

What Can We Learn From Russian Novelists? p. 7 ... Exploring
Native Truths p. 10 ... How Unbalanced Genes Drive Aging p. 16 ...
Your Apps Can't Keep a Secret p. 22 ... Cleanup on Planet Earth p. 34

*"I'd watch Riccardo Muti conduct
and think, 'This man is touching
sound.'"* p. 42

Northwestern

SPRING 2023



Making the Scene

You may not know it, but Joanna Bush '99
helps create your favorite movies.
p. 28

I Am Northwestern, Hear Me Roar!
 Junior Matthew Nicholson, center, celebrates with exuberant fans on the floor of Welsh-Ryan Arena after the Wildcats toppled the No. 1 team in the nation for the first time in program history. Nicholson, Northwestern's 7-foot center, helped contain Purdue's Player of the Year candidate Zach Edey as the men's basketball team beat the Boilermakers 64-58 on Feb. 12. One month later, Northwestern received a bid to the NCAA Tournament, where the Wildcats, a No. 7 seed, beat Boise State in the first round in Sacramento, Calif. The Wildcats lost to UCLA 68-63 in the second round.



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Nothing Is Private

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← “A lot of environmental pollution problems are manageable and treatable if there’s a willingness to innovate and take some chances.”

— Vinayak Dravid, the Abraham Harris Professor of Materials Science and Engineering at Northwestern's McCormick School of Engineering

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Draw Your Destiny

Joanna Bush '99 creates art for many hit movies, including *Life of Pi* (above).



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From bhangra to bachata to K-pop and jazz, Northwestern students have formed more than a dozen dance groups on campus, celebrating cultures from all over the world.

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“Whenever I travel, the first or second place I’ll go is a bookstore. I like to get lost among the shelves. I love the serendipity of finding something I didn’t know existed that looks interesting.”

Schill on Schill



As President Michael Schill wrapped up his first few months in office, *Northwestern Magazine* talked with him about higher education’s role in creating a compassionate community, his favorite books and what he values most in his human — and canine — companions.

What has surprised you about the University in your first months here?

One is the level of ambition of virtually everyone here — wanting to get better, wanting to push themselves. I had known it was a great school; I just didn’t know how ambitious everybody is, and that’s very positive.

What’s your favorite place on campus — maybe to walk your dog, Max?

The place I go to the most is Deering

Meadow, and if there’s no one there, I let Max off leash for a few minutes, and he runs and chases squirrels and rabbits. Walking through campus with Max is a great way to meet students because they always stop us and want to pet him.

How can we continue to build a community of kindness, collaboration and thoughtfulness at Northwestern?

One of the challenges of universities is to model the behavior that we would

like to see in the world around us. And we’re at a point in this country where we don’t have a community of kindness or collaboration — certainly not in our politics and not really in our society at large. So, it’s an opportunity for us.

This is one of the great benefits of a residential higher education experience, particularly at a great school like Northwestern. We should bring people of all different races, sexes, genders, abilities and, importantly, politically

different students — not all with the same biases or predilections — and bring them all together and help them learn from each other. They don’t have to be persuaded. They don’t have to be brought over to a particular viewpoint, but they should learn how to respect other viewpoints and know that there are other people who have legitimate beliefs that are different from theirs.

You have strong opinions on freedom of expression. Would you like to share some thoughts on that?

We’re seeing one side of the political debate taking over freedom of speech as their issue, but it isn’t just a value on one side of the political spectrum. Freedom of speech needs to undergird all civil society. And for universities, that’s our bedrock. If you can’t give your views, even if they’re unpopular views, if you can’t do research in unconventional areas and suggest theories, I’m not sure what value our institutions of higher learning hold at that point.

In addition, I will defend freedom of speech with passion, but just because you have the right to say something doesn’t mean that you should say it. You need to have empathy. And while I’m not going to inhibit your speech, except if it reaches the level of harassment, I believe you should be mindful of the way those comments will affect people around you.

In the unlikely event you had a free hour, how would you spend that time?

I would go to a bookstore. Whenever I travel, the first or second place I’ll go is a bookstore. I like to get lost among the shelves. I love the serendipity of finding something I didn’t know existed that looks interesting.

What is your most treasured possession?

My books, of course.

Can you tell us about your extensive book collection?

I’m a nonfiction guy. I like biographies. I like learning when I read.

I have a great collection. Here, in my office, this is probably 1/20th of my collection. I have shelves of books on Chicago, on housing, on race and urban history, and on higher education. I buy most of what’s written on higher

education. And I even read some of it!

I have enjoyed books written by former university presidents, including Bill Bowen’s book on leadership [*Lessons Learned: Reflections of a University President*]. He was the president of Princeton when I was a student there, and he became a mentor of mine. It is interesting reading about how he dealt with some of the issues that we doled out to him when I was on the other side of Nassau Hall [which houses Princeton’s administrative offices].

I like looking at how university presidents resolve issues. You learn from that. No one goes into teaching thinking they’re going to become a college president. We go into this profession because we want to teach and we care about students and we care about research. So having someone to model oneself after is important, because you’re typically not trained to do this.

You recently enjoyed seeing *As You Like It* at Northwestern’s Barber Theater. What are some of your favorite plays?

My favorite play of all time is *Arcadia* by Tom Stoppard. I saw it three times and learned something different every time. It’s just an amazingly interesting and intricate play. My favorite musical is *Dreamgirls*. Anyone who is around my age who went to see the original *Dreamgirls* will remember the end of the first act when Jennifer Holliday, who had a voice like no one’s ever heard before, belted out “And I Am Telling You I’m Not Going.” And then the curtain comes down. We were all stunned and on our feet. It was just a very magical experience — goosebumps.

What do you most value in your friends?

They will always be honest with me, and I’ll always be honest with them, even when we don’t agree. And we don’t worry about hurting each other’s feelings, because we’re sensitive to each other but also we accept and care about each other for who we are. You can’t have that if you don’t trust people, and I value the trust that we share with each other.

Northwestern will celebrate the Inauguration of Michael H. Schill on Friday, June 2. Learn more at www.northwestern.edu/president/inauguration.

SHANE COLLINS

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Talk Back

MORE SPORTS MEDIA
ALL-STARS

You made a serious omission in the article “Purple Press” [winter 2023]: Cynthia Frelund ’15 MBA, ’19 MS of the NFL Network, who received an MBA in finance, entrepreneurship and innovation in 2015 and went on to earn a master’s degree in predictive analytics. Cynthia’s contributions to TV media are at least as important, if not more important, than the contributions of the Medill alumni.
Henry J. Klayman ’70, ’76 MBA Schaumburg, Ill.

I am enjoying the profiles of Northwestern alumni working in sports media. However, it should be noted that Dave Revsine ’91 has had a very successful run at ESPN (11 years) and more recently the Big Ten Network. Dave also authored a critically acclaimed account of the early years of college football (*The Opening Kickoff*). Although Dave is not a graduate of Medill, he represents Northwestern’s finest in sports journalism.
Bela Barner ’89 Chicago

Great article, save for the glaring omission of Rachel Nichols ’95.
Matt Rhodes ’96 McKinney, Texas

PUNK-ROCK COLLECTOR

Thanks for this article [“Five Questions With Andrew Krivine,” Creation, winter 2023] and your work, Andrew, in the punk space. I’m a “punk mom” to Sasha Stroud, owner operator at Artifact Audio in

New York City. I, too, find the artwork on album covers and posters remarkable!
Robin Stroud ’92 MBA Woodbridge, Va.

SNOW FUN

I loved “The Magic of Snow” [Sound Off, Voices, winter 2023]. It triggered a long-buried memory: Texas does everything bigger except for the leaves on our trees. Our live oaks drop their tiny, dull, brown leaves each winter. My first autumn at Northwestern was my introduction to hand-sized leaves in so many colors. My roommates teased me for collecting them as I walked to class. My family thanked me for bringing them home to decorate our Thanksgiving table!
Lauren Fisher Halpern ’95 Austin, Texas

On the cover of *The Daily Northwestern*, around 1979, there was a photo of my Volkswagen Karmann Ghia buried up to the roof. After some serious shoveling on one end of the auto, I hopped into the driver’s seat and pulled right out leaving a shell of snow. Miraculous.
Tobi Augustiny Grassey ’84 Briarcliff Manor, N.Y.

RUBBER TEETH

I was involved for several years with the weekly *Rubber Teeth Radio Show* on WNUR, which was a highlight of my time at Northwestern [“Biting Humor,” ’Cat Tales, winter 2023]. It gave us all a can-do spirit — a sense that we were able to put out something original on a regular schedule. It should be noted that the

“something original” was often pretty brilliant.
Bill Pardue ’84 Downers Grove, Ill.

What a total pleasure to read about *Rubber Teeth*, which, along with meeting my future wife, was among the highlights of my Northwestern career. So many great friends and great times. Robert Leighton ’82, you are my idol!
Dave Aron ’86 Naperville, Ill.

GAME CHANGER

Please feature Brian Schmidt ’85, ’88 MMus, who has been — and is — a leader in game audio for 35 years. Brian is the founder of GameSoundCon, the world’s foremost professional conference for game audio professionals. A glaring and disappointing omission from an otherwise informative article [“We’re in the Game,” fall 2022].
Penka Kouneva Los Angeles

BEARING WITNESS

As a former hospital administrator, I found Stephen Thrasher’s position that the underclass is more vulnerable to viruses quite interesting [“Bearing Witness,” fall 2022]. His comments about the cost of COVID tests are skewed. He mentions a family of four having to pay \$600 for testing. The truth is that there are more than 20,000 sites in the U.S. that provide tests for free.
Ken Rash ’54, ’63 MBA Palm Harbor, Fla.

Correction: Alison Ehrlich Wachstein ’69 was incorrectly listed in the winter 2023 In Memoriam section. We regret the error. Please see her class note on page 45.

Voices

THE BIG QUESTIONS

Lessons From Great Russian Novelists

By Gary Saul Morson

Despite today’s focus on STEM, the humanities are still vitally important, in part because literature is the best way to come at life’s biggest questions. And no one did that better than the great Russian novelists.

For two centuries, Russians have behaved as if life exists to be made into great literature. If you had something to say about human psychology, you analyzed Dostoevsky’s characters. If you

wanted to discuss life’s meaning, you might explicate Tolstoy’s novels. In her 1925 essay “The Russian Point of View,” Virginia Woolf enthusiastically praised newly translated Russian classics that were then taking Europe by storm. She found nothing like them in the West and no literary genius to rival Tolstoy.

