularly focused. "In college I always thought, 'I'm going to put tap on film. Now, to make a film is insane, and even crazier is to become a professional tap dancer, and even crazier is to say, 'I'm going to make tap movies.' But in my head, that's what was going to happen. Every film project I did

was about tap. My thesis film was about tap. Everything was about tap."

After graduation, Chloe moved to LA. She had no money, so Debbie Allen put her up and let Chloe shadow her at work. Allen told Chloe that if she wanted to tap professionally, she had to learn how to do it all: dance, direct, choreograph, write, and produce. Tap auditions were scarce, so you needed the skills to create the work itself.

One night in LA, at a tap jam session, Chloe ran into some other female dancers. She rarely saw other women at jam sessions. Sensing their power as a group, she pulled them together — along with the teenage Maud — and formed a dance crew called Syncopated Ladies, a wink to *Sophisticated Ladies*, the 1981 Broadway revue based on the music of Duke Ellington, starring Gregory Hines.

These Ladies were something different: young, gifted musician-dancers who, through their moves and outfits, asserted their femininity in ways seldom seen in tap — bare midriffs, ripped jeans, bustiers, a little leather, and a strong, athletic attack. Tap was about to graduate.

Maud, too, majored in film at Columbia, and by her senior year, a new rhythm was pounding across the land. *Yes we can! Yes we can!* Graduation speeches at Columbia in 2008 were filled with references to Barack Obama '83CC, who was two weeks away from clinching the Democratic nomination for president.

Maud could relate to the candidate. They had a common educational experience, and they'd both had to settle the complexities of their mixed backgrounds.

"At Columbia, I met a lot of mixed kids who really weren't sure who they were, and I was so sure about it," Maud says. "I'm Black. My mom's white, I love her, but I'm Black. Our dad taught us a lot about being proud to be Black. He always said, 'The world will look at you as a Black person, so you have to recognize that. You're not better than anybody because you're light-skinned.' I'm so grateful, because it saved me a lot of time and emotion questioning this."

Obama won the election, and Maud and Chloe were in the crowd outside the Capitol on Inauguration Day. “It was cold, but we didn’t care,” says Maud. “It was one of the greatest days of my life.”

With Maud out of school, the sisters started Chloe & Maud Productions. Mindful of Debbie Allen’s gospel of versatility, they performed with Syncopated Ladies and also pursued jobs as production assistants on music-video shoots. Among the artists they got to work for was one of their heroes: Beyoncé.

“Beyoncé made me see the role of women in entertainment differently,” Chloe says. “She’s so unapologetically *amazing*, and at the same time, she lifts everybody up and makes *you* feel amazing. It doesn’t matter if you’re picking up trash — you still feel like you’re part of the most incredible production ever. I thought, ‘That’s what I want for Syncopated Ladies. I want these women to feel that we are lifting each other up.’”

By 2013, the sisters were ready for a new step. “Maud,” Chloe said, “it’s time to use our film degrees. Let’s make music videos of tap dancing.”

Chloe choreographed a piece for Syncopated Ladies, set to Rihanna’s “Where Have You Been.” Dark stage, floor lights, black shorts and bodices, silver glitter, studded boots, rapid-fire syncopations, kinetic camera work. Chloe and Maud put the polished product on YouTube, and it quickly got more than sixty thousand views. “I was blown away,” Chloe says. “I had no idea that we could get tap seen by that many people.”

Next, as an expression of gratitude to Beyoncé, the Ladies made a video to her song “End of Time.” To their surprise, Beyoncé shared it on Facebook. Within days that video got more than five hundred thousand views. The popular TV show *So You Think You Can Dance* took notice, and the Ladies were invited to compete in the show’s first-ever dance-crew battle. They won.

Twitter was aflutter. Blogs and magazines swooped in. People started recognizing Chloe and Maud on planes. Now the question had new urgency: what next?



If there is a glass ceiling for women in tap, it’s full of cracks made by generations of rapping feet. For Chloe, tap history is filled with women who “did the work but don’t get the credit they deserve,” and she recalls the lack of prospects that she faced coming up.

“I was really entering a boys’ club,” she says. “You had *Tap Dogs* and *Bring in ’da Noise, Bring in ’da Funk*; there were no roles I could get into.” Nor was *Riverdance* an option. “If you look at Broadway, there are very few shows that feature or star a Black woman, and very few African-American producers and choreographers,” says Chloe. “I would say to myself, ‘If it doesn’t exist, create it.’”

In the critical realm, too, she encountered a certain narrowness of perspective. “Some people didn’t like that I was using my curves, my African-American culture, incorporating African dance and hip-hop and things that are authentic to my experience,” she says. “There was a lot

of resistance, and Debbie Allen was so pivotal in saying, ‘Ignore them, go forward, don’t let them stop you.’”

Margaret Morrison, who knew Chloe and Maud at Columbia and had Maud as a student, notes that the Arnold sisters are fighting against centuries of ideas. “Anything too close to sexuality and the female body is considered less art-worthy, less rigorous, less serious. It’s entertainment, not art. Chloe just dives into that and says, ‘That’s BS. Who made these rules?’ And that’s how I feel. It’s the twenty-first century! We’ve been through postmodernism! Who made these rules?”

“Some women of my generation felt it was important to downplay sexuality to align ourselves with art, so we did that,” says Morrison. “Then Chloe’s generation came along and said, ‘That’s interesting, but *why?*’ We fought that fight, and Chloe doesn’t need to fight it anymore. Now she and Maud can fight a different battle.”



**O**n February 6, 2016, Beyoncé released “Formation,” an empowerment anthem of Black womanhood whose music video contains visual references to police violence and the abandonment of African-Americans in Hurricane Katrina. The next day, the singer performed “Formation” during the halftime show of Super Bowl 50.

If Chloe and Maud weren’t sure what to do next, now they knew. Chloe created a dance for “Formation,” and the Ladies hit the studio. “The idea of *formation* — of getting people unified — inspired me to reach out to people in countries I’d traveled to as a performer,” says Chloe. “I sent them instructions for the dance and told them that if they could learn this and film it in a week, they might be in our video.” The response was emphatic: the video features dancers from Chicago, DC, Seattle, LA, Taipei, Rio de Janeiro, and more.

The sisters uploaded the video, not expecting Beyoncé herself to see it. Not only did she see it — she posted it on her homepage. In two weeks it got eight million views, and now it has more than thirteen million.

Beyoncé hired the Ladies to perform in London at the launch of her clothing

and Prince videos than anything since the Hollywood era of the 1940s and ‘50s. That in itself is astounding.”

Calls poured in. Chloe got hired as a choreographer on *So You Think You Can Dance* and *The Late Late Show with James Corden*. In July, Syncopated Ladies performed in Philadelphia at the Democratic National Convention. And now, in the fall, Chloe and Maud were ready to roll with Apartment 33.

While Chloe creates dances and runs rehearsals, Maud meets people and closes deals. The Chloe & Maud portfolio now includes the two bicoastal tap troupes; the DC Tap Festival (started in 2009 and expected to draw, in April, six hundred dancers from around the world); an after-school program in LA called Tap Into Life (“We want to provide education and scholarships for inner-city kids,” says Chloe. “We were once those kids, and we had mentors and got scholarships from Columbia — so we are very heavy on scholarships”); and the buoyant 2015 documentary *Tap World*, which showcases modern tap virtuosos and demonstrates the community-building potential of the form.

Next, the sisters want to create a TV documentary series about their lives as

us, so our responsibility is to create work. We’re trying to create an industry.”

**I**t’s showtime at Aaron Davis Hall. *Apt. 33: Where Dreams Are Made* is based on the stories of tap dancers in New York who have used Chloe and Maud’s real-life Washington Heights apartment (unit 33) as their communal crib. Choreographed by Chloe, the show projects *Fame*-era wholesomeness juxtaposed with present-day issues, as if the graffiti-covered New York of 1980 — the auditions and rehearsals and blue Greek-diner coffee cups — had fused with Black Lives Matter and an affordable-housing shortage.

Like many artists, the sisters are anguished by the unending incidents of police violence against African-Americans. They know plenty of people with stories, and have had their own disturbing run-ins. They wanted to say something in the show, to present a united front against what Maud calls “blind hatred,” a solidarity underscored by the diversity of the dancers, who come from India, Australia, Honduras, Montana, Brazil. “We can’t push forward unless we’re a collective,” says Chloe. “It can’t just be African-Americans fighting for our rights; it has to be *everybody* saying these are *human* rights.”

Onstage, video images pulsed behind the dancers on a large screen. Midway through the show, an ensemble performed a piece called “One Day . . .,” set to the ballad “Glory,” by Common and John Legend, from the movie *Selma*. As cell-phone footage of police violence played onscreen — of bodies lying unattended, of grief and terror and outrage — the lead dancer, Gerson Lanza, stomped ecstatically, mournfully, transmuting the dynamics of a national emergency into furious rhythm; and as the screen flashed with clips of civil-rights protests past and present, the dancers nailed the insistent steps, and ended with their fists raised in unity and defiance.

There was a soundless shiver. And then, one after another, the people stood. They clapped, whistled, called out, cried out. The air trembled. Tap had spoken. ✪

“WE HAVE DANCERS AROUND THE WORLD ASPIRING TO WORK WITH US, SO OUR RESPONSIBILITY IS TO CREATE WORK.”

line, Ivy Park, in April. A week later, the pop star Prince, another major influence on Chloe and Maud, died unexpectedly. Syncopated Ladies made a tribute video, set to “When Doves Cry.” That one has topped twenty-five million views.

Says Morrison, “Probably more people have seen tap dance through the ‘Formation’

tap dancers and entrepreneurs, and build franchised shows for Syncopated Ladies and Apartment 33 so that they can do their favorite thing: hire dancers, especially women dancers.

“Women have been marginalized in tap,” says Chloe. “We have dancers around the world aspiring to work with

# Policing the Police

Jeffrey Fagan, a professor of law, the director of Columbia Law School's Center for Crime, Community, and Law, and a professor of epidemiology at the Mailman School of Public Health, is a leading American criminologist who studies policing and race. We asked him to assess the relationship between police and minority communities and suggest how it might be improved.

By Fred Strasser



**Columbia Magazine: Mistrust of police in African-American communities seems to be more pronounced than ever. Is it growing?**

**Jeffrey Fagan:** We all know the names — Eric Garner, Walter Scott, Laquan McDonald, Freddie Gray. The mistrust has exploded into the national consciousness after a series of high-profile deaths, many of them caught on video. But it's always been there. In the 1980s, the General Social Survey found a big gap in trust of the police between Black people and white people. Further back, the Kerner Commission, which assessed the causes and consequences of the urban riots of the 1960s, found that outbreaks in cities including Newark, Los Angeles, and Detroit were sparked in nearly every case by an incident of police abuse. Deep anger had built up toward the police based on what people in the Black community perceived as historical maltreatment.

**What are the major problems in policing today?**

There's greater emphasis on pursuing low-level crimes and disorder, using fairly aggressive tactics. People who are suspected of minor crimes are often automatically arrested

rather than fined or given a warning. Cities around the country have embraced a model sometimes called "broken windows" policing, and with it a variety of tactics that include "stop and frisk," the theory being that combating low-level offenses prevents more serious crime. Also, the way police interact with citizens can be harsh and disrespectful, and often uses racialized language. These stories are widely shared in the Black community. It's hard to statistically pinpoint the use of force, but certainly the crowd-sourced data we have on police shootings suggests that this has been going on throughout the past decade.

**You appeared as an expert witness in *Floyd v. City of New York*, the case that ended the city's controversial "stop and frisk" program. How did that practice begin?**

The idea of an investigative stop goes all the way back to what's called the common-law right of inquiry. Police have always had the right to stop someone and say, hello, how are you, what are you doing here? You're not always obligated to answer, but police certainly have the right to ask. In 1968, the US Supreme Court set the legal standard for

these stops: police need only be able to articulate a reasonable suspicion that a person has committed or is about to commit a crime. If they have a reasonable suspicion that the person is armed, they can also pat the person down. The practice grew quite a bit in the 1980s during the war on drugs, and in the 1990s it expanded further as police departments adopted broken-windows policing. In short, a tactic that had been used fairly judiciously by police became weaponized, and the brunt of that fell on Black communities. In *Floyd*, the court found the city's program unconstitutional in practice because it disproportionately focused on Blacks and Hispanics, and too often officers lacked the reasonable suspicion that the law required. In 90 percent of stops, the police came up empty-handed.

**In his 2016 campaign, President-elect Donald Trump said that stop and frisk succeeded in New York and should therefore become national policy. Constitutional considerations aside, did the program reduce crime?**

The evidence is tenuous. There are studies — including a few I worked on — that suggest that stop and frisk had a very minor effect. But recent research shows that a more selective use of stop and frisk, in which police follow the higher legal standard of probable cause rather than reasonable suspicion, is more likely to deter crime, since more of the people being stopped will actually be criminals. That said, given everything we know empirically, it would certainly be a wrong-headed national policy.

that threatens the security of everyone. Listen, there's a reason kids say "Don't snitch": they don't feel the police act in the best interests of the neighborhood. In addition to alienation, we've also observed that young men who have been stopped and treated harshly by the police experience mental-health problems including posttraumatic stress, anxiety, and insomnia.

**Many people, particularly members of minorities, believe that police officers are seldom called to account for improper or illegal actions. Is that perception accurate?**

Police discipline suffers from a lack of transparency. I suspect that people might have a bit more trust in the police if they were able to see how the officers who they report violated their rights are punished within the department. Also, legal barriers to obtaining personnel records make it impossible to test the bad-apple theory, which holds that a small number of officers commit the bulk of improper acts. And prosecutions are rare, because police work closely with prosecutors. Police also work under the doctrine of "qualified immunity," meaning that they are generally protected from civil or criminal liability as long as they are acting within the expected conduct of their jobs.

**If you were designing the New York Police Department from the ground up, where would you start?**

First, I'd reconsider the criteria for recruitment. There's probably a skill set needed for the modern era that not all the members of the current corps have: cognitive skills for discerning risk and suspicion; temperamental skills like the ability to regulate one's conduct and see certain interactions as behavioral problems to be managed rather than personal affronts — skills that would help officers conduct everyday policing in a way that diminishes tension. We need people who are more acutely aware of the law and how it works. I would pay police more and would be more aggressive with firings and promotions.

**FBI director James Comey claimed that a "viral-video effect" is discouraging officers from fighting crime, for fear that they'll be accused of using excessive force. Does the viral-video effect really exist?**

I haven't seen any evidence of it. Police shootings have gone up since 2014. If anything, police seem to have become a little more aggressive. In any

case, what would it mean to the public if the police did take a step back? New York went through a short-lived experiment in de-policing at the end of 2014 and early 2015 in a protest against Mayor Bill de Blasio's supposed lack of support. The police virtually stopped writing tickets and making arrests for low-level quality-of-life crimes. Total arrests dropped by more than half. Crime rates didn't go up. So even if there were a viral-video effect, it might not embolden bad guys to go out and commit crimes. ❖



**How did the expansion of stop and frisk affect police relations with minority communities?**

People who were already suspicious of the police tipped over the edge into complete alienation and cynicism. That has severe consequences for society. Police are heavily dependent on communities to help them investigate crimes. They need citizens to identify witnesses, testify in court, serve on juries, and so forth. The more you alienate a community through harsh policing tactics, the less likely people are to get involved, and

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# EXPLORATIONS

FRONTIERS OF  
RESEARCH AND  
DISCOVERY

A wildfire near  
Fawnskin,  
California.



## Climate change fuels significant increase in US forest fires

**W**ildfires have been consuming forests in the western US at a devastating pace, with the amount of land burned annually increasing ninefold between 1984 and 2015. Last year alone, 1.5 million acres were destroyed by fire — an area half the size of Connecticut.

Now, a new study has confirmed what many experts

have long suspected: that human-induced climate change is fueling the infernos.

“Climate change is the single most important factor driving the trend, being responsible for nearly half the total increase in fire activity,” says A. Park Williams, a climatologist at Columbia’s Lamont-Doherty Earth Observatory, who coauthored the study with John Abatzoglou of the

University of Idaho. “Since 1984, it has led to the loss of about twenty-four million acres, whereas fourteen million acres would have burned otherwise.”

Average temperatures in the western United States have gone up about 2.5 degrees Fahrenheit over the last century, and as the air warms it is sucking the moisture out of trees, plants, dead vegetation, and soil at a faster rate, making them more susceptible to fire.

Williams and Abatzoglou calculated the effect that this drying process has had on fires by comparing the aridity of forests in any given year —

based on historical drought indexes — to the amount of land that burned. They found a direct relationship, with the worst fires occurring in the driest years.

“We then worked backward, using the latest climate models, to determine how much of each year’s aridity was likely caused by anthropogenic climate change,” says Williams.

The scientists say that several other factors are driving the intensity and scope of US forest fires. One is natural climate variation. Most notably, cyclical changes in oceanic currents have steered rain and snowstorms away from the western US in recent decades, exacerbating drought conditions.

Williams and Abatzoglou say that their study may actually understate the impact that human-induced climate change is having on forest fires, because it does not account for some factors that could be offshoots of global warming. These include the millions of trees killed in the US in recent years by warm-weather-loving beetles, and declines in spring-time soil moisture brought on by earlier snowmelt. There is also evidence that lightning — which causes many forest fires — may increase with warming.

In the coming years, the scientists say, fires in the western US will continue to intensify. “The magnitude of fires that we’re seeing now is very different from what we saw in the 1980s,” says Williams. “And in the 2030s, fires will probably dwarf those that we’re seeing today.”

## Revealing the true hunting habits of Yankee whalers

In the nineteenth century, a poor man seeking adventure could take a job on an American whaling ship, a dangerous and not always lucrative undertaking. A typical expedition might sail south to the Caribbean, around Cape Horn, out to Easter Island and Hawaii, and then north to Alaska before returning to

published a quantitative assessment of the non-cetacean kills made by Yankee whalers. The study, which is based on his team’s analysis of dozens of ship logbooks, shows that the ecological damage wrought by the American whaling industry extended far beyond the decimation of certain whale species. Walrus

on the northern coast of Alaska, for example, were killed en masse when whaling ships began frequenting the region in the 1850s.

“The men were mainly interested in the walrus’ ivory tusks at first,” says Drew. “But they soon discovered that they could also render their blubber into a cheap substitute for whale oil.”

Hunting was so extensive, the logbooks indicate, that by the late 1880s



**Above:** Pages from the logbook of an American whaling ship. **Below:** Carcasses of a walrus and fur seal killed by whalers.

New England three or four years later. The pay was uncertain because if a crew did not secure a sufficient amount of whale oil in that time, everyone onboard would be in debt to the ship’s owners upon their return. Given the vagaries of the industry, it’s not surprising that some men, looking to earn extra cash, would periodically go ashore and hunt animals for furs, skins, or ivory.

This year, a team of Columbia researchers led by Joshua Drew, a lecturer in the Department of Ecology, Evolution, and Environmental Biology,

whalers passing through the region could no longer find any walrus. As a result, they shifted their attention to killing and skinning seals, polar bears, reindeer, caribou, rabbits, and foxes.

Drew’s paper, which appeared in the journal *Ecology and Evolution*,



## EXPLORATIONS

grew out of a midterm project that he assigned to undergraduates in his Historical Ecology course. The course teaches students to use unconventional sources of data to ascertain how people in the past affected their natural environment. In this case, the data came from a collection of whaling records, representing seventy-four voyages between 1846 and 1901, recently digitized by Massachusetts's New Bedford Whaling Museum. The logbooks, which were typically produced by a ship's first mate, contain surprisingly detailed accounts of their crews' daily activities.