In my teaching at Northwestern, I try to convey the excitement of asking life’s ultimate questions and show why reading great literature is really worth the effort. In my forthcoming book on the Russian literary and political tradition, *Wonder Confronts Certainty*, I explore the positions Russian writers took on issues that will always matter. Does life have a meaning, and if so, what is it? If the universe is wholly explicable in terms of material cause and effect, are right and wrong mere conventions, or do they have some objective basis? How do people avoid taking responsibility for their actions (or inactions)? Are the most important moments of life the dramatic ones we

all notice or the countless ordinary ones, including the tiniest movements of consciousness, that we overlook precisely because they are so ordinary?

Tolstoy, for instance, insisted that life is a matter of “tiny, tiny alterations,” that goodness really exists and is seen most often in the small acts of kindness available at every moment, and that people too often use great theories about life and society as an alibi to avoid taking individual responsibility.

The extreme nature of the Soviet experience intensified these questions. Millions — finding themselves arrested, tortured and sent to labor at 60 degrees below zero without sufficient calories in Siberia’s “north pole of cold” — could no longer regard evil as a mere convention. And when millions of peasants were being deliberately starved to death during the collectivization of agriculture, could anyone seriously maintain that life’s point was individual happiness rather than a common moral good? Lenin and the Soviets regarded their version of Marxism as absolutely certain, and it was this certainty that made people accept their cruel actions as historically necessary and morally unchallengeable. Perhaps the greatest evil is committed by those intent on abolishing it forever.

While 19th-century Russian revolutionaries and 20th-century Soviet officials were people of unflinching certainty, the great writers were people of wonder, marveling at a world of infinite complexity. For them, there were no final answers, but it was always important to deepen our understanding of the timeless questions.

No matter what career they may choose, students will lead richer lives if they sometimes rise above the pursuit of worldly success to contemplate questions that will always lie at the core of human experience. Engaging with great literature, as the Russian writers demonstrated, is a uniquely favorable way to make such questions palpable, immediate and deeply felt.

Gary Saul Morson is the Lawrence B. Dumas Professor of the Arts and Humanities and a professor of Slavic languages and literatures. His new book *Wonder Confronts Certainty: Russian Writers on the Timeless Questions and Why Their Answers Matter* (Harvard University Press) will appear this spring.



SHANE COLLINS

↑ Professor Gary Saul Morson has taught more than 10,000 Northwestern students.

SOUND OFF

Creative Influences

What artistic work has changed your outlook on life?

Derrick Fields, assistant professor of instruction at Northwestern’s School of Communication and digital artist

Spider-Man: Miles Morales sits at the top of my list of titles that have shifted my outlook on life. The video game’s protagonist, Miles Morales, comes from both Black and Puerto Rican backgrounds and quickly resonated among players who come from similar heritages upon its release in 2020. I cried a lot while playing the game.

As a Black game developer, seeing a game highlight the experiences and challenges that Black individuals face and allow players to see themselves represented positively charges me with validation that these experiences genuinely matter. It motivates me tenfold to contribute to the demand for diverse representation in video games.

S.L. “Sandi” Wisenberg ’79, author of *The Wandering Womb: Essays in Search of Home* and editor of *Another Chicago Magazine*

I remember reading Michelle Cliff’s “If I Could Write This in Fire, I Would Write This in Fire.” The essay is about race, colorism, class, homophobia, male entitlement, imperialism and colonialism, rendered in deeply honest, lyrical prose. What changed my outlook was its mention of a Black movement protest slogan used in England after the fall of the British Empire: “We are here because you were there.” That sums up colonialism,

imperialism, slavery — and it raises the question of what the descendants of perpetrators owe the descendants of the brutalized. I had never thought of these injustices in a geographical way before.

Ava Earl, sophomore political science major, singer and songwriter

Ten years ago, Vampire Weekend released the song “Unbelievers” on their album *Modern Vampires of the City*. My mom and I listened to it on our commute from Anchorage, Alaska, where I went to school, to my hometown of Girdwood, Alaska. As a 10-year-old avid consumer of all things musical, I was captivated. An upbeat rumination on the (un)importance of belief and its intersection with love, the pre-chorus says: “We know the fire awaits unbelievers, / all of the sinners the same. / Girl, you and I will die unbelievers, / bound to the tracks of the train.” At 10, I desperately sought a way to live and love that felt like rebellion. This album echoed that feeling for me. I now believe that sometimes rebelling is as simple as living in the moment.

Matthew Grayson, professor of electrical and computer engineering at the McCormick School of Engineering

As a graduate student in electrical engineering, I would balance many reclusive workdays in the lab with involvement in community theater. One summer I directed the play *Our Town* by Thornton Wilder, an American classic about a girl growing up in a small New England town. The simplicity and specificity of the story belies the universal appeal of the play’s emotional resolution, just as the specialization of my lab work led me to a broader awareness of the universal nature of research from the humanities to the sciences. To echo the lesson of Mr. Wilder: Specificity often begets universality.

SOCIAL FEEDS

Is there anything better than finding the perfect study spot? Alumni share their favorite secret nooks on campus.



“My favorite spot was anywhere I could hear the whistle from the sandwich man. Always on time. 😊”

Anita Cruise ’85 in

“My address may as well have been Galter Library at the Feinberg School of Medicine during my time there! Thank you to all the staff and those who support our libraries.”

Mark Herndon ’21 MPO in

“Upper floor of the Pritzker Legal Research Center. Amazing view of Lake Shore Drive and Lake Michigan!”

María Santa María ’03 LLM in

“Main library, cubicle at the southeast corner of the first floor. My son sat in the same spot 35 years later!”

Mark Aronson ’86 in

EARL: SHANNON EARL; WISENBERG: LINC COHEN; SANDWICH MAN: COURTESY OF UNIVERSITY ARCHIVES



MY NORTHWESTERN DIRECTION

My Story Is Sharing Black Stories

I wasn’t supposed to go to Northwestern. I don’t say that in a whimsical or serendipitous way. I mean, I never knew I could go to a school that would help me pursue a career in journalism.

I was supposed to be a doctor. Or at least that’s what I was supposed to *want* to be. As a first-generation Haitian American, there were only a handful of careers my Caribbean family deemed acceptable: doctor, lawyer, nurse, teacher. Journalist certainly wasn’t one of them.

So when my junior year English teacher at Chattahoochee High School, just outside Atlanta, told me I’d be doing the world a disservice if I didn’t write for a living, I had no idea where to start. I remember coming across Northwestern in my research and falling in love with the beautiful campus and the proximity

to the beach, and the vibrant and engaged student community appealed to me.

And when I stepped on campus, it immediately felt like home.

It didn’t take long for me to feel at ease on campus, especially within the small but close-knit Black community. I joined the Alpha Kappa Alpha sorority and became an active member of the National Pan-Hellenic Council and For Members Only. But attending a primarily white institution wasn’t always comfortable for me as a Black student.

As an undergraduate, it was all too common to hear about, or personally experience, racism on campus, whether it was a frat party where someone wore blackface, or a campus alert where the suspect was loosely described as a Black male, or a Black student being

“I quickly learned that the Black student experience was very different from any other. And that’s when I realized how badly I wanted — and needed — to tell Black stories.”

By Danielle Cadet ’10, ’11 MS

Danielle Cadet is executive editor and vice president of content at *Essence* magazine.

asked to show a Wildcard to prove they attended the University. I quickly learned that the Black student experience was very different from any other. And that’s when I realized how badly I wanted — and needed — to tell Black stories.

My dream to share the full breadth of the Black experience was fostered at Northwestern. Professors like Ava Thompson Greenwell ’84, ’85 MS, ’14 PhD and Charles Whitaker ’80, ’81 MS (now dean of the Medill School of Journalism, Media, Integrated Marketing Communications) nurtured my curiosity and challenged me to always dig deeper. Writing for *BlackBoard*, the Black student magazine, gave me the opportunity to both do what I loved and become better at it. The time I spent telling my community’s stories on campus only further equipped me to tell Black stories globally.

After graduating with my bachelor’s degree in 2010 and my master’s degree in 2011, I went on to tell impactful Black stories about the investigation into the shootings of Trayvon Martin in Sanford, Fla., and Michael Brown in Ferguson, Mo. I worked with ESPN and Netflix to help them serve Black audiences more deeply. I’ve fought for a seat at the table to ensure publications present a more holistic perspective on the Black experience and tell Black stories more fully.

In retrospect, I not only fell in love with Northwestern, I learned what I loved to do. Medill helped instill within me the drive to succeed in an ever-changing industry. Charles Whitaker, my mentor, recently invited me back to campus to share my story with students. I returned to the places where I once worked and studied, dreaming of leading a Black publication. And today that’s exactly what I’m doing as executive editor and vice president of content at *Essence* magazine.

When I look back, Northwestern is exactly where I was always supposed to be.

AS TOLD TO ...

Doug Kiel on Native Truths

In May 2022 Chicago’s Field Museum of Natural History renovated its outdated Native North America exhibit hall and opened *Native Truths: Our Voices, Our Stories*, a permanent exhibition. Doug Kiel, assistant professor of history at the Weinberg College of Arts and Sciences and a citizen of the Oneida Nation, served on the Native American advisory committee that spent 4 ½ years setting the agenda for the renovation and bringing it to life. Kiel talked with *Northwestern Magazine* about what makes *Native Truths* so radically different from its predecessor. Kiel also highlights their favorite exhibit features and celebrates the relationships that have been strengthened between Native people and the Field Museum.

At the time of the Field Museum’s opening in 1894, Americans truly believed that Native people and everything about us were going to completely disappear, and so anthropologists were salvaging and collecting everything they could before it vanished forever.

But we did not vanish. In the old exhibit hall, there was a section with a ton of spoons, for instance, but no context. That’s the older-school approach: Show off all this stuff. But for Native people to walk through a space like that — it felt ostentatious, like showing off impressive loot.

The approach of this new exhibition is fewer objects that you get to know more intimately. The Field is a natural history museum, but with this exhibition, the museum is engaging contemporary Indigenous artists and acquiring their work as well.

There are four exhibit areas, or “story pods” as we call them. Their content will rotate over time. But in each you’ll see new acquisitions alongside historical objects, as well as media presentations with Native narrators who explain their cultural significance.

One of my favorite things about the new exhibit is the flooring, which is made of maple timber from the Menominee Forest in Wisconsin, one of the most sustainably managed forests in the world. Northwestern and the Field Museum reside on the homelands of the Menominee people. And there’s a tree ring on display that’s 192 years old — it’s from the white pine that gave us the exhibit’s benches. We realized, “Wow, this tree was born just before Chicago was!”