"Many of the logbooks contain descriptions of every single animal the crew killed, often with little drawings to depict species the men hadn't seen before," says paper coauthor Elora López '15CC, who is now a graduate student at Stanford. "We spent weeks skimming through them."

Studying the hunting habits of nineteenth-century whalers gives scientists a clearer picture of the wildlife that inhabited particular places before settlers arrived. And this, Drew says, helps preservation efforts that aim to restore human-disrupted ecologies to their original states.

"Some islands in the Arctic that are thought to be pristine were actually hunted by the whaling crews," says Drew. "Our study suggests that the scientists' current baselines for some species in the region could be too low."



## STUDY: "WHEAT SENSITIVITY" IS REAL

**A** team of Columbia scientists say they have found the first physiological evidence that people who test negative for celiac disease and other forms of wheat allergy can still get sick from eating wheat.

In a study published in the journal *Gut*, the researchers say they found signs of wheat-inflicted intestinal damage and inflammation in dozens of such patients. The researchers have not yet determined if gluten — a protein in wheat that provokes an autoimmune reaction in celiac sufferers — or another component of the grain may be making people ill.

Physicians have lately struggled to make sense of the fact that many

patients complain of feeling sick after consuming wheat and related grains even though they lack the diagnostic markers for celiac disease — which include a particular antibody in the blood and a distinct form of damage to the intestine. Some have suggested that increased public awareness of celiac disease has led people to imagine their symptoms. Others insist that these patients are suffering from a disorder similar to celiac disease — "non-celiac wheat sensitivity," or NCWS, some have called it — that has yet to be formally described by medical researchers.

The new Columbia study strongly suggests that NCWS is a real condition. "The people who complained of celiac-like symptoms had several types of immune markers in their blood that you don't see in celiac patients," says Armin Alaedini, an assistant professor of medicine at Columbia University Medical Center and the paper's senior author. These patients, he says, also reported slightly different symptoms than are typical in celiac disease, such as the sudden onset of nausea and diarrhea. Many of them said that within a few hours of eating wheat they would also experience mood swings, depression, anxiety, or mental foggi-ness — symptoms that are much less common among celiac patients.

The researchers are now planning follow-up studies to fully understand the causes of NCWS and to develop diagnostic tests.

"Figuring out a way to identify people with this condition is crucial," says Peter H. R. Green, a gastroenterologist who directs Columbia's Celiac Disease Center and is a coauthor of the new paper. "Too often, people with non-celiac wheat sensitivity are told by doctors that they're hypochondriacs, or else they are misdiagnosed with conditions like irritable-bowel syndrome or Crohn's disease. If we can develop a comprehensive test for wheat intolerance, people will finally be able to get the right treatment."

# Some credence to clear-water revival

In 1984, when the federal government declared a two-hundred-mile stretch of the Hudson River a Superfund cleanup site, the waterway was generally off-limits for recreational use. Now, after decades of progress in controlling industrial pollution, many towns along the river are again encouraging swimming and water sports.

But is all this splashing around really a good idea?

system, from the headwaters in the upstate town of Keene to New York Harbor. The results, published on the website of the environmental nonprofit Riverkeeper, gave the Hudson a spotty but mostly positive health report.

The scientists' primary concern was testing for *Enterococcus*, bacteria that live in the guts of warm-blooded animals, including humans, and are therefore a good indicator

to discharge the filthy mixture without treating it," says Juhl. "If you come into contact with that water, you risk picking up bacteria or viruses that could give you an upset stomach, a skin rash, or an ear or eye infection."

Juhl and his colleagues found the worst fecal contamination not in the Hudson itself but in several of its tributaries, including the Mohawk, Wallkill, and Saw Mill Rivers and Sparkill

tempting to do through DNA analysis with Queens College microbiologist Greg O'Mullan — is difficult but vital.

"If the source of contamination is a dog park or a flock of geese, the management solution is different than if it's a farm or a failing sewage system," says Juhl.

The most immediate lesson to be drawn from Juhl's research, he says, is that water-quality testing should be done routinely in recre-



Andrew Juhl, a Columbia marine biologist, and Greg O'Mullan, a Queens College microbiologist, collect a sample at the headwaters of the Hudson River.

"Yes and no," says Andrew Juhl, a Columbia marine biologist who studies the microbial ecology of rivers, lakes, and estuaries. "The Hudson is much cleaner than it used to be — but it still has its bad days."

This past summer, Juhl and colleagues from several other institutions conducted an unprecedented health check of the entire 315-mile river

of fecal contamination. Pathogens found in feces, Juhl says, pose the most acute public-health threat in the Hudson River system today. He says that fecal contamination is especially a problem during heavy rains, when sewage pipes get inundated with storm water.

"The increased flow can overwhelm water-treatment plants, which may be forced

Creek. The waters surrounding New York City, in comparison, generally showed safe levels of *Enterococcus*.

"The smaller the river, the longer it takes for contaminants to get diluted," says Juhl.

Both human and animal waste find their way into the Hudson River system. Identifying which is to blame in any given case of contamination — which Juhl is now at-

tional areas. He says that water conditions at many locations in the Hudson River system vary dramatically from week to week, or even day to day, depending on the weather and other factors.

"People are accessing the rivers at more and more locations, which is good," says Juhl. "But that makes monitoring efforts more important than ever."

# Chemists discover key to improving solar power

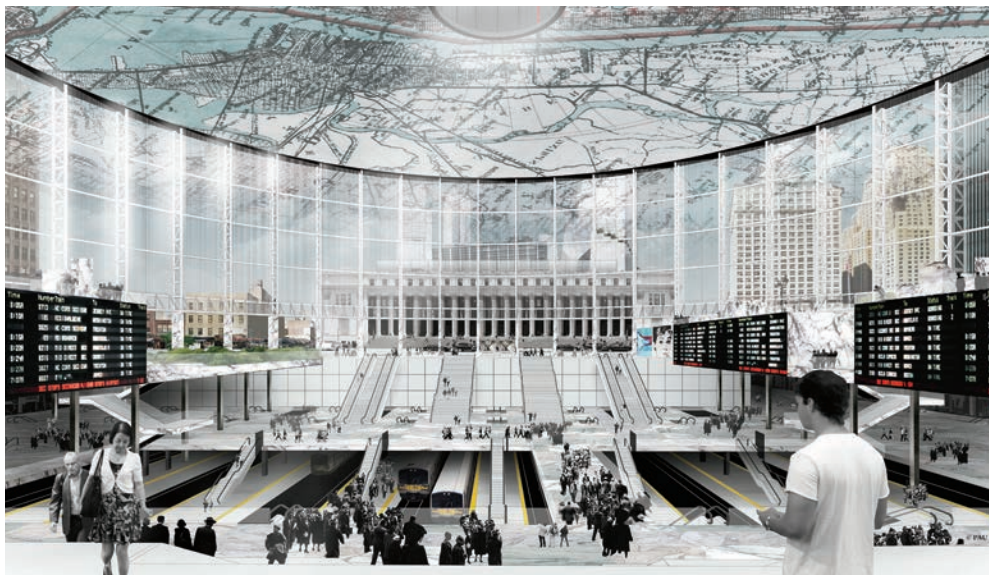
In the race to make solar power more economical, one of the most exciting recent discoveries is that solar cells can be manufactured at a lower cost using crystals called perovskites instead of silicon. These solar cells have not been made commercially available, however, in part because perovskite crystals contain lead, which scientists fear could leach into the environment.

Now a group of Columbia chemists say they have found a way around this impasse. By carefully examining how perovskites convert sunlight into electricity, the researchers have concluded that conductive crystals could be made from any number of materials. They say the discovery opens up many new possibilities for designing super-efficient solar cells.

“What we’ve done is describe the fundamental structural properties that make perovskites such great semiconductors,” says chemistry professor Xiaoyang Zhu, who reported his team’s results in the journal *Science*. “And our findings suggest that similar semiconductors could be made from nontoxic metals or synthetic substances.”

In the past few years, many scientists have experimented with making perovskites out of tin, which resembles lead in its chemical properties, only to find that the resulting crystals underperform as solar-cell components. Zhu says that his research ought to reenergize these efforts, since it suggests that perovskites made of tin or altogether different elements, if produced correctly, could act as efficient semiconductors.

## Penn Station in a brand-new light



What would it take to turn New York’s Pennsylvania Station — that labyrinth of tunnels beneath Madison Square Garden — into a public space as majestic as Grand Central Terminal?

As a former New York City planning official, Vishaan Chakrabarti, also an associate

professor at Columbia’s Graduate School of Architecture, Planning, and Preservation, has been pondering this question for years. And this fall, amid growing public debate about how to refurbish the station, he released a plan. It calls for relocating the Madison Square Garden arena and then recycling the building: replacing its concrete cladding with glass and tearing

up its floor to reveal the trains underneath. (See above.)

“Arriving passengers would look up and see the city all around them,” says Chakrabarti, who shared his proposal in a *New York Times* op-ed in October.

Penn Station currently serves 650,000 passengers a day — triple what it was designed for. Critics say that the congestion has only

intensified the need to address a litany of shortcomings that have always made the station perplexing and unsafe: a confusing layout, poor ventilation, and a lack of sightlines to the city outside.

Earlier this year, New York governor Andrew Cuomo announced a plan to alleviate some of the station’s overcrowding by turning an adjacent property, the James A. Farley Post Office, into a terminal annex.

Chakrabarti says that his proposal complements the governor’s plan but goes further, using the station’s expansion as an opportunity to bring it into the twenty-first century. And he says that his entrance pavilion would cost much less to develop than a number of other, similarly ambitious ones that have been proposed, since it would reuse Madison Square Garden’s foundation and structure.

“This is a realistic, economical plan to create a grand civic space,” he says.





## Data mining reveals risky drug combos

**T**hey are two of the most commonly prescribed drugs in the United States: the heartburn medication Prevacid and the antibiotic Rocephin. Taken separately, neither is known to cause heart problems. If taken together, however, they may short-circuit an electrical pathway in the heart, causing it to beat irregularly and putting a patient at risk of cardiac arrest.

A team of Columbia data scientists recently discovered this potentially dangerous drug combination, along with three others, after analyzing an online archive of medical records maintained by the US Food and Drug Administration. The scientists, whose findings appeared in the *Journal of the American College of Cardiology*, are among the first ever to identify risky drug combinations by spotting patterns in large data sets, rather than by investigating drugs that had already been flagged by physicians as potentially dangerous.

Led by Nicholas Tatonetti, an assistant professor of biomedical informatics at Columbia, the scientists searched the FDA database for drugs that had never been known to cause heart problems but that share side effects with those that had — a deductive technique that Tatonetti had developed and proved effective. After identifying hundreds of such medications, they consulted Columbia University Medical Center's records to see if patients who had taken these medications in various combinations later experienced heart problems. The combination of Prevacid and Rocephin was among the apparently risky pairs that stood out; people who had taken these drugs together were 40 percent more likely to develop a heart condition that can cause dangerous arrhythmias.

Tatonetti says that additional research will be necessary to prove that the discoveries warrant changes to prescription guidelines. But even more important than his team's specific findings, he says, is that they modeled a new way of conducting medical research.

"There is currently a lot of skepticism about whether big data is worth the hype," he says. "I hope that our study ameliorates some of this doubt."

Nicholas Tatonetti, center, and members of his research team: from left, Tal Lorberbaum, Phyllis Thangaraj, and Kevin Sampson.

### STUDY HALL RESEARCH BRIEFS

#### Razzle-dazzle 'em

Smarts, strategy, and performance are important, but they alone won't get you the top job. A study of 2,600 executives coauthored by Morten Sørensen, an adjunct associate professor at Columbia Business School, found that job candidates who also rate high on charisma are most likely to be hired as CEOs.

**Pot payoff** In states that have legalized medical marijuana, fewer people appear to be using opioids, according to a new study by researchers at Columbia's Mailman School of Public Health.

**Big dustup** A team of geologists that includes Columbia's Dennis Kent, an adjunct senior research scientist at Lamont-Doherty Earth Observatory, has found evidence that an ancient period of global warming was caused by a comet that struck the earth fifty-five million years ago, forcing enormous amounts of carbon into the atmosphere.

**Blue note** Pregnant women who take selective serotonin reuptake inhibitors, or SSRIs, the most common form of antidepressant, increase their children's risk of speech and language disorders from about 1 percent to 1.37 percent. The study of 65,000 mothers in Finland, which was led by Columbia psychiatrist and epidemiologist Alan Brown, adds to a growing body of research that indicates SSRIs are potentially harmful to fetuses.

**Mind over money** Companies that take their social responsibility seriously can save on salaries. A study by Vanessa Burbano, an assistant professor of management at Columbia Business School, found that people applying for jobs in the for-profit sector submitted wage bids that were 44 percent lower, on average, if they were informed of a company's ethical business practices.

**Enthusiasm gap** Male geoscientists are less likely to give female students enthusiastic recommendations for postdoctoral fellowships, according to a new study of letters written by 1,224 faculty at five hundred institutions worldwide. The male scientists tend to describe women as "hard-working" and "diligent," while reserving such accolades as "brilliant" and "superb" for men, says lead author Kuheli Dutt, an assistant director of academic affairs and diversity at Columbia's Lamont-Doherty Earth Observatory.

**Toss the toupee** Columbia University Medical Center researchers have discovered that a drug used to treat bone cancers and arthritis promotes hair growth in people with alopecia areata, a condition that causes hair loss. Of the small sample size studied, 75 percent of patients experienced hair regrowth after six to nine months of treatment. The scientists plan to test the same drug on male pattern baldness.

— Julia Joy

# NETWORK

## YOUR ALUMNI CONNECTION

### The National Museum of African American History and Culture A Virtual Tour with Mabel O. Wilson '91GSAPP



On September 24, 2016, President Barack Obama '83CC opened the Smithsonian's National Museum of African American History and Culture — an institution, he said, that seeks to reaffirm “that African-American history is not somehow separate from our larger American story. It's not the underside of the American story. It is central to the American story.” The four-hundred-thousand-square-foot museum, designed by David Adjaye, displays more than three thousand artifacts. Mabel O. Wilson '91GSAPP, a professor at Columbia's Graduate School of Architecture, Planning, and Preservation and a scholar of African-American studies, wrote the official companion book to the museum. Here she highlights some of the building's most meaningful architectural features.



#### **DISTINCT FAÇADE**

The building has a triple-tiered corona, a decorative façade that gives it a very distinct shape. It is particularly striking on the National Mall, which is dominated by classical architecture. The tiers are meant to recall hands raised in celebration, and also the West African caryatid, a ceremonial sculpture from Yorubaland, in what is now Nigeria.

# Products with a Purpose

Industrial designer Diana Sierra '12SPS spent almost a decade designing sunglasses, watches, and perfume bottles for companies like Kenneth Cole and Nike. But her proudest creation — and the one that would transform her professional life — was a little less glamorous: a reusable, sustainable sanitary pad for girls in developing nations who lack access to menstrual products.

The idea came to Sierra in 2012 when she was pursuing her master's degree in sustainability management. She had come to Columbia looking for more meaningful ways to apply her skill set. "As an industrial designer, you rarely get to choose what you work on," she says. "After a while, I felt like I was making products that had no purpose. I wanted to design something that actually improved people's lives."

Toward the end of the program, Sierra traveled to Uganda as an intern for the Millennium Villages Project, a development initiative co-led by Columbia's Earth Institute that helps communities in Africa lift themselves out of poverty. There, she learned something troubling from one of the village's schoolteachers:

## SUBTLE DETAILS

The building is covered in metallic panels that morph from reddish gold to deep sepia in the changing light. The lace detail is based on wrought-iron construction that you see on railings and balconies in New Orleans, Charleston, and other parts of the American South. Most of that work was done by Black slaves who were, of course, not credited for their craftsmanship. There's Black history hidden in plain sight everywhere; we just don't recognize it.



## OPEN SPACES

Most museums have a cloistered, enclosed interior. This museum opens into a huge space with vast floor-to-ceiling windows. You feel suspended between the inside and the outside. The space evokes the clearing field — the middle of an open field of crops — which was the only community gathering space for many slaves.



## INSPIRING VIEWS

The view from the upper floors is powerful. Large windows look directly out onto the Washington Monument and, at different points, out to the Mall, the Capitol, the White House, and the city itself. Washington, DC is an important character in the African-American story; the strategically placed windows are also an important reminder that this museum is not just about African-Americans, but about the American experience as a whole.



## NETWORK

once girls got their period, they started missing a week of class every month because they didn't have access to pads or tampons. "Girls would use anything they could find, like dried grasses and pieces of old mattresses," says Sierra. Not only were these materials unhygienic and irritating, but they would also fall out of a girl's underwear when she moved. "The girls eventually stayed home so often that their parents pulled them out of school," says Sierra.

Sierra was stunned. "Basically, these girls were being denied an education because

taboo subject in Uganda that the girls couldn't believe I was even talking about it," says Sierra.

The pad got a thumbs-up, and with the help of her teachers and the Millennium Villages Project, Sierra refined the pads and tested them in other countries. "I discovered that girls in Tanzania and Malawi didn't even have underwear, which led me to develop panties with a built-in sanitary pouch," she says. In 2014, Sierra and her Columbia classmate Pablo Freund '12SPS launched Be Girl, a for-profit social enterprise that provides the pads

and underwear to girls in developing countries. The underwear is also available to the general public at [Begirl.org](http://Begirl.org); for each pair purchased, the company donates a pair to a girl in need.

In the past two years, Be Girl has distrib-

uted over sixteen thousand pads and panties in twenty-three countries. Sierra credits much of her success to the creative freedom and support she received at Columbia. "I came from a humble background myself," says Sierra, who grew up in rural Colombia. "My hometown didn't even appear on Google Maps until last year. Now I'm traveling the world helping people. It's my dream job."

— Jessica Brown



Diana Sierra shows Be Girl underwear to a group of schoolgirls in Uganda.

of their biology," she says. "It was the kind of problem industrial designers are meant to solve." She used the few materials she had with her in Uganda — umbrellas, mosquito netting, scissors, and a needle and thread — to develop a prototype of a reusable sanitary pad with a permeable pouch that could be filled with any type of safe, absorbent material such as toilet paper or washable cloth. After getting approval from the teacher and the girls' parents, she gave the pads to the students to test. "Menstruation is such a



**Measures**, an installation of three hand-painted sculptures by Josephine Halvorson '07SOA, was on display this fall at the Storm King Art Center, in New York's Hudson Valley. The piece was a part of the center's annual Outlook series, which honors one emerging artist by commissioning a site-specific piece. All three sculptures play with scale: a twelve-foot sundial (above), a twenty-four-foot measuring stick camouflaged as a tree, and a thirty-six-foot yellow yardstick that rests horizontally in an open field. "I want these painted sculptures to heighten an individual's curiosity for the environment and his or her place within it," Halvorson says.

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▶ **A subscription to Try the World**, which sends a monthly box of gourmet ingredients from different countries. \$39 per delivery. [trytheworld.com](http://trytheworld.com)



# Reporting Reimagined

“I always wanted to be a foreign correspondent,” says Peter Klein ’93JRN. He recalls watching the 1984 film *The Killing*

*Fields* as a teenager and idolizing the heroic journalist Sydney Schanberg, who braved Pol Pot’s notorious Communist guerillas to cover the 1970s Cambodian genocide for the *New York Times*. “I wanted to be him.”