The floor and benches also represent a new relationship between the Field Museum and



Menominee people, and a chance to do something joyful. The Native American advisory committee helped make those connections, and by the end of the renovation, we had about 130 Native collaborators and contractors from across North America, 130 voices that were all part of the process. So the floor is emblematic of not only an Indigenous way of thinking but also of the relationship that we strengthened.

There’s a series of murals by Monica Rickert-Bolter, a local Black and Potawatomi artist. Chicago founder Jean Baptiste Point du Sable and his wife, Kitiawa, were Black and Potawatomi, respectively, and so it felt symbolically great to have this well-respected artist in our community contribute to the work in this way. She built these beautiful murals of Turtle Island, which refers to the creation story of Sky Woman falling and landing on Turtle’s back. Turtle Island is North America. Then there are these murals of the Great Lakes, which are personified as Indigenous women. Lately the lakes are lashing out to show us their disapproval in regard to climate change. It’s a traditional kind of story with a contemporary spin.

The next update to the exhibit will be a story on lacrosse, which is an Indigenous game. Some Native communities referred to it as “war’s little brother” and used it in lieu of going to actual war. A match could go on for days. People could die. But it was conflict mediation, and in an Indigenous context, it was a very different game from what you see today. But it’s definitely our game, and we are still really good at it.

Read more at alummag.nu/Kiel.

↑ Doug Kiel stands outside of Chicago’s Field Museum of Natural History, which opened its new permanent exhibition, *Native Truths: Our Voices, Our Stories*, in 2022. The exhibit’s floors and benches were made with timber from the Menominee Forest in Wisconsin, including a 192-year-old white pine. Below, a “tree cookie” showing the growth rings of that tree is on display at the museum.



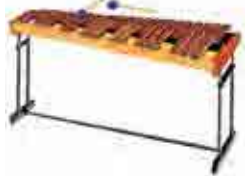
KIEL: STEPHEN LEWIS; TREE RING: © FIELD MUSEUM, EDGAR LOPEZ

News

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Marimba Madcap memories p. 15

World tour on the dance floor p. 13



WEST BY NORTHWESTERN

Silicon Valley Immersion

Farley Center program brings undergrads to the Bay Area.

Grant Galatas had never seen mountains or palm trees before he arrived in San Francisco shortly after the New Year. But the Kansas City native got to experience much more than a Northern California winter during his quarter at Northwestern’s Bay Area location in the heart of San Francisco’s financial district.

The 16,000-square-foot site, which boasts newly renovated classrooms, plus spaces for student and alumni events, launched in 2016 and is home to several Northwestern academic programs in engineering, journalism, law and business.

Galatas was one of 18 undergraduate students who participated in the first Farley Bay Area Quarter, a new program offered by Northwestern’s Farley Center



Northwestern students took a biking tour of Googleplex in Mountain View, Calif., after meeting with Google executives as part of the Farley Center’s Bay Area Quarter.

MAX NELSON



Students at Northwestern's San Francisco location

for Entrepreneurship and Innovation that provides classes in tech ethics, product management and venture fundraising, as well as an experiential seminar that includes externships at a range of tech companies. The companies — many led by Northwestern alums — provide an insider's view of the culture of innovation in the Bay Area.

For example, several students shadowed LogicMonitor CEO Christina Crawford Kosmowski '98 and her executive team, while others spent an afternoon at Liftoff with Rob Goldman '92,

“This program has completely redefined my trajectory.”

— Senior Kate Lee

who serves on the board of the mobile app monetization startup.

“On my externship at Taelor, which one of my professors [Anya Cheng '08] co-founded, I was surprised by how deeply involved the co-founders were with operations,” says two-time startup founder Steven Jiang, a Weinberg College of Arts and Sciences junior. “They were shipping packages themselves and ironing clothes. Then they met with a salesperson and immediately went right back to work. I was exhausted at the end of the day. Watching what they do every day has inspired me and shown me what I need to do with my own company.”

Students also participated in field trips throughout the Bay Area, visiting companies including Google and Lilac Solutions, a lithium supply company founded by Farley

alum David Snyder '16 PhD. Sharmila Shahani Mulligan '88, '94 MBA hosted a lunch panel of leading venture capitalists in Silicon Valley, while Cruise vice president of global government affairs Prashanthi Rao Raman '04 arranged for a visit to a company testing facility.

“This program is a unique opportunity for our students to have transformational learning experiences both inside and outside the classroom,” says Hayes Ferguson, Farley Center director and a clinical associate professor in the McCormick School of Engineering.

“This program has completely redefined my trajectory, exposed me to flavors of innovation I never thought I'd be interested in and got me to understand myself a lot better,” says School of Communication senior Kate Lee, who plans to move to San Francisco this summer for a job that she secured thanks to an introduction from Goldman.

Lee will become the product manager at web3 Platforms, an early-stage startup. “I'll be working on something that could fundamentally change how society experiences the internet, which is mind-blowing,” Lee says. “This is a testament to how transformative this program is. I hope it will continue to create opportunities for future Farley students.”

DALE DURO LATIN DANCE COMPANY
Latin America

Salsa, bachata, cumbia and merengue are just a few dances in Dale Duro's repertoire. Celebrating a variety of Latin dance styles, the group's choreographies are often set to modern pop music. “This year, we have three Bad Bunny dances from his new album,” says Dale Duro vice president Nicole Constante, a junior majoring in biology and global health. “Last year we had a Brazilian funk piece, and this year we have champeta, an Afro-Colombian dance style. Dancing is a great way to get moving while also connecting with your culture. Whenever I dance, I forget about all my problems and just immerse myself in the music.”



SAN FRANCISCO: MAX NELSON; TICKER ILLUSTRATIONS: LESLIE-ANNE MOCK; DANCE PHOTOS: JABULANI 2018, COURTESY OF AFROTHUNDA; COURTESY OF DALE DURO; COURTESY OF @NUBHANGRA

CULTURE

Dance Like the World Is Watching

Northwestern students find their groove by embracing regional moves from across the globe.

Watch videos and read more at alummag.nu/dance.



NORTHWESTERN BHANGRA DANCE TEAM

Punjab Region of India and Pakistan

Bhangra, a traditional folk dance and music, encompasses a variety of styles. “Jhumar is done with very light steps and flowy hands,” says Northwestern Bhangra president Anika Trehan, a sophomore economics and sociology major. “On the other hand, dhamaal is done with the constant lifting of the legs at a 90-degree angle and arms held wide. ... Dancing and choreographing bhangra, especially to the Punjabi music I grew up listening to, has been very rewarding. Many of my family members and friends have done bhangra, so I wanted to learn it, too, in order to better connect with them and to meet other South Asian people at Northwestern.”

AFROTHUNDA DANCE TROUPE

Africa

Afrothunda performs dances originating from Ghana, Nigeria and other African nations, says Claribel Osei, a sophomore biological sciences major and co-president of the group. “My favorite is azonto because it is not a set dance, meaning it changes slightly depending on the beat of the song,” says Osei, who choreographs about half of Afrothunda's dances. “I listen to a lot of Afrobeats music, and I use the beat to guide my dance moves. Then I refine it using choreography inspired by the music videos for those songs. I love being able to showcase African culture and highlight the unique complexity of it by telling stories through dance.” In February the group performed at Jabulani, a show hosted by the African Students Association to cultivate a deeper appreciation for African culture.



TYPHOON DANCE TROUPE

China and Southeast Asia

Typhoon performs traditional Chinese cultural dances as well as routines that blend the traditional with hip-hop, jazz, K-pop and other modern styles. This past fall Typhoon's artistic director Shushan Wu developed a Chinese jazz dance routine set to the Cantonese song “Dangerous Lover” by Fang Shier. “The choreography is originally from a talent show in China,” says Wu, an environmental engineering doctoral student. “It's a complicated performance featuring elements of jazz, Latin, and '80s and '90s Chinese pop dances. It requires flexibility, body control and facial expression to draw you into the beautiful love story of the song.”



K-DANCE

South Korea

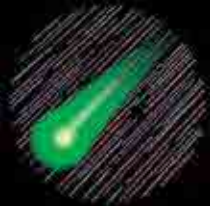
“Coming to college, I didn't expect to find people who like K-pop here,” says Michelle Lee, a senior psychology major who grew up in Taiwan. She couldn't have been more wrong. Korean pop music, or K-pop, has become a global phenomenon thanks to its catchy beats and mesmerizing synchronized dance videos by popular artists such as BTS, PSY, Girls' Generation and BLACKPINK. Now president of K-Dance, Lee heads up one of five subgroups, affectionately called “families,” who band together based on their fandoms (favorite K-pop performers) and learn the choreographies to their favorite music videos.

The Ticker

● African American studies professor **Tracy Vaughn-Manley sews quilts with a group of women she calls her “sister quilters.”** Displayed at Northwestern's Dittmar Gallery last winter, their quilts showcase the brilliance, resilience and radiance of Black Americans.



● Northwestern astrophysics graduate student Imran Sultan captured **rare images of a green comet**, which had not been seen since the Stone Age. Sultan, who began chasing the comet in January, noted that events like this “accentuate the beauty of the universe.”



● McCormick School of Engineering sophomore Ariana Pineda was **crowned Miss Asia USA 2023**. A biomedical engineering major, Pineda is focused on increasing the number of women in STEM fields and promoting scientific literacy among young people. She also created the gout diet management app Purity in 2020.



● A new Block Museum of Art exhibition from McCormick School of Engineering artist-in-residence Dario Robleto uses prints, sculptures, video and sound to explore the **emotional significance of technology like cardiographs and telescopes**. *The Heart's Knowledge: Science and Empathy in the Art of Dario Robleto* is on display through July 9.



PLAY BALL!

Look Who’s Back

Softball stars return to lead Wildcats’ bid for another trip to Women’s College World Series.

Northwestern pitcher Danielle Williams ’22 had an incredible senior season: 31 wins, including six in the postseason, Big Ten Pitcher of the Year and first-team All-America accolades, and a trip to the Women’s College World Series (WCWS).

Now she’s back for more.

Williams is one of five core Northwestern softball players returning for a fifth year of eligibility. She’ll be joined by her battery mate, catcher Jordyn Rudd ’22, outfielder Skyler Shellmyer ’22, shortstop Maeve Nelson ’22 and first baseman Nikki Cuchran ’22. The Wildcats have their eyes set on a return to the WCWS.