Schanberg made it back home to collect a Pulitzer Prize, but he saw scores of his Cambodian colleagues and sources marched to their deaths by the Khmer Rouge. This fact — the relative safety of Western correspondents in relation to the life-or-death risks taken by the local “fixers” who serve as their interpreters and guides — was not lost on Klein, even as a young person. In the thirty years since, he has held onto the notion that international journalism needed a reboot. Now he’s giving it one.

This June, Klein became the founding director of the Global Reporting Centre, a Vancouver-based nonprofit that reports international stories in cooperation with local journalists. The center, which grew out of a program that Klein created in 2008 to take University of British Columbia graduate journalism students on overseas reporting trips, hopes to reinvigorate enterprise reporting and cover global issues that are currently underreported.

## NETWORK

Klein first began thinking about how to help international and local journalists create better collaborations in the 1990s, when he covered the Bosnian war for National Public Radio and the *Christian Science Monitor*. While he traveled the area for months, learning

a global network of international and local journalists and academics to showcase voices that would have gone unheard in the for-profit media environment. For one recent project, the center partnered with an independent media organization in Mogadishu, Somalia. The



the dialects and immersing himself in the culture, he was concerned when he saw “these reporters from New York and London coming in with their little reporter vests out of a *Doonesbury* cartoon, flying in for a couple of days, not speaking one word of any of the languages, having very little knowledge of the history of why this war was going on.”

He knew this was a systemic issue. “I thought about what a fraud this is,” he says, “and yet somehow I got sucked into that world. I would parachute into a country that I knew very little about and try to do the best I could.”

Over the following two decades, Klein would build an enviable résumé, reporting and producing for news programs such as *60 Minutes* and *Nightline*.

With the Global Reporting Centre, he’s now established

team there was fitted with body cameras to offer a reporter’s-eye view of what it’s like to be a journalist in the East African country, where more than fifty reporters have been murdered in the past twelve years. Another project uses local reporting teams to examine how the mentally ill are treated in the slums of Mumbai, the refugee camps of Jordan, and the rural West African nations of Togo and Benin.

Klein admits that courting donors and filling out grant applications leaves him little time to be where he’s always wanted to be: the front lines of a story. But his efforts to expand the role of nonprofit journalism on a global level are already paying off — plans are in the works for two more centers to open in Europe and India.

— Chris Cannon

## ASK AN ALUM

**Amy Schapiro '12SW** is a consultant and leader of Women Techmakers, Google’s global program to support women in technology.

**You have a degree in social work. How can social work inform technology?**

Social work is a field that emphasizes relationships, empathy, and community. Incorporating these principles can help ensure that industries that build technology reflect diverse human experiences. Their products can then serve people in a way that supports that kind of diversity.

**What are some of the obstacles that women interested in science, technology, engineering, and math (or STEM) face?**

It differs based on various institutional and cultural barriers around the world. Often there is a lack of access to (or at least a lack of support for) educational and professional opportunities. Once in the industry, many women face obstacles like unconscious bias in company culture and policies, as well as lower pay than men.

**What are some of the resources available to help combat those challenges?**

There are a lot of great organizations that have been incredibly helpful to women in the global technology industry. For example, the Women Techmakers membership program that I developed provides personally curated resources for women and allies in tech. The National Center for Women and Information Technology also publishes a lot of resources to support women. The re:Work program provides training in unconscious bias and instruction guides on how to build effective management programs that ensure a supportive and inclusive environment.

**What advice do you have for the parents of young girls interested in STEM?**

There’s a saying that “you can’t be what you can’t see,” and this message is particularly salient for underrepresented communities. So I would encourage families to expose young girls to environments where peers, mentors, and role models are also involved in STEM, so they can see the possibilities. A lot of my work with Women Techmakers focuses on increasing the visibility of rising and

established technologists from underrepresented communities. That increased visibility not only provides them with a platform that they didn’t previously have: it also provides evidence that people from all sorts of backgrounds can thrive in tech.



# That's Amaro

Brad Thomas Parsons '95SOA is an amiable man with an unusual motto: "Stay bitter." Fortunately, this has nothing to do with cynicism and everything to do with cocktails. After studying fiction-writing at Columbia and working for a decade as a cookbook editor at Amazon, Parsons published a James Beard Award-winning guide to cocktail bitters in 2011. His follow-up, *Amaro*, published this fall, is an ode to amari — bittersweet herbal Italian liqueurs that are the star ingredient in classic cocktails like the negroni. "Americans are starting to embrace bitter as a flavor," says Parsons, "and bartenders are dusting off their old bottles and creating some lovely new drinks." With more than one hundred recipes in his new book, Parsons is happy to join the cause. Here he shares a seasonal punch perfect for holiday parties.



## Cranberry Beret

### MAKES 1 DRINK

- 1 orange wedge
- 12 fresh cranberries
- 1½ ounces Laird's Straight Apple Brandy
- ½ ounce Amaro CioCiaro
- ½ ounce Aperol
- 2 dashes cranberry bitters
- Hard apple cider
- Garnish: orange zest and 3 fresh cranberries, skewered

Combine the orange wedge and cranberries in a cocktail shaker and muddle until the fruit is just broken up. Add the apple brandy, Amaro CioCiaro, Aperol, and bitters and fill with ice. Shake until chilled and double-strain into a collins glass filled with ice. Top off with the hard apple cider. Garnish with the orange zest and skewered cranberries.

## NEWSMAKERS

- **Jimmy Keyrouz '16SOA** and **Felecia Hunter '13GS, '16SOA** won the narrative-film Oscar at the 2016 Student Academy Awards this fall. Their film, *Nocturne in Black*, which was directed by Keyrouz and co-produced by Hunter, is about a musician trying to rebuild his piano in a war-torn Middle Eastern neighborhood.
- New York City health commissioner **Mary Bassett '79PS** won the Frank A. Calderone Prize, one of the most prestigious honors in the field of public health. Bassett is also an associate professor of epidemiology at Columbia's Mailman School of Public Health.
- Authors **James McBride '80JRN** and **Louis Menand '80GSAS** were two of this year's twelve National Humanities Medal winners. The award, which President Barack Obama '83CC granted in a September ceremony at the White House, is the highest national recognition of achievement in the humanities. McBride is a novelist, memoirist, and biographer who won the 2013 National Book Award for his novel *The Good Lord Bird*. Menand is a critic, essayist, and professor of literature and language at Harvard University. Keyboardist, composer, and arranger **Dick Hyman '48CC** was also honored this fall as a National Endowment for the Arts Jazz Masters Fellow, which comes with \$25,000 and a tribute concert.
- **Jorge Daniel Veneciano '06GSAS** was named director of New York's Museum of Arts and Design. A native of Argentina, Veneciano studied English and comparative literature at Columbia. He was most recently the executive director of El Museo del Barrio, in Harlem.
- **Claudia Rankine '93SOA** was named a 2016 MacArthur Fellow. Rankine, a professor of poetry at Yale University, is the author of five volumes of poetry, two plays, and several essays. Her most recent work, a book-length poem called *Citizen*, won the 2014 National Book Critics Circle Award in poetry and was a finalist for the 2014 National Book Award.
- **Mia Alvar '07SOA** won the Janet Heidinger Kafka Prize for her debut story collection, *In the Country*. The prize is given annually by the University of Rochester to "promising but less established" women authors. Past winners include Toni Morrison, Ursula K. Le Guin '52GSAS, and Ann Patchett.



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# BULLETIN

## UNIVERSITY NEWS AND VIEWS

The Jerome L. Greene Science Center is one of two new buildings that will open in Manhattanville this spring.

### COLUMBIA DEDICATES NEW MANHATTANVILLE CAMPUS

University leaders recently dedicated the new Manhattanville campus, now taking shape west of Broadway above 125th Street — an expansion that marks Columbia’s most transformational campus development since it moved to Morningside Heights in 1897.

Institute, and the Lenfest Center for the Arts.

The Greene Science Center and the Lenfest Center will officially open in the spring. A third building on the Manhattanville campus, the University Forum and Academic Conference Center, also designed by Piano’s firm, is

far west side of Manhattan, between 125th Street and 133rd Street.

The new campus is designed to have no barriers — either between academic disciplines or between Columbia and the West Harlem community. The academic facilities will host interdisciplinary programs, and the amply landscaped grounds will be woven into the existing street grid with no walls or gates. Buildings will be open to the public and host community programming. The Jerome L. Greene Science Center, for example, will house the Education Lab, where local K–12 students and others can learn about brain science. The Wellness Center will offer free health screenings and disease-prevention services (see “Wellness Center to Open in 2017,” opposite).

“When we committed ourselves to the Manhattanville campus in West Harlem, we knew it would be essential for Columbia to use this opportunity to build exceptional spaces for our mission of teaching, research, and creativity,” said Bollinger. “We are creating a different kind of academic space than in the past, designed for the cross-disciplinary interaction that is crucial to new knowledge, within an open, accessible urban campus that encourages the University and community to engage with and strengthen one another.”



The new campus is designed to have no barriers — either between academic disciplines or between Columbia and the West Harlem community.

On October 24, President Lee C. Bollinger led a ceremony attended by distinguished faculty, deans, and students, as well as local civic and community leaders and internationally renowned architect Renzo Piano of Renzo Piano Building Workshop, which designed the campus master plan with Skidmore, Owings & Merrill. Piano also designed the first buildings to rise on the campus: the Jerome L. Greene Science Center, which houses the Mortimer B. Zuckerman Mind Brain Behavior

under construction now and is expected to open in 2018. Soon to begin construction is a new home for Columbia Business School in two buildings: the Henry R. Kravis Building and the Ronald O. Perelman Center for Business Innovation, designed by Diller Scofidio + Renfro in collaboration with FXFowle.

With 6.8 million square feet of new academic space, the Manhattanville campus will be realized over the course of the next several decades in the former industrial area on the



## FELLOWSHIP PROGRAM TO COMBAT ANTI-BLACK RACISM

The Atlantic Philanthropies and Columbia University recently announced the creation of the Atlantic Fellows for Racial Equity, a ten-year, \$60 million fellowship program that will empower activists, writers, artists, and others fighting anti-Black racism in the United States or South Africa. The program, which will be based at Columbia, will support up to thirty-five people in these countries each year.