“Team goals? Obviously, winning the World Series, that’s a no-brainer,” says Shellmyer. “I also want to win the Big Ten regular season again, win the conference tournament, host a regional and super-regional — all the things, check all the boxes.”

Williams, who ranks among Northwestern’s top 10

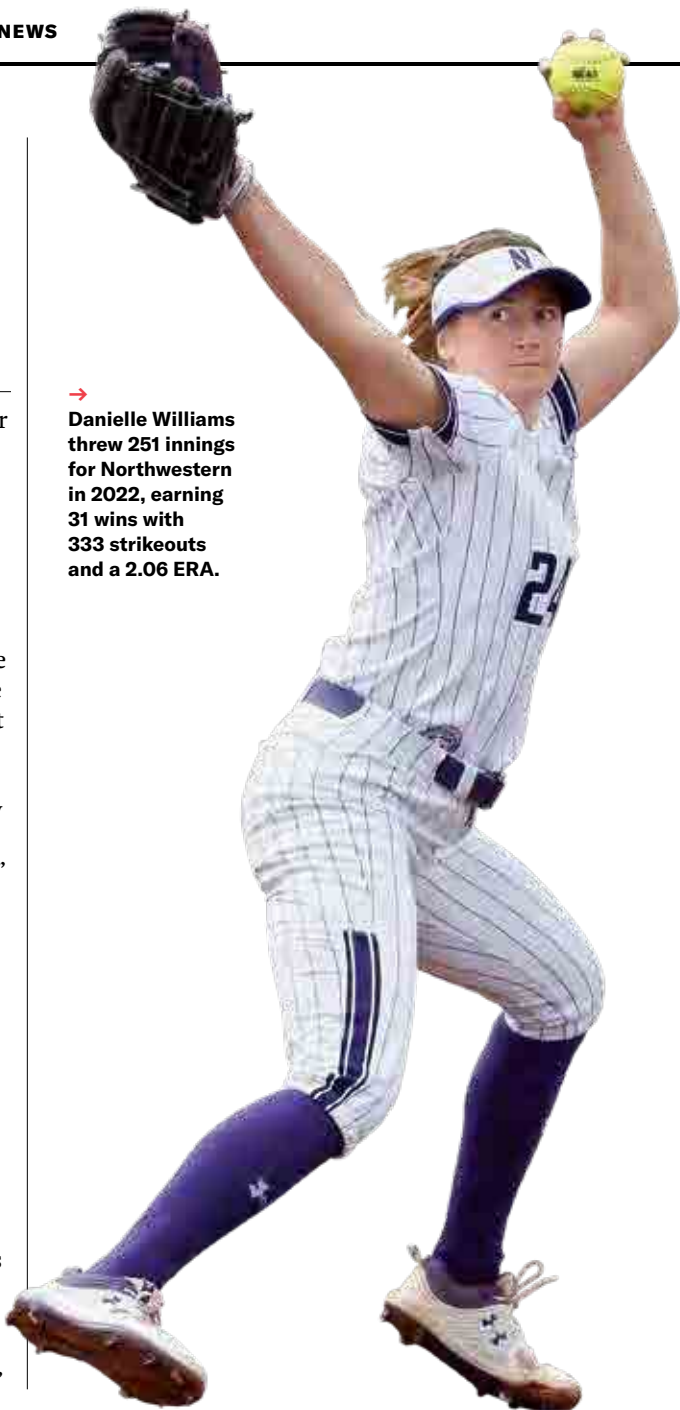
all-time greats in seven career pitching categories, will be a big part of that plan, along with Rudd. A Rawlings Gold Glove Award winner, Rudd was *Softball America’s* 2022 NCAA Defensive Player of the Year.

From her perspective in the outfield, says Shellmyer, “I see Jordyn and Danielle as a direct line. I really feel the energy they have and the connection they have. And I love how they bring that connection and energy to the rest of the team.”

On and off the field, the returning players know they have a responsibility to shape the next generation of Wildcats. Shellmyer says that means modeling steadiness and calmness. Rudd and Williams emphasize focusing on the team goals rather than outside expectations, while remembering the importance of keeping the game fun.

“Our young players help us remember the real joy of the game,” says Rudd. “And we get to teach them how to do things the Northwestern way.”

→ **Danielle Williams threw 251 innings for Northwestern in 2022, earning 31 wins with 333 strikeouts and a 2.06 ERA.**



COFFEE CUP: GETTY IMAGES; WILLIAMS: JOHN KONSTANTARAS/NORTHWESTERN ATHLETICS; MARIMBA: @MARIMBAMOODS VIA YOUTUBE; HU: LINUS HÖLLER

CAMPUS LIFE

Want to learn something new? Now in its 50th year, the Norris Mini Courses program offers more than 30 noncredit courses on a wide range of topics such as sewing, photography and American Sign Language. Offered quarterly, courses are open to Northwestern students and the general public. Here are just a few offerings:



Coffee Appreciation A partnership with local shop Backlot Coffee, this course offers lessons about the farming practices and history of coffee, as well as a tasting and brewing tutorial.

Introduction to Pole Dance In partnership with the student group Polerize, this course covers basic moves and dance techniques of pole dancing, helping students increase strength, flexibility and body awareness.

Wine Appreciation Featuring wines from California and around the world, this course teaches students to taste and describe wines like a sommelier. Mark Gruber ’76 has taught the course for more than 30 years.

Wheel Throwing I Students learn the basics of making pottery on a wheel, with a focus on ceramics such as cylinders and bowls. There are also intermediate and advanced levels of this course.

’CAT TALES

Remember the Marimba Madcaps?

In the early 1940s, Northwestern became the first U.S. university to offer a major and master’s degree in (drumroll, please) ... marimba!

Part of the percussion family, the marimba consists of wooden tone plates that are played with mallets. Similar to the xylophone, the marimba is known for its warmer, softer tones and a deeper range of notes.

Renowned percussionist and marimba virtuoso Clair Omar Musser, a hugely influential conductor and composer, began teaching marimba at Northwestern in 1942. Under his tutelage, several student marimba groups formed at Northwestern in the 1940s, including the Marimba Coeds (also called the Marimba Madcaps), an all-women orchestra comprising seven members. Together they toured the U.S. and Canada and performed at venues such as Carnegie Hall.

Watch a 1947 Marimba Madcaps performance at alummag.nu/marimba.



Dan Hu outside the White House in Washington, D.C.

JOURNALISM

News That Empowers

Dan Hu leads *The Yappie*, a publication for the AAPI community.

Looking for a place to pitch a story about Asian American and Pacific Islander (AAPI) voters in December 2020, journalism student Dan Hu discovered *The Yappie*, a digital news publication focused on activism and policies affecting the AAPI community. Soon after that initial pitch, Hu joined *The Yappie* as a writer and is now its executive director.

“There isn’t another publication like ours that focuses on AAPI politics,” says Hu, who spent three months in Washington, D.C.,

in 2021 reporting on the debt ceiling and the bipartisan infrastructure bill as part of Northwestern’s Medill on the Hill program.

“I’ve always loved following politics. But there’s so much reporting that isn’t being done about the AAPI community,” he says. “Affirmative action is a big example. There’s a huge Supreme Court case coming up that’s controversial within the AAPI community — we’re providing the deep coverage that the community needs.”

Among major racial and ethnic groups in the U.S., Asian Americans are the fastest-

growing segment of eligible voters, according to the Pew Research Center. Meanwhile, a 2021 survey from Stop AAPI Hate and Edelman Data & Intelligence showed that one in five Pacific Islanders and one in five Asian Americans had experienced a hate incident in the previous year.

“Since the media often only covers the AAPI community after a shooting or hate crime, it creates a narrative that we’re victims,” Hu says. “By telling a much more diverse set of stories from the community, we’re building a new narrative.”

OUR DNA

The Long and Short of Our Genes

New research shows how an imbalance in genetic activity can drive aging.

Why we age — and why some people tend to age more gracefully than others — has remained a mystery for centuries. Now, Northwestern data scientists have gleaned new insights into aging that could lead to interventions designed to slow — or even reverse — the process.

In a new study, the researchers used artificial intelligence to analyze an enormous dataset of bodily tissues at different ages. In their analyses, they uncovered a pattern: As genes age, they change their activity according to their physical length.

Genes’ activities include protein synthesis; DNA replication, expression and repair; cell metabolism; and cell division. All cells

must balance the activity of long and short genes. The researchers found that longer genes are linked to longer lifespans, and shorter genes are linked to shorter lifespans.

The length of a gene is based on the number of nucleotides within it. Each string of nucleotides translates to an amino acid, which then forms a protein. A very long gene, therefore, yields a large protein. And a short gene yields a small protein. A cell needs to have a balanced number of small and large proteins to achieve homeostasis. Problems occur when that balance gets out of whack.

“Imagine a waiter carrying a big tray. That tray needs to have everything balanced,” says Northwestern’s Luís A.N. Amaral, the Erastus Otis

All cells must balance the activity of long and short genes. The researchers found that longer genes are linked to longer lifespans, and shorter genes are linked to shorter lifespans.

Haven Professor of Chemical and Biological Engineering and a senior author of the study. “If the tray is not balanced, then the waiter needs to put in extra effort to fight the imbalance. If the balance in the activity of short and long genes shifts in an organism, the same thing happens. It’s like aging is this subtle imbalance, away from equilibrium. Small changes in genes do not seem like a big deal, but these subtle changes are bearing down on you, requiring more effort.”

The physical length of

genes can explain most molecular-level changes that occur during aging. More specifically, aging is accompanied by a shift in activity toward short genes, meaning short genes become more active than longer ones.

Surprisingly, the researchers uncovered this pattern across several animals, including humans, and across many tissues (blood, muscle, bone and organs) analyzed in the study.

The research team first analyzed tissue samples from mice — aged 4 months,

9 months, 12 months, 18 months and 24 months. They noticed the median length of genes shifted between the ages of 4 months and 9 months, a finding that hinted at a process with an early onset. Then, the team analyzed samples from rats, aged 6 months to 24 months, and killifish, aged 5 weeks to 39 weeks.

“There already seems to be something happening early in life, but it becomes more pronounced with age,” says Northwestern’s Thomas Stoeger, a postdoctoral

scholar in Amaral’s laboratory who led the study. “It seems that, at a young age, our cells are able to counter perturbations that would lead to an imbalance in gene activity. Then, suddenly, our cells are no longer able to counter them.”

Researchers examined changes in human genes from ages 30 to 49, 50 to 69 and then 70 and older. Measurable changes in gene activity according to gene length already occurred by the time humans reached middle age.