The program is the latest in an interconnected set of fellowship programs from Atlantic Philanthropies that are designed to “advance fairer, healthier, more inclusive societies.”

The Atlantic Fellows for Racial Equity will be directed by Kavitha Mediratta, who will step down as chief strategy adviser at Atlantic Philanthropies this winter to assume her new role. Alondra Nelson, Columbia’s dean of social science and a sociology professor, will serve as the lead faculty partner on the program.

The program was designed in collaboration with the leadership of Black Organizing for Leadership and Dignity (BOLD), a nonprofit based in Washington, DC; the Center for Community Change, also in Washington, DC; the NAACP Legal Defense and Educational Fund, based in New York City; the Nelson Mandela Foundation, based in South Africa; and the Haas Institute for a Fair and Inclusive Society at the University of California, Berkeley.

The new program will also support undergraduate fellows at Columbia and UC Berkeley; an annual symposium of fellows and faculty at Columbia; and a multidisciplinary research effort at UC Berkeley.

The first cohort of Atlantic Fellows for Racial Equity will be announced in 2017.



Kavitha Mediratta



Olajide Williams, top; and Sidney Hankerson, bottom.



## WELLNESS CENTER TO OPEN IN 2017

Two Columbia doctors, the neurologist Olajide Williams '04PH and the psychiatrist Sidney Hankerson, have been appointed to lead the new community Wellness Center on the first floor of the Jerome L. Greene Science Center, in Manhattanville. Operating with support from Columbia’s Mortimer B. Zuckerman Mind Brain Behavior Institute, the Wellness Center will open in the coming months. It will provide members of the local community a broad range of health services, including free blood-pressure readings, cholesterol screenings, mental-health treatment, and stroke-prevention training.

Both Williams and Hankerson are known for their pioneering approaches to improving public health in Harlem and Washington Heights. Williams, chief of

staff of neurology and associate professor of neurology at CUMC, founded Hip Hop Public Health, which uses rap music to teach youngsters health tips. Hankerson, an assistant professor of clinical psychiatry at CUMC, founded Mental Health First Aid, a program that works through religious organizations to improve locals’ access to mental-health services.

“The Wellness Center is going to be a hub for health in West Harlem,” says Hankerson. “We know that people of color — African-Americans and Latinos — are disproportionately affected by chronic medical conditions such as high blood pressure, diabetes, depression, anxiety, and stroke. Our goal is to promote education, awareness, and engagement so people can get the help and healing that they need.”

## MEDICAL CAMPUS RENAMED FOR HERBERT AND FLORENCE IRVING

Columbia University and NewYork-Presbyterian Hospital have renamed their shared medical campus in Washington Heights in honor of two of their most significant benefactors, Herbert and Florence Irving. In September, the institutions announced that the campus will now be called the Columbia University Herbert and Florence Irving Medical Center and NewYork-Presbyterian/Columbia University Irving Medical Center.

The Irving name is already well known at the medical center, which is home to

the Herbert Irving Pavilion, the Irving Cancer Research Center, the Irving Institute for Clinical and Translational Research, the Irving Radiation Oncology Center, the Irving Bone Marrow Transplant Unit, and the Herbert Irving Comprehensive Cancer Center. The Irvings' donations and commitments over time to Columbia University Medical Center and NewYork-Presbyterian will ultimately exceed \$300 million. Most recently, they made donations to support Columbia's precision-medicine initiative.

Herbert Irving was a cofounder and vice chairman of Sysco Corporation, the nation's largest food distributor. He died on October 3, at age ninety-eight, just weeks after the medical campus was named in his honor. He and Florence, both of whom were born and raised in Brooklyn, had been married for seventy-four years.

"One of the proudest things we've done has been to support the terrific doctors at Columbia and NewYork-Presbyterian," the couple said in a statement on September 21. "This is a relationship that

has endured for many years and been very important to us. We are honored to be associated in this way with these great institutions and the special people who make them what they are."

A joint statement issued by Columbia President Lee C. Bollinger, NewYork-Presbyterian president and CEO Steven J. Corwin, and Columbia University Medical Center chief executive and dean Lee Goldman praised Herbert and Florence Irving for being "among the most generous benefactors in the history of our institutions."

## DE MENOCAL APPOINTED SCIENCE DEAN

Peter B. de Menocal '92GSAS, a Columbia oceanographer and paleoclimatologist, has been appointed dean of science in the Faculty of Arts and Sciences.

As a divisional dean, he joins Sharon Marcus, dean of humanities, and Alondra Nelson, dean of social sciences.

Columbia's divisional-dean structure was established in 2011; the divisional deans work with the executive committee of the Faculty of Arts and Sciences — currently executive vice president David Madigan, Columbia College dean James J. Valentini, and Graduate School of Arts and Sciences dean Carlos J. Alonso — and other academic deans in managing the academic departments, research centers, and institutes in their divisions. The divisional deans are also responsible for establishing broader interdisciplinary research initiatives and helping to lead fundraising efforts to support them.

De Menocal, who chaired the Department of Earth and Environmental Sciences from 2011 to 2014, also directs the Center for Climate and Life at the Lamont-Doherty Earth Observatory. This fall, he was named the Thomas Alva Edison/Con Edison Professor, a newly established chair funded by the public utility company Con Edison.

"The world faces urgent challenges in climate, human health, and technology innovation, and large research universities should be leading the charge to provide answers," says de Menocal. "My goal is to help lead this charge for Columbia, to see us attack such big global problems with resources, discipline, and a sense of purpose."



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## Homecoming Victory

The Lions football team came from behind to beat Dartmouth in dramatic fashion at this year's Homecoming game at Robert K. Kraft Field. Battling rain and forty-mile-per-hour wind gusts, freshman place kicker Oren Milstein hit three field goals, including the game-winner, scoring with one minute to go in the third quarter to lift Columbia 9-7. The Lions defense then held firm, stopping the Big Green on their last drive, which ended when their placekicker missed a field goal with just twenty-seven seconds left in the game. "It was an awesome win," said Columbia head coach Al Bagnoli. "I couldn't be happier for our kids, our alumni, and the entire Columbia football community."

## YOU NEVER FORGET YOUR FIRST LIFESAVING INVENTION

This past summer, two dozen high-school students came to Columbia to learn the basics of engineering research and to design, build, and test inventions that address global health problems. Over the course of the six-week program, which was led by Columbia Engineering lecturer Aaron Kyle, the students took crash courses in subjects like electronics, materials science, medical diagnostics, and computer programming. They then pitched their ideas for original creations to a panel of biomedical-engineering professionals, whose feedback the students incorporated into their devices.



Participants in a youth science program test a water-purification system they designed.

The program, called the Hk Maker Lab, is part of Hypothekids, a science-education initiative for underserved youth in New York City.

"They learn the engineering design process and then use that to create solutions to problems that they identify," says Christine Kovich, cofounder of the Harlem Biospace, a local biotechnology incubator that runs Hypothekids in collaboration with Columbia Engineering and Teachers College.

Among the standout projects were Cathalert, a device that notifies medical professionals if a needle has been improperly inserted into a patient's vein, and Cerequa, a water-purification system that kills bacteria with sunlight.

"I came into this program knowing that I was interested in engineering and design, but I didn't know what biomedical engineers did day to day," says Gabrielle Caporusso, a high-school senior from Queens. "This program really gave me a sense of the biomedical process."

To watch video, visit [engineering.columbia.edu/news/hypothekids](http://engineering.columbia.edu/news/hypothekids).

## TRUSTEES ELECT ABIGAIL BLACK ELBAUM, MARK T. GALLOGLY

Abigail Black Elbaum '92CC, '94BUS, a New York City realty executive, and Mark T. Gallogly '86BUS, a New York City investment banker, have been elected to the University Board of Trustees. Their six-year terms began in September.

Elbaum, a principal of real-estate company Ogden CAP Properties, previously served on Columbia College's Board of Visitors.

Abigail Black Elbaum



In 2002, she received the College's Young Alumni Achievement Award and in 2015 its John Jay Award for distinguished professional achievement.



Mark T. Gallogly

Gallogly is a co-founder and managing principal of the investment firm Centerbridge Partners. He serves on the Columbia Business School's Board of Overseers and the Economic Club of New York's Board of Trustees.

"We are fortunate at Columbia to have a group of highly accomplished individuals who generously give their time, energy, and considerable wisdom to the governance of the University by serving on its board as Trustees," says Trustees chairman Jonathan Schiller '69CC, '73LAW.

## 4321

By Paul Auster '69CC, '70GSAS (Henry Holt)

**O**n the first page of Paul Auster's new novel, *4321*, a man named Isaac Reznikoff steps off a boat at Ellis Island and is asked his name. Overwhelmed by his surroundings, he blurts out in Yiddish,

*"Ikh hob fargessen"* — meaning "I've forgotten." The clerk misunderstands, and within seconds, Reznikoff's former identity is gone. In America, he will be known by the English transliteration of his Yiddish phrase: Ichabod Ferguson.

Ferguson né Reznikoff is an incidental character — the book is about his grandson, Archie — but his story is a profound beginning to a novel

preoccupied by a fundamental question: what makes someone the person he is? Is it birth or circumstance?

To find the answer, Auster '69CC, '70GSAS takes on a wildly ambitious project — telling the coming-of-age story of one boy in four separate but simultaneous narratives. In the book's prologue, there is just one Archie, born an only child in Newark, New Jersey, in 1947. But beginning with chapter 1, when Archie is in grade school, Auster separates each chapter into four threads and tells a different version of Archie's life in each one. At first, the changes are rela-

tively small — in one thread, Archie's father's small-appliance store burns down, while in another the store prospers — but the variations accrue, eventually sending Archie down four completely divergent paths.

As Archie's circumstances evolve, so do the people in his life. While some new characters are introduced in each thread, it's particularly interesting to watch how Auster manipulates Archie's supporting cast of friends and family. One scholarly aunt consistently influences Archie's taste and interest in literature, yet in one thread she is a closeted lesbian living secretly with a partner in Palo Alto; in another a spinster in Chicago; and in a third, involved in an on-again, off-again romance with a male intellectual in New York. A cousin who is beloved in one story ends up betraying an adolescent Archie in another. And Archie's first girlfriend Amy reemerges elsewhere as his stepcousin and still elsewhere as his step-sister, which makes for some amusingly uncomfortable narrative shifts.

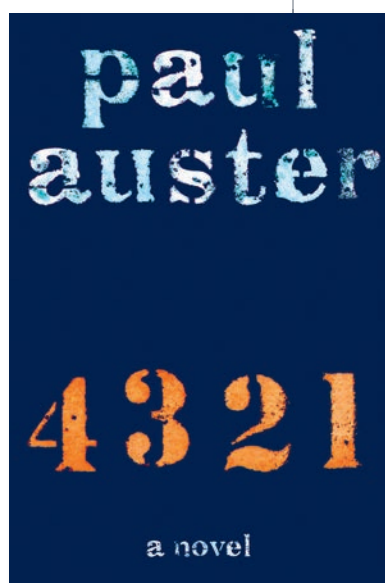
This structural conceit gives Auster an unusually wide lens through which to view a volatile, fascinating period in American history: the 1960s, which coincides with Archie's adolescence and college years. One Archie works in experimental theater in the burgeoning hippie enclave of Greenwich Village; one Archie rushes home to his

parents, who lose everything in the Newark race riots of 1967; one Archie gets caught up in a racially charged incident in rural New Hampshire. And one Archie comes to Columbia, where, as a reporter for the *Spectator*, he covers one of the largest protests in student history: "What he was watching was a revolution in miniature, Ferguson decided, a revolution in a dollhouse."

It's impossible to discuss *4321* without acknowledging the obvious autobiographical overtones. Archie was born exactly a month after Auster; and in all four iterations, he gravitates toward places important to Auster's own life: northern New Jersey, Columbia, and Paris. Archie grapples with themes consistent throughout Auster's novels: absent or difficult father figures, a deep devotion to sports and competition (especially baseball), and a search for identity through art. And all of the Archies become writers of some kind. The parallels between character and author make it clear that this isn't just a rumination on identity in general, but a very personal quest.

It's tempting to think about how our lives might have turned out if we had made different decisions, or if fate had dealt us a different hand. With this brilliantly rendered, intricately plotted epic, Auster has indulged that temptation and turned it into a magnum opus.

— Rebecca Shapiro



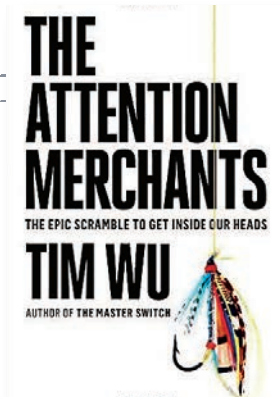
**Auster separates each chapter into four threads and tells a different version of Archie's life in each one.**

## EXCERPT

# The Attention Merchants: The Epic Scramble to Get Inside Our Heads

By **Tim Wu** A professor at Columbia Law School, Wu examines how industries increasingly vie for and commodify our attention.

The past half century has been an age of unprecedented individualism, allowing us to live in all sorts of ways that were not possible before. The power we have been given to construct our attentional lives is an underappreciated example. Even while waiting for the dentist, we have the world at our finger tips: we can check mail, browse our favorite sites, play games, and watch movies, where once we had to content ourselves with a stack of old magazines. But with the new horizon of possibilities has also come the erosion of private life's perimeter. And so it is a bit of a paradox that in having so thoroughly individualized our attentional lives we should wind up being less ourselves and more in thrall to our various media and devices. Without express consent, most of us have passively opened ourselves up to the commercial exploitation of our attention just about anywhere and anytime. If there is to be some scheme of zoning to stem this sprawl, it will need to be mostly an act of will on the part of the individual.



Stasha and Pearl resist Mengele's attempts to separate them. They have a tight bond, are deeply intuitive, and resolve to operate as one. Pearl quickly makes a plan to divide up the responsibilities of life between them: "Stasha would take the funny, the future, the bad. I would take the sad, the past, the good."

In Auschwitz, the girls' ability to comfort and sustain each other helps build their resilience. But this bond, while a source of strength, is also their greatest vulnerability. They live in fear of being separated. And when the girls are forced apart and experiments eviscerate them — literally — their will to live is sorely tested.

*Mischling* is a tough read, and some chapters may actually provoke nausea. The fact that its young narrators detail their suffering with such aching banality only amplifies the horror. Many reviewers have marveled at the book's brutality, but it seems appropriate that the twins' fortitude, love, and imagination, while inspiring, should not eclipse the nightmare of their experience.

If it takes guts to read this book, it certainly took guts to write it. Konar, who is of Polish-Jewish ancestry, has said that the story is based partly on the testimony of Auschwitz survivors Eva and Miriam Mozes, and in an interview with *Publishers Weekly* she admits to feeling "plagued by doubt" when she wrote it. Her caution seems prudent. Some critics have challenged other attempts to "stylize" the Holocaust (Nobel Prize-winning novelist Imre Kertész famously decried Steven

## Mischling

By **Affinity Konar '08SOA** (Little, Brown and Company)

Few authors would have the nerve to spin an uplifting fable out of the true story of two twelve-year-old girls who were tortured and maimed at Auschwitz. But Affinity Konar '08SOA went there. And the result is at once marvelous and strange.

The novel opens with identical twins Pearl and Stasha arriving at the concentration

camp, where they are selected and inspected by infamous Nazi doctor Josef Mengele. "He drew us out, made us turn for him, and had us stand back to back so he could appreciate the exactitudes of us," says Stasha.

With their blond hair, the girls are at first mistaken for *mischlinge*, the word the Nazis used to describe people of mixed Aryan and Jewish

descent, but what ultimately saves them from the gas chamber is the fact that Mengele prizes multiples. He collects twins and triplets in a human "zoo" and subjects them to sadistic experiments in the name of his genetic research. One twin might be injected with a disease, or have a limb or organ removed, while the other serves as the control.

## BOOKS

Spielberg's *Schindler's List* as kitsch, asserting it took away survivors' only real possession: their "authentic experiences"). And in 2016, the issue of "cultural appropriation" has certainly escaped the safer confines of polite academic discourse. Witness the recent social-media explosion after Lionel Shriver '78BC, '82SOA



donned a sombrero to defend the novelist's right to "try on other people's hats" and said political correctness was becoming a threat to creativity.

Who has the right to speak for Miriam and Eva Mozes, for their grandparents, parents, two older sisters, cousins, aunts, uncles, and the six million others who died in the Holocaust? Should a writer feel free to exercise her imagination outside the boundaries of her own experience, even though her artistry will transform the survivors' story? Affinity Konar may or may not speak for the hundreds of twins and triplets murdered by Josef Mengele, but one thing is certain: *Mischling*, which is already popular on the book-club circuit, will ensure that at least one version of their story will be heard.

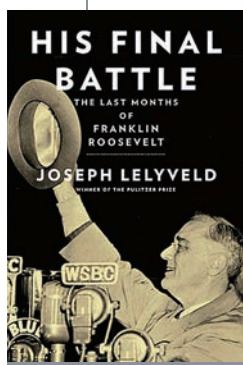
— Sally Lee

# His Final Battle: The Last Months of Franklin Roosevelt

By Joseph Lelyveld '60JRN (Knopf)

On September 11, 2016, Hillary Clinton nearly collapsed while leaving an event in Lower Manhattan. Hours later, under pressure from reporters, her campaign admitted that she had been battling pneumonia. For Clinton, the incident was a double blow — it fueled conspiracy theories that she was in frail health, and seemed to confirm the charge that she was not always forthright with the public. Over the next few days, Clinton's polling numbers dropped to their lowest point of the summer. With health, stamina, and transparency at the center of the 2016 election, it seems almost inconceivable that less than a century earlier, an American president was able to conceal his inability to walk from public view, and to wield political influence on a global scale even as he rapidly approached his death.

In *His Final Battle*, a meticulously researched examination of the last eighteen months of the life of Franklin Delano Roosevelt, Joseph Lelyveld '60JRN paints a portrait of a carefully protected patriarch, whose failing health is kept secret not only from the American people but to a considerable extent from the president himself. FDR was just sixty-two when he undertook an unprecedented fourth campaign for the presidency in 1944, but he was worn



out, not just from guiding his country through twelve years of economic privation followed by world war, but from hypertension and congestive heart failure. While the long conspiracy of silence around Roosevelt's health problems is well documented — health problems

that began with his contracting polio at the age of thirty-nine — Lelyveld makes palpable the high cost of that secrecy. Perhaps the book's most sobering revelation is the degree to which this towering figure was running on fumes during his final year and half; the effort required to keep going, the author makes clear, eventually claimed his life.

FDR's stamina was particularly put to the test on the international stage, where, with wars to win on two fronts, he pursued a punishing schedule. In the summer of '44, shortly after being re-nominated, he embarked on a five-week, press-embargoed trip to the West Coast and the Pacific Islands, stopping in Pearl Harbor to talk strategy with a skeptical General Douglas MacArthur. (Afterward, the notoriously arrogant general deemed his commander in chief "a man of great vision — once things are explained to him.") The following January, he left for the Crimean resort of Yalta, where the Big Three powers drew up a plan to reorganize Europe after the war; FDR's goal there was to avoid the fate of Woodrow Wilson, who failed to secure a permanent peace after World War I.