Although the researchers did find that long genes are associated with increased lifespans, short genes also play important roles in the body, including fighting off pathogens.

“Some short genes could have a short-term advantage on survival at the expense of ultimate lifespan,” Stoeger says. “Thus, outside of a research laboratory, these short genes might help survival under harsh conditions at the expense of shortening the animal’s ultimate lifespan.”

SPEAK UP

Bilingual Boost

Based on decades of research, professor Viorica Marian shares remarkable benefits of knowing more than one language:

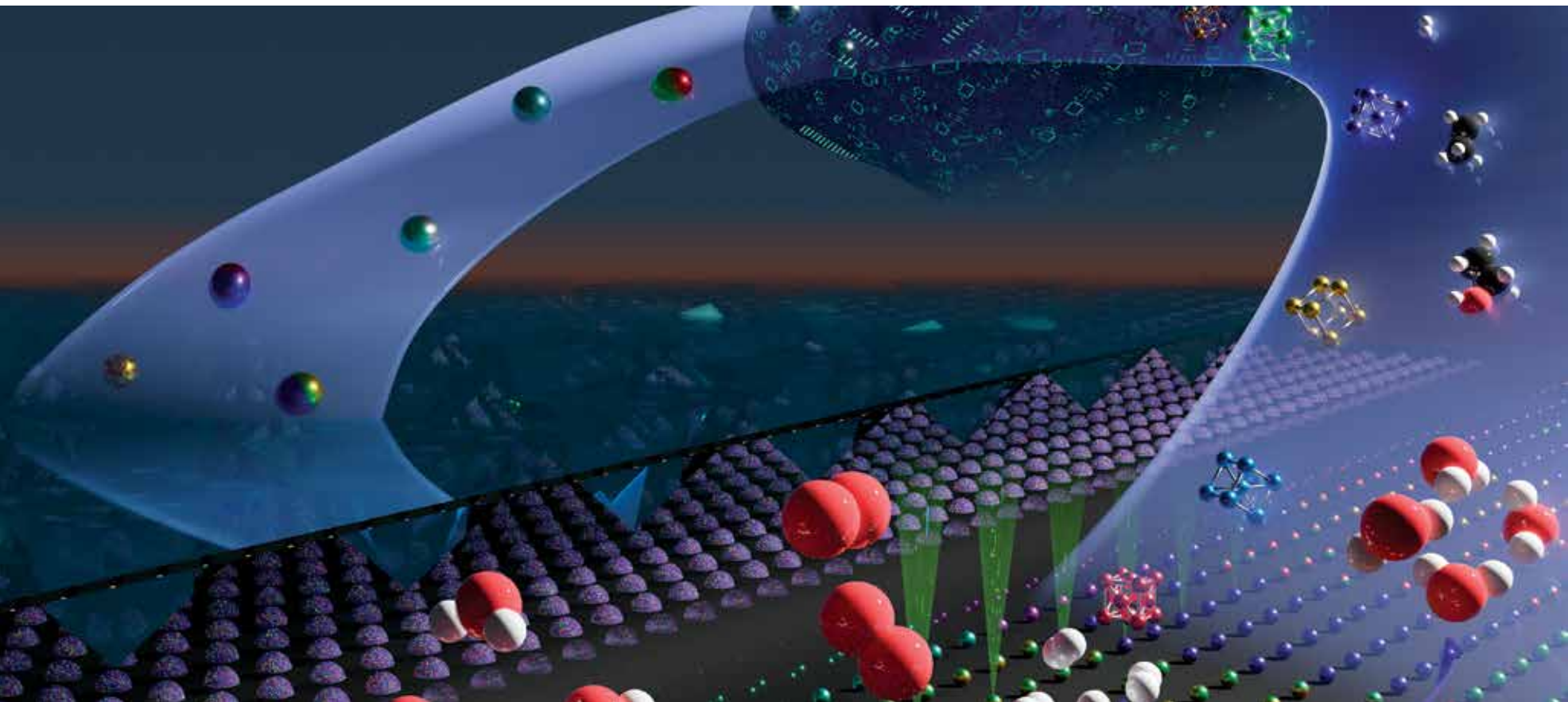
• Children who learn a second language gain an earlier understanding that the connections between objects and their names are arbitrary. Understanding that reality is not the same as the symbolic system we use to describe it **leads to more developed metalinguistic skills** that lay the foundation for even more advanced metacognitive processes.

• Bilingualism **may delay Alzheimer’s disease** and other types of dementia by four to six years and provides a protective mechanism for healthier cognitive aging.

• Across the lifespan, the experience of speaking more than one language while controlling interference from the other language(s) **improves performance on executive function tasks.**

• Knowing multiple languages enables people to make connections between things in ways that others do not see and results in **higher scores on creativity and divergent-thinking tasks.**

Marian’s 2023 book, *The Power of Language*, will be translated from English into 10 other languages.



GIFT PLANNING

Planning Ahead to Leave a Legacy

Donors who make planned gifts to Northwestern provide lasting resources that sustain students, faculty and research.

What does it mean to leave a legacy? For Rosemary Bruzek Schnell '54, an endlessly curious kindergarten teacher, it meant creating ways for Northwestern researchers

to push the frontiers of science and technology. For businessman Stan Gradowski '60, '62 MBA, a first-generation college student, it meant investing in programs across the University to benefit

future students and faculty. Both Schnell and Gradowski — who passed away in 2021 and 2020, respectively — left significant bequests to Northwestern that will make an impact for years to come.

As a teacher in Niles, Ill., Schnell touched many lives. Friends remember her as a constant learner who also was an active volunteer and philanthropist. Schnell followed Northwestern's research accomplishments with keen interest, especially the work of the International Institute for Nanotechnology. Before her death, she made a bequest in her estate plans to create the Rosemary Schnell Fund for Innovation and Technology at IIN, aiming to help scientists find solutions to pressing problems in medicine, energy and the environment.

IMAGE COURTESY OF JESSIE KU AND PROFESSOR CHAD MIRKIN

"Nanotechnology is an exciting, interdisciplinary field — one where Northwestern's leadership has already made phenomenal progress, with even greater potential to come," says Chad Mirkin, IIN director and the George B. Rathmann Professor of Chemistry. "Rosemary understood this, and her bequest will allow us to direct resources to nanotechnology innovators who can revolutionize areas ranging from cancer treatment to

"Mr. Gradowski's generosity, dedication and passion will make a difference for generations of Wildcats student-athletes."

— Dr. Derrick Gragg

← Planned gifts advance research in areas such as artificial intelligence and big data.

environmental protection."

Like Schnell, Gradowski chose to support his alma mater through his estate plan. The only child of immigrant parents, the Chicago-area native earned two business degrees at Northwestern before working for many years at the Tribune Company as a vice president and corporate secretary. He was a lifelong supporter of Northwestern Athletics and attended many basketball and football games.

Gradowski wanted to create opportunities for students and faculty that would last beyond his lifetime. His bequest established funds to support academics for student-athletes. He also established a fund for medical research, professorships and student life programs.

"Mr. Gradowski's generosity, dedication and passion will make a difference for generations of Wildcats student-athletes," says Dr. Derrick Gragg, the Combe Family Vice President for Athletics and Recreation. "His gift to Athletics will help accelerate student-athlete progress toward graduation and athletic excellence by funding summer quarter expenses, including tuition."

To create a strong foundation for the future, many donors name the University as a beneficiary in a will or living trust, retirement plan or other payable on death account. Others set up charitable gift annuities or remainder trusts, which provide income to individual beneficiaries. Alumni and friends from 49 states and seven countries belong to the Henry and Emma Rogers Society, which recognizes those who include Northwestern in their estate plans.

An Advocate for Equity

As a dentist and an educator, Juliann Bluitt Foster blazed a trail.

First, she earned a degree from Howard University College of Dentistry in 1962, when a tiny fraction of U.S. dental school graduates were African American women. Then, in 1967, she became Northwestern Dental School's first Black full-time faculty member. There, Bluitt Foster created a community dentistry program to increase access to dental care and, as associate dean of admissions, developed a program to recruit highly qualified students. She later served as the first woman and Black president of the Chicago Dental Society and the first

woman to lead the American College of Dentists.

Before her death in 2019, Bluitt Foster included an unrestricted bequest for Northwestern in her estate plan, which allowed University leadership to designate the gift to an area of need upon receipt. In recognition of Bluitt Foster's work to diversify the dental profession, Provost Kathleen Hagerty chose to allocate this gift to the Office of Institutional Diversity and Inclusion.

"Dr. Bluitt Foster distinguished herself as a tireless advocate for equity and inclusion at Northwestern and nationally," Hagerty says. "We are proud to honor her legacy by directing her bequest to advance access, belonging and accountability."

↓ Juliann Bluitt Foster, left, made an impact on Northwestern during and after her lifetime.



1,986

Living donors who have included Northwestern in their estate plans

\$533M

Amount of planned gift commitments made by current Rogers Society members

28

Percentage of planned gift commitments that will benefit financial aid and fellowships

FINANCIAL AID

Supporting Students Year After Year

Through endowed scholarships, donors create pathways for generations of undergraduates.

Northwestern alumni and friends who want to make a lasting impact on students for years to come direct their philanthropy toward endowed scholarships.

Financial aid remains a crucial component of the University’s commitment to making a Northwestern education accessible to highly qualified students. During the 2022–23 academic year, the University distributed more than \$272 million in undergraduate financial aid, a nearly 40% increase since 2018, with more than 60% of undergraduates receiving scholarships. Generous donors advance the institution’s mission by establishing endowed scholarships — named funds that directly benefit students in need.

University Trustee Valerie Friedman ’85 wanted to create pathways for students to realize their passions and explore diverse academic pursuits, which led her and her husband to establish the Valerie and Mark Friedman and Family Scholarship in 2012.

“Mark and I wanted to help students from a variety of backgrounds to attend Northwestern so the world can benefit from the beautiful art they’ll create, the innovative companies they’ll build and the scientific discoveries they’ll make,” Friedman says.

Over the last 10 years, eight students have been impacted by the Friedmans’ gift — including McCormick School of Engineering student Madeline Farr ’24. The Friedman Family Scholarship provides Farr with the financial flexibility to explore interests outside of her chemical engineering studies. Between completing a prestigious research internship in Germany, serving on the American Institute of Chemical Engineers executive board and performing at open mic nights with the Songwriters Association of Northwestern, Farr says financial aid has helped her fully engage with the University.

“The freedom to do all these things is possible only because of my scholarship,” says Farr, who hopes to focus on sustainable research and development after graduation.

School of Communication student Morgan Frost ’24 also knows how it feels to benefit from philanthropy. Her scholarship is the result of a gift that was made

“Mark and I wanted to help students from a variety of backgrounds to attend Northwestern.”

— Valerie Friedman

more than 80 years ago by a retired Chicago Public Schools teacher. Rachel A. Hargrove, who died in February 1940, left estate gifts to four Illinois universities, including Northwestern. Her unrestricted bequest to Northwestern was used to create the Rachel A. Hargrove Scholarship, which has been awarded to 16 recipients, including Frost.

A theater major, Frost always knew she wanted to work in live entertainment. A class taught by School of Communication associate professor of instruction Barbara Butts inspired Frost to chase her dream career in stage management. In the future, she hopes to foster a safe environment for people of all ages to create art.

“I could not attend Northwestern without scholarships,” Frost says. “I knew the University would provide experiences I couldn’t find anywhere else — and I was right.”

↓ Madeline Farr is one of the more than 60% of Northwestern undergraduates who have received scholarships this academic year.



FARR: EILEEN MOLONY; THEATER: MICHAEL BROSILOW



← Students in Northwestern’s theater department performed in José Rivera’s *Marisol* in July 2022.

THEATER

Program to Highlight Underrepresented Works

An anonymous gift to the School of Communication will honor an educator who was also the star of an award-winning TV series.

A gift to the School of Communication (SoC) at Northwestern will bring in high-profile artists focused on telling the stories of underrepresented communities. The gift will establish the Astere E. Claeysens Artist in Residence, SoC’s first visiting professorship dedicated to expanding the diversity of the school’s theatrical works and curriculum.

The gift was made anonymously in memory of Astere E. Claeysens, who served as a professor of English at George Washington University and was the producer, director, writer and star of *One to One*, an Emmy Award-winning

public TV program, prior to his passing in 1990.

As part of Northwestern’s commitment to supporting a diverse and inclusive campus community, the Astere E. Claeysens Artist in Residence will enable access to a more diverse theater faculty, promote equity in the stories that are told and enrich the education of the next generation of imaginative theater-makers.

SoC is known worldwide for educating leaders across the communication arts and sciences. Its five departments — communication sciences and disorders, communication studies, radio/television/film, performance studies and theater — set the standard

for excellence in their fields. The new visiting artist program aims to connect students with prominent

“The Astere E. Claeysens Artist in Residence will have a profound effect on how we engage established artists and prepare our own for careers in the creative arts.”

— E. Patrick Johnson

industry leaders and increase Northwestern’s capacity to engage international artists, ultimately helping contribute to a more inclusive learning environment at the University and beyond.

“The Astere E. Claeysens Artist in Residence will have a profound effect on how we engage established artists and prepare our own for careers in the creative arts,” says E. Patrick Johnson, dean of the School of Communication. “The American theater needs diverse voices in order to thrive, and this unique position will enable Northwestern to become a pivotal pipeline for the industry’s changemakers.”

Claeysens was born in Waukegan, Ill. He served as an infantryman in the U.S. Army during World War II and earned the Silver Star, two Bronze Star awards and the Purple Heart. After the war, Claeysens graduated from the University of Illinois with a degree in English and Columbia University with a master’s degree in American literature. Prior to serving on the faculty at George Washington University, he taught at Carnegie Mellon University. Claeysens’ book *Words and Music: An Introduction to American Musical Comedy* was published by the National Endowment for the Humanities in 1982.

NOTHING IS PRIVATE

Experts say it's time to enact comprehensive consumer privacy legislation in the United States to protect our personal information.

BY SEAN HARGADON

Illustrations by Deena So'Oteh

Identify theft can have devastating effects. In one recent example, a retired couple in the Chicago suburbs came within hours of losing their life savings to a sophisticated attack.

The attackers worked for months to gain access to the couple's retirement accounts. After obtaining one of the individuals' Social Security numbers from a prior data breach, the attackers contacted the couple's cellphone company, impersonated one of them, and then diverted text messages

and calls to the attackers' cellphone to intercept multi-factor authentication codes from the couple's bank.

With help from privacy professionals, the couple was able to recognize the cloning attack and immediately contacted the cellphone carrier and the banks. It was a Friday afternoon, and the attackers had placed an order to sweep the couple's life savings into a separate account first thing on Monday morning. The couple was able to get the transfer order canceled, but they came within 72 hours of losing much of their retirement savings.

Financial and identity theft is just one of the many dangers of personal information falling into the wrong hands. Location data from your cellphone, even when anonymized, can reveal personally identifiable information that could be used for surveillance, and scammers can piece together bits of information from social media accounts to do online phishing.

Technology has made life undeniably more convenient. But how much has this convenience put our privacy and personal information in peril?

"We're all generating an exponential amount of data all the time," says Caitlin Davitt Fennessy '04, vice president and chief knowledge officer at the International Association of Privacy Professionals (IAPP). The abundance of personal information — and the ability to connect the dots between those bits of data — is cause for concern.

"Anything that allows data to be collated and well organized turns a few incidental web searches here and a few purchases there into knowledge about your personal life that would otherwise be very difficult to obtain," says professor Matthew Kugler, who teaches a popular course on privacy law at the Northwestern Pritzker School of Law. "If someone put your TikTok history next to your Amazon history next to your Google history, they might be able to learn a lot about you that you didn't mean to tell them.

"And if I give an app data to provide some basic service ... and they sell it, that data could then be used for hundreds of purposes that I can't even imagine. It is that vast, unknowable possibility that is particularly scary in the privacy space."

The protection of personal information is a growing concern among Americans. According to a 2019 Pew Research Center survey, 81% of respondents felt they had very little or no control over information

"Privacy underpins all that we do and experience in today's increasingly digital world."

— Caitlin Fennessy

about them collected by companies — and a similar percentage were very or somewhat concerned about how that information was used. Other surveys reveal that most U.S. consumers believe companies should take additional steps to protect their privacy. And, importantly, two-thirds of Americans want the government to do more.

"Organizations and governments are working through how to manage the vast quantity of data that is out there," Fennessy says. "How do you provide the space for organizations to use it in innovative ways while also preventing and avoiding harmful or surprising uses of data? And how do you erect those guardrails in ways that are manageable both for individuals and for companies?"

Fennessy, who lives in Concord, N.H., manages the IAPP's content and knowledge products, which are shared with more than 75,000 privacy professionals around the world.

Lara Leniton Liss '99, global chief privacy officer at Walgreens Boots Alliance, manages the Walgreens team responsible for protecting the privacy of hundreds of millions of prescriptions per year as well as customer loyalty programs in the U.S. and the United Kingdom.

Liss is also a member of the IAPP's educational advisory board. The board helps develop programming for IAPP's privacy conferences around the world, gathering speakers to educate privacy professionals on the latest threats to privacy, emerging privacy-enhancing technologies and new regulations that require companies to update their compliance frameworks.

"Privacy underpins all that we do and experience in today's increasingly digital world," says Fennessy. "How our personal data is handled affects everything from the information we can access online to our personal health to the business model underpinning online services to how freely we express ourselves to the functioning of our democracies."

Fennessy and Liss are two of several Northwestern alumni working to protect your privacy. They agree that privacy is a serious matter and that comprehensive federal legislation is needed to set reasonable expectations for individual data protection rights and harmonize the growing patchwork of state rules that protect only a subset of the U.S. population.



REPRODUCTIVE HEALTH PRIVACY

The right to privacy is not mentioned in the U.S. Constitution. From a legal standpoint, our idea of a right to privacy has been shaped by the landmark Supreme Court case *Griswold v. Connecticut*, says Joanna Grisinger, associate professor of instruction and director of legal studies at Northwestern's Center for Legal Studies. The 1965 ruling overturned a state birth control ban and established a right to privacy within marriage. The notion of privacy in *Griswold* guided subsequent Supreme Court cases about abortion, contraception and who you can marry or have sex with.

But the 2022 case *Dobbs v. Jackson Women's Health Organization* changed that notion of privacy. As a result of *Dobbs*, the Supreme Court indicated that abortion is no longer a private matter, says Grisinger, who teaches courses on U.S. constitutional law. This new holding means that some personal information — including browser search history, health app summaries and location data — could potentially be used "to penalize pregnant people who are getting abortions," she says. "What about their metadata? What about apps that track fertility or menstruation? What about apps that track movement, because people might want to leave the state to get access to abortions?"

The *Dobbs* decision "has shined a light on the huge amounts of information that is not typically considered protected health information [under the Health Insurance Portability and Accountability Act] but could put an individual's health privacy at significant risk," says the IAPP's Caitlin Fennessy.

For Grisinger and law professor Matthew Kugler, the *Dobbs* decision portends even bigger changes to come regarding a right to privacy, with new limits seemingly on the horizon for sexual privacy, personal identity and autonomy privacy. "The Court seems to be tap, tap, tapping at the foundation of the right to privacy as a whole," says Grisinger.

PRIVACY TIPS FROM OUR EXPERTS



Create complex, unique passwords for each account and device, and **USE A PASSWORD MANAGER**. “One of the most common problems is the recycling of passwords,” says Lara Liss, global chief privacy officer at Walgreens Boots Alliance. “And then, when one website has been compromised, those usernames and passwords can be available on the dark web for others to use in an account takeover attack.”



TURN ON MULTI-FACTOR AUTHENTICATION wherever it is available to help keep your data safe even if your password is compromised.



BEWARE OF EMAIL AND TEXT SPAM that can download malware to your phone or other device: “Often the attackers use the psychological impact that something is time

bound. Any time you [feel] a sense of urgency, be very careful not to click on those links,” Liss says. And learn how to identify phishing messages sent by email, text or direct message. The Federal Trade Commission website offers training on how to spot phishing attacks.



BE SKEPTICAL OF FREE SERVICES. “A free online service has to make money somewhere,” law professor Matthew Kugler says, “and that ‘somewhere’ is probably collecting,

analyzing and marketing your data. ... So, if you’re not paying for the product, you are the product.”



CONSIDER USING A PHYSICAL KEY FOB, also called a token device, to log into important financial accounts, such as retirement accounts. This may be especially

helpful if you are aware that your Social Security number has been compromised in a prior data breach. Popular in the early 2000s, a key fob is a small electronic device that generates a new, unique code every 30 seconds to provide account access. This prevents account takeover attacks, where a recycled password is obtained via a different data breach and used to access the account, as well as phone cloning or email takeover attacks, in which the attackers intercept multi-factor authentication codes. Keep the key fob in a secure place, such as a safe-deposit box or home safe.