As readers witness the gravely ill president heading inexorably toward death, the heart-sinking what-ifs mount. Had Roosevelt been well, or had someone else been president, how many failures might have been turned into triumphs? At Yalta, Roosevelt and Churchill wrested a promise from Stalin to preserve democracy in Poland and the rest of Eastern Europe; but with the Soviets already occupying those countries, the promise was empty, and the region succumbed to communism for the next half century. As Roosevelt lobbied to organize a homeland in Palestine for the displaced Jews of Europe, the Saudi king Ibn Saud warned him, "Arabs would choose to die rather

than yield their land to Jews”; Roosevelt was greatly affected by the meeting, but little came of it. As for the international peacekeeping organization envisioned by FDR, led by “the Big Four (or Five) standing together under the UN aegis,” Lelyveld, with twenty-twenty hindsight, writes, “Faced with many-sided civil wars, involving what are now called ‘violent non-state actors,’ with terrorism and mass migration spilling across regions and borders, they seldom stand together.”

But perhaps no what-if is more painful to contemplate than the dropping of atomic bombs on Hiroshima and Nagasaki. While acknowledging that most Americans believe “the atom bombs ended the war,” Lelyveld hints that Roosevelt — always a “creative procrastinator” — might have chosen to prod Japan into surrender with a mere public test of the bombs’ destructive power, had he lived past April.

Obviously, we’ll never know what path FDR would have followed. He died without sharing his thoughts with Truman, and the rest — *sigh* — is history. Such speculation, however, does lay to rest one contrarian myth that made the rounds in the 2016 election cycle — that with so much governing taking place in cities and states on the one hand and courts and Congress on the other, perhaps it doesn’t really *matter* in the long run who the president is. It matters, and Lelyveld knows it. In his skillful rendering, even a tragically diminished Franklin Roosevelt looms as large as ever.

— Lorraine Glennon

## READING LIST

### New and noteworthy releases

#### AVID READER

*by Robert Gottlieb* '52CC In the world of the New York literati, Robert Gottlieb is royalty. At Simon & Schuster and Alfred A. Knopf, he edited, among others, Joseph Heller, Toni Morrison, and John le Carré, then went on to succeed William Shawn as editor of the *New Yorker*. His

memoir chronicles his sixty-year career, with strikingly frank observations about the figures behind some of the twentieth century’s most enduring works.

#### POWER AT GROUND ZERO

*by Lynne B. Sagalyn* The definitive account of one of the biggest urban reconstruction projects in history. Columbia Business School professor Lynne Sagalyn spent ten years researching the effort to redevelop the sixteen-acre site where the Twin Towers collapsed. Her meticulous reporting reveals a project that was fueled by idealism, rife with complexity, marred by competing factions, and freighted with symbolism.

#### ART WORLD

*by Barbara Guggenheim* '76GSAS “Making your way through the art world is like picking wild mushrooms,” says

Barbara Guggenheim. “It’s not always easy to differentiate what’s okay from what’s deadly.” With a doctorate in art history and decades of experience at Christie’s, Sotheby’s, and the Whitney Museum of American Art, Guggenheim is a consummate guide. Her book on buying and selling art is part instruction manual, part history, and a fascinating look at a complex and remarkably unregulated industry.

#### RANCHER, FARMER, FISHERMAN

*by Miriam Horn* '05GSAS Some of America’s most important environmental-conservation work is being done not by scientists or political activists but by the ranchers, farmers, and fishermen whose livelihoods depend on the land. Miriam Horn, a best-selling environmental writer, profiles five members of this quiet revolu-

tion: a Montana rancher, a Kansas farmer, a Mississippi barge owner, a Louisiana shrimper, and a Gulf fisherman. All have developed innovative solutions to the challenges their communities face, and the resulting portrait is inspiring and enormously hopeful.

#### THE SHIPWRECKED MIND

*by Mark Lilla* Mark Lilla, a Columbia professor of humanities, argues that much about our current political polarization can be explained by a close examination of political reactionaries, those “shipwrecked” in the present but nostalgic for an idealized past. He examines the work of three twentieth-century reactionary political philosophers and discusses how reactionary thought has become a formidable force in twenty-first-century politics on both sides of the Atlantic.



# The Shock of the New

Oscar-winning screenwriter and *New York Times* best-selling author Graham Moore '03CC discusses his new novel, *The Last Days of Night*, about the 1888 legal battle between Thomas Edison and George Westinghouse to patent the light bulb and electrify America



**Columbia Magazine:** What first attracted you to this story?

**Graham Moore:** I was interested in chronicling a hinge moment in American history, when technology was creating a massive cultural and social shift. And there is something so beautiful about the idea of the night sky being lit up for the first time. People who were alive then write about seeing electricity as if they were seeing a new color. The effect was shocking, literally and figuratively.

**CM:** In fact, your book does open with a literal shock — a man is electrocuted in the middle of a New York City street. Why did you decide to start with that graphic image?

**GM:** That scene was based on real events, and I thought that it illustrated what it was like to live in that time. Electricity was exciting, but it was also terrifying. People didn't know if children or pregnant women should even be allowed near electric lights. It was a massive challenge for these scientists to translate their ideas such that the public would grasp and embrace them. There are so many parallels to how people would react to computers and cellular technology a century later.

**CM:** You won an Oscar for your screenplay for *The Imitation Game*, about another scientist: mathematician Alan Turing, a World War II codebreaker who is considered the father of computer science. But you never seriously studied science. What fascinates you about these figures?

**GM:** When I was a kid, my grandfather took me on a tour of Bell Laboratories. I was really moved by seeing the



scientists at work. I had always put inventors on a pedestal, but for the first time I realized that they were flawed human beings. They had passion, but they also had jobs to do, and sometimes they disagreed. I realized that real technological progress is not just about one person's idea. Turing wouldn't have admitted it, but he needed his team to be successful. In the case of the light bulb, Edison was the famous scientific genius, but George Westinghouse was the one integrating and mass-producing everything. They needed each other in certain ways. Those types of relationships intrigue me.

**CM:** You gave an inspiring Oscar acceptance speech, which garnered a lot of attention, encouraging people to celebrate what makes them weird or different. Does that message manifest itself in this book as well?

**GM:** I think it most directly applies to my portrayal of Nikola Tesla, who also becomes a central figure in the case.

To describe Tesla as an eccentric is to put it mildly. It is widely thought that modern doctors would diagnose him as a schizophrenic. Tesla didn't have his name in the papers; he never became a celebrity like Edison; he wasn't a huge corporate innovator like Westinghouse; and he couldn't quite play nicely with either of them. He died penniless and not very well known. I wanted to write about him because, like Turing, he was a singular genius who needed other people to bring his ideas to fruition.

**CM:** Why did you choose Paul Cravath 1886LAW — George Westinghouse's lawyer — as your narrator, rather than one of the scientists?

**GM:** I was trying to figure out who I wanted as my protagonist — Edison, Westinghouse, or Tesla — when I saw Cravath's name in the legal records. In some ways, he was also a prodigy; a century after his first case, his name is still on one of New York's most prominent law firms. But when he took the case, he was just twenty-six years old, two years out of Columbia Law School. He also came from a fascinating family — his father was a white man who founded Fisk University, one of the first colleges primarily for African-Americans. There are no biographies of Cravath, and his story was compelling. I also liked the idea of telling the story from a layman's perspective, which allowed me to explain some of the science in a way that I didn't think any of the scientists would have been able to do. And finally, I identified most with Cravath — a youngish non-scientist working to understand the minds of these unusual geniuses.

— Rebecca Shapiro



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## BOOKS

**NEW BOOK BY DR. ERIC E. CLARKE:** *Living in America: Hilarious and Provocative Tales of a Foreign Student.* A must-read for current students, prospective students, and their parents, or just a fun read. Amazon.com: paperback \$12.95, electronic version \$9.99. Feedback: clarkes83@hotmail.com.

## PERSONALS

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# FINALS

## The Mane Event

Last issue's caption contest by *New Yorker* cartoonist Benjamin Schwartz '03CC, '08PS drew hundreds of entries, and picking a winner was a labor of laughs — certainly more enjoyable than a doctor's visit.

In the Great Minds Think Alike department, we received twenty-two submissions of "Say Roar" and sixteen of "Roar, Lion, Roar." Four alumni found Dr. Livingstone. Jimmy Hoffa was also located, as was, somewhat disturbingly, Dorothy. Indeed, the lion had swallowed a lot of things: zebras, flashlights, Christians, a zookeeper, a tricycle,

the Princeton tiger, and — *wince* — Barnard (Marilyn Aron '52BC).

Diagnoses were in no short supply. The Lion had liongitis. Or the election-season strain, lyinitis (Sherrie Dulworth '13JRN). Stephanie Denzer '09CC offered, "Well, you're healthier than the donkey and the elephant I gave checkups to this morning," while Ausama Abdelhadi channeled a single-payer future: "Before universal health care we had to lick our wounds."

Yes, the lion was ill. He needed a Roar-schach test. He needed a CAT scan. He was eating too much red meat (Joe Karlesky '72GSAS). He had hoof-and-mouth disease (Carol Mick). "Sore, Lion, Sore," suggested Tom Seaman '82CC. Lillian G. Nash, age ten, also cited Oz: "It looks like you have a bad case of the Cowardly Lion."

If the lion was not ill, he was perhaps too spirited: ten savvy readers made

reference to lines in the Columbia fight song, including "I suggest that you take a break from waking the echoes of the Hudson Valley" (Robert M. Levine '68CC). And, as Joseph Greenberg reminds us, high spirits are just around the corner from heartburn: "How long have you been a Columbia football fan?"

No shortage of wit, but there could only be one winner. That entry, chosen by the cartoonist, reveals how wording can make all the difference. Four entries played on the same pun, but one got it just right. We asked Schwartz how he chose the winning caption, by Joe Maguire '89GSAPP. Schwartz responded, "Simple: it made me laugh." 🐾



**"You've got to stop swallowing your pride."**



**“Columbia was my growth engine, and it still moves me to be of service to others.”**

—STEPHEN BUCHMAN '59CC, '62LAW,  
2013 Alumni Medalist

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