“If you wanted to protect your privacy completely, you would have to opt out of large parts of the modern information economy.”

— Matthew Kugler

WHO’S RESPONSIBLE?

“If you wanted to protect your privacy completely, you would have to opt out of large parts of the modern information economy,” says Kugler. “To get rid of every data tracker, every last company trying to invade your privacy, would involve drastically changing your life.”

Most privacy protection protocols rely on “notice and consent” policies, which require notification and approval for the organization to collect and utilize an individual’s personal data.

“How many years would it take you to read all of the privacy notices that you receive in your day-to-day life?” asks Liss, who lives in the Chicago area and is also an MBA student at the Kellogg School of Management. “Research that came out a decade ago showed that it would take the average person roughly a month each year to read all the privacy notices they were receiving at that time. That’s simply not practical. Given advances in technology in the last decade [and the growing number of] internet-connected devices in our homes and workplaces, the number of privacy policies the average person encounters in a year has increased as well.”

She says the government “has a role to play in establishing clear baseline protections for everyone and providing standards that are easily actionable for consumers.”

New statewide data privacy regulations in California, Colorado, Connecticut, Utah and Virginia — with more likely on the way in the next legislative cycle — are moving away from notice and consent toward an individual rights model, which provides a legal framework that all companies must follow to safeguard all personal data. The European Union’s General Data Protection Regulation (GDPR), which went into effect in 2018, is one such example; it requires organizations to have processes in place for the handling and storage of such data. Brazil, China, India and several other countries have recently proposed or enacted data privacy laws as well. (The ever-changing regulatory and legal landscape has increased the size of the privacy workforce. See “Consider a Career in Privacy,” opposite page.)

The new U.S. state laws focus, in part, on data lifecycle management. “You have to understand the inventory of data and the flow of data in order to be able to comply with state laws that are giving individuals the right to ask, ‘Where is my data? Who has my data? Please delete my data or correct my data,’” says Sheila Phillips Hawes ’76, ’79 JD, vice president, associate general counsel and chief privacy officer at AmerisourceBergen Corp. Hawes, who lives in Philadelphia, oversees global compliance with international privacy laws for the 42,000-employee pharmaceutical distributor, which operates in more than 60 countries.

From left, privacy experts Lara Liss, Matthew Kugler and Caitlin Fennessy



Some federal legislation already protects personal information in the U.S. The Health Insurance Portability and Accountability Act (HIPAA), for example, provides a national standard to protect patients’ personal health information, and the Gramm-Leach-Bliley Act requires financial institutions to explain their information-sharing practices to their customers and to safeguard sensitive data. But the nation lacks a comprehensive federal privacy law.

“We have a fragmented, industry-by-industry, state-by-state system,” says Mitchell Granberg ’90, chief privacy officer at Optum, an information- and technology-enabled health services business. Granberg, who lives in Minneapolis, oversees Optum’s privacy program and is responsible for developing policies, ensuring members’ and patients’ privacy rights, and handling privacy issues.

“I don’t think anyone is happy with the piecemeal approach,” says Kugler. “Privacy advocates, concerned that people in some states have more privacy rights than others, would like everyone to have a greater level of privacy. Those seeking to comply with the law — companies and law firms — are concerned about the complexity of these different state law regimes.”

CONSIDER A CAREER IN PRIVACY

The international focus on privacy compliance and enforcement has created a booming market for privacy professionals.

A recent global survey by the IAPP and the consulting firm EY found that the size of the average corporate privacy team grew by 12% over the course of 2022, as thousands of workers entered the profession. A 2022 survey by TRU Staffing Partners reported a 30% year-over-year increase in data privacy jobs, and privacy professionals have seen a 22% increase in pay.

“We see the need for more than a million privacy professionals over the next several years,” says IAPP’s Caitlin Fennessy, who says the field needs people with legal and technical backgrounds. “I think universities that recognize the growth of the field and its hybridized nature can develop programs that connect the dots and help educate the next generation of privacy professionals.”

“Having said that, the reason we have these different state regimes is because of the difficulty of passing a federal law. ... Fundamentally, there is a split on what kind of rights should be granted and on how easy it should be for people to sue to enforce those rights, because companies are terrified of privacy laws that have a strong enforcement mechanism. And if you have a privacy law giving people a lot of rights, it will be easy for companies to make mistakes.”

U.S. companies that operate across international borders are building compliance programs in response to foreign data protection laws such as GDPR, Fennessy says. “And a lot of those programs are quite strong, but that doesn’t necessarily provide rights to millions of Americans who are asking, ‘Where are my protections in this space?’ But as more and more states pass laws, it becomes harder to take a holistic approach. ... It feels, frankly, shocking that we don’t have a national privacy law yet.”

In 2022 the U.S. House of Representatives considered the American Data Privacy Protection Act (ADPPA), which aimed to provide consumers with foundational data privacy rights. While ADPPA stalled in the House in fall 2022, “we actually saw the most significant coalition of interests come together to support passage of a national privacy law that we’ve seen in two decades,” says Fennessy.

That coalition includes privacy advocates, academics and some of the largest companies in the world who view comprehensive federal privacy law — and a single national standard for how consumer data is treated in the U.S. — as an important development for the global economy. In 2018, for example, Business Roundtable, an association of chief executive officers of the United States’ leading companies, issued its proposed framework for federal privacy legislation.

Liss partners with Walgreens’ government relations team to meet with federal and state regulators and legislators to advocate for consumer privacy laws. “Over the past three years, we have met with congressional staffers to talk through proposed comprehensive federal consumer privacy legislation and how it will benefit the American public and business community,” Liss says. “I am hopeful that within the next three to five years we will see comprehensive federal privacy legislation in the U.S.”

Sean Hargadon is editor in chief of Northwestern Magazine.

KUGLER: RANDY BELICE © 2016, NORTHWESTERN UNIVERSITY

MAKING THE SCENE

Meet **Joanna Bush '99**,
the Hollywood concept
artist behind several
Oscar-winning films.

BY MARTIN WILSON

Joanna Bush '99 got her *second* big break when she showed up in spring 2000 for an internship at a newly formed production company in Hollywood called Section Eight.

She immediately went above and beyond in any way she could: organizing the closet, labeling items and generally making herself essential. Her meticulousness led to a pivotal moment in her career. When the co-founder of Section Eight, Oscar-winning director Steven Soderbergh, needed someone to comb through archival footage of World War II for his 2006 film, *The Good German*, he knew just the person.

Despite her lack of training as an archivist, Bush threw herself into the

project and created an elaborate database of footage. Her intimate knowledge of the material made her indispensable, and Soderbergh hired her onto the project full time. From there, *The Good German's* production designer, Philip Messina, hired her for Soderbergh's next project, *Ocean's Thirteen*. It was Bush's first job as a film illustrator or concept artist (the terms are largely synonymous to her). A film illustrator helps to "develop the visual look and tone of a film [and] communicates a director's vision to all the departments of a film," Bush says. "Great illustration can inspire and unite."

Quick rewind: Bush, who grew up in Columbia, Md., as the art-loving daughter of two National Security Agency linguists, got her *first* big break at Northwestern when she transferred from the Weinberg College of Arts and Sciences into the

radio/television/film department in the School of Communication and found the creative possibilities helped her overcome some of her shyness. "I was, and still am, an extremely introverted person," she says. "But because I knew it was the path to pursue film, I signed up for the first available project" with Studio 22, a student-run production company that provides extracurricular filmmaking opportunities for Northwestern students.

"Being a part of Studio 22 films was an integral step in preparing me to work professionally in film," Bush recalls. "There was a real sense of mentorship and appreciation for the entire crew, no matter what your position." Bush worked as a production assistant, a set painter, a production designer, a sculptor for a stop-motion film and more.

COURTESY OF JOANNA BUSH





One day a classmate asked her to storyboard his student film. That classmate was Zach Braff '97. They would reunite 20 years later when she created illustrations for Braff's 2023 film, *A Good Person*, starring Florence Pugh and Morgan Freeman.

"Northwestern was the perfect fit for me," says Bush. "I was able to take fine art classes in the [Weinberg] College of Arts and Sciences and other courses that also really challenged me intellectually. Northwestern has such a high level of excellence in so many fields, from science to theater to engineering to journalism to business to law and everything in between. I loved that ability to broaden my perspective on how the rest of the world outside of

film looks at storytelling and art and culture."

Fast Forward: *NOPE*

After her Section Eight internship, Bush's career as a film illustrator took off. She continued working regularly with Soderbergh on *The Informant!* and *Che: Part One* and *Che: Part Two* — in which some of her illustrations were edited directly into the film by Soderbergh.

Finding a successful niche as an illustrator was somewhat surprising to

Bush, who didn't even know what a film illustrator did at first. "I was very open, just trying to find my way into [the film industry]," she says. "Like all things in life, if you try to force something, it's hard to make it work. When you step in the door, like that [Section Eight] internship, it creates possibilities."

Another possibility presented itself when Bush was hired to work on Oscar-winning writer and director Jordan Peele's



2022 film, *Nope*. Bush also worked with both Peele and his production designer Ruth De Jong on the 2019 film *Us*.

Early in preproduction of *Nope*, Peele selected nine frames from his script to present to Universal Pictures, the studio that co-produced and distributed the film. Bush was tasked with developing an illustration for each that would convey a different aspect of the story for the studio.

"Jordan Peele is both a writer and a director, so the process very much felt like the way a writer approaches drafts," says Bush. "It felt organic and fluid, and I really felt we were molding and shaping as we went along — with each draft finding more of what the scene should convey."

For *Nope*, Bush says that De Jong had researched Western towns — real-life

ILLUSTRATION: JOANNA BUSH; ALL IMAGES: COURTESY OF UNIVERSAL PICTURES



Above, top, Joanna Bush's illustration of Jupiter's Claim, a fictional amusement park in *Nope*. "It's pretty much the climactic end of the film," Bush says of the scene. "Although the sequence of events in the illustration changed during production ... it gives a sense of the final scene and all the elements at play. ... It's a pivotal moment for a strong leading female character played by Keke Palmer [above]." Left, *Nope* writer, director and producer Jordan Peele on set.

ghost towns as well as the “film towns” in classic movies such as *Heaven’s Gate* and *Once Upon a Time in the West*.

“We looked at Western paintings of African American cowboys as inspiration,” Bush says, “and experimented with pushing the colors in extreme ways. We tried out several color palettes. The style of the buildings was [meant] to feel grounded in a Western town vernacular, but the colors were [meant] to be exaggerated and given the more modern, contemporary feel of an amusement park.”

Each new project for Bush is like going to a new class. “As you work on films, you get to travel through history,” she says. “Right now, I’m working on a Tyler Perry project [the film *Six Triple Eight*] about a group of African American women who went to England during World War II to sort the mail. Every new film you work on is an invitation to learn something that you hadn’t known anything about.”

Special Feature: LIFE OF PI

The project that Bush says took every ounce of her talent was Ang Lee’s Oscar-winning 2012 epic, *Life of Pi*, based on the bestselling novel by Yann Martel.

Bush was one of the first people hired to work on the film by David Gropman, the production designer. (The production designer is a crew member



Joanna Bush worked on the following films that earned Academy Award nominations in the best production design category.

Babylon (2022)
Production Designer:
Florencia Martin

Mank (2020) *
Production Designer:
Don Graham Burt

Ma Rainey’s Black Bottom (2020)
Production Designer:
Mark Ricker

Beauty and the Beast (2017)
Production Designer:
Sarah Greenwood

La La Land (2016) *
Production Designer:
David Wasco

Life of Pi (2012)
Production Designer:
David Gropman

* Won the Academy Award

who leads the art department for a film.) Through extensive research, Bush helped Gropman and Lee create a visual language for the film. For example, “I researched these different kinds of ornamental exhibit cages used at the zoo in Pondicherry, India,” she says. “And one of them ended up in the illustration that was the first thing I ever sent to Gropman.”

Her research eventually included traveling to Taiwan with the production team.

“Ang was fully committed to portraying the spirituality and religions of *Life of Pi* in the most authentic way possible,” Bush says. “I knew very little about Hinduism. But this is my world of getting to learn about and explore and understand other cultures and other ways of life.

“There are these types of drawings in Indian history that are amalgams of one animal created by all these little animals. They wanted [a mural of] an elephant in the film, so I composed it out of the parts of all these different animals.”

The main character in the film, Pi, has a lifeboat manual that features prominently in the narrative. Bush was initially tasked with designing five or six specific pages of the manual to be seen on camera. “But I wanted to make sure that every page of the manual felt authentic. I hadn’t done many prop illustrations before, and I was nervous they might flip to a page and



Above, Joanna Bush's illustration of a ship's cargo hold from *Life of Pi*. Left, the completed scene as it appeared in the film. Bush says the original script for *Life of Pi* didn't enumerate any particular animals beyond the tiger, “Richard Parker.” Her rendering shows her selections. “I got to fill in whatever animals I wanted,” she says. “I remember that day when the [prop] animal heads showed up. I just couldn't believe it.”

Bush traveled to Taiwan with the *Life of Pi* production team, a rare treat for an illustrator, whose work is typically complete prior to production. “I love when I get to see how someone interprets my work,” she says. “I love seeing what things stay — and when somebody punches it up one more notch.”

“From the beginning, motion pictures have relied on illustration. An illustrator’s work influences the look and feel of a film, in some cases setting it early on, in others, guiding it during production. I have the greatest respect for artists who, through research, imagination and artistic skill, can create something that didn’t before exist. Joanna is one of those very talented, creative artists.”

— Oscar-winning screenwriter, director and producer **Steven Zaillian**, who worked with Bush on the forthcoming series *Ripley*



ZAILLIAN: UNIQUE NICOLE; GETTY IMAGES ENTERTAINMENT

JOANNA BUSH; LIFE OF PI ©2012 20TH CENTURY STUDIOS, INC. ALL RIGHTS RESERVED

see gobbledygook text, so I ended up typesetting and illustrating 60 pages,” she says with a laugh. “I made sure that every page in that lifeboat manual was readable and made sense. Then the title company [that produced the credit sequence for the film] used the little drawings I had done [in the film credits].”

In 2022, with recommendations from Ang Lee and others, Bush was admitted into the Academy of Motion Picture Arts and Sciences — better known as “the Academy” that everyone thanks when they win an Oscar.

“The directors and the production designers I’ve worked for are [my]

mentors,” Bush says. “They really do nurture and care for the people around them. It’s given me such a feeling of community.”

That community exists not just for the whole film production community in Hollywood but also on each project Bush takes on.

“The most enjoyable experiences are with directors and designers who give you a clear vision at the beginning but are open to you adding to the vision,” she says. “Film is a collaboration, and all departments come together to work with each other toward the common goal of making the best film possible.”

And when that collaboration happens, there’s no better feeling for Bush.

“I remember on *Life of Pi*, Ang and David Gropman were talking about what was left to do for our presentation with Fox. And I remember Ang saying, ‘Oh, I’m not worried about Joanna. She’ll get it done,’ and I remember thinking, he has such high standards, so for him to think that I was going to deliver — that’s exactly what you want to hear.”

Martin Wilson ’10 MS is director of creative production in Northwestern’s Office of Global Marketing and Communications.

Cleanup on Planet Earth

In April 2010 an explosion on the Deepwater Horizon oil drilling rig spilled an estimated 134 million gallons of oil into the Gulf of Mexico — the largest oil spill in U.S. history.

The aftermath of the disaster inspired engineer Vinayak Dravid to focus his work on solving environmental problems. “I realized the scale of the problem was gigantic and that we needed commensurate solutions,” Dravid says. Somewhat by accident, he and his team designed a sponge that can soak up oil spills and help save marine life.

Dravid is one of many researchers at Northwestern who are leveraging basic science and fundamental research to address some of today’s most dangerous environmental threats. These researchers are developing new technologies and processes to improve our air, our water and our world.

“A lot of environmental pollution problems are manageable and treatable,” Dravid says, “if there’s a willingness to innovate and take some chances.”

Humanity has made a mess of our precious planet. These researchers are developing amazing new ways to help restore it.

BY CLARE MILLIKEN



SAVING OUR SEAS WITH SPONGES

PROBLEM: 20,000 oil spills annually
SOLUTION: A sponge that can soak up 30 times its weight in oil

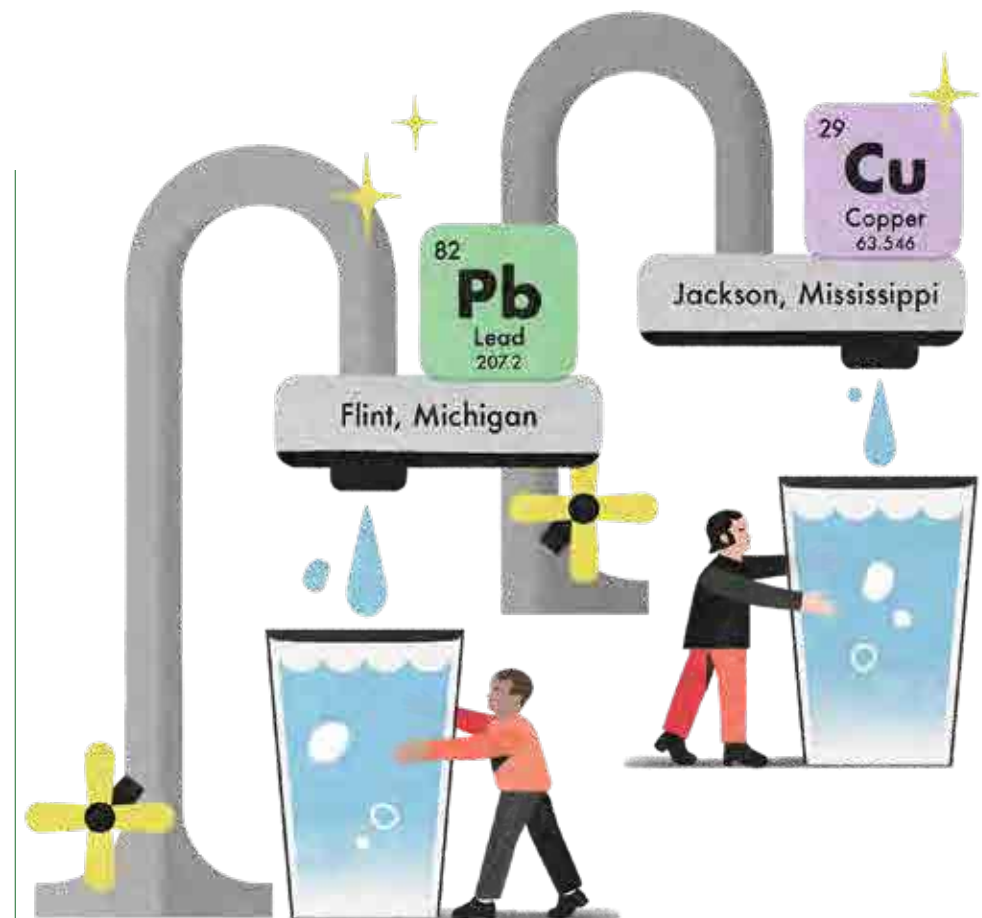
Vinayak Dravid, the Abraham Harris Professor of Materials Science and Engineering at Northwestern’s McCormick School of Engineering, says he is developing “nanoscale solutions to gigaton problems,” such as water pollution.

In 2018 a senior member of his research group spilled a nanoparticle solution on a lab table. As the team prepared to clean up the mess, they noticed that water droplets rolled right over the solution, rather than being absorbed. Dravid and his team were intrigued. So they placed a drop of oil on the solution, and that oil was immediately absorbed. “We immediately knew there was something fishy going on,” he says.

Dravid’s team applied the nano-based coating to a polyurethane sponge, similar to a regular kitchen sponge or packaging foam. Remarkably, the sponge soaked up 30 times its weight in oil and could then be wrung out and reused dozens of times. With 4 million tons of sponges being thrown into landfills each year, Dravid realized he could effectively use trash to clean up oil spills.

“There are 20,000 oil spills [reported to the U.S. government] every year,” Dravid says, adding that current methods to mitigate spills in bodies of water — including burning or dispersing the oil — are themselves harmful to marine life. His sponge technology could provide a safe and scalable way to clean up spills while leaving the surrounding environment unscathed.

Dravid’s lab has been working with the U.S. Coast Guard to develop this sponge technology, and recent testing at the National Oil Spill Response Research & Renewable Energy Test



Facility in New Jersey showed the sponges completely soak up spilled oil within 10 seconds. The research group is also working with nongovernmental organizations and regulators to develop accident mitigation strategies for companies that transport oil across bodies of water. In the same way that ships provide life jackets for passengers, Dravid says, they could also store sponges on board in case of an accidental oil spill.

“It’s not just about absorbing oil but also doing so quickly before the oil spreads,” Dravid says. “Not only can we clean up with high capacity but we can clean up fast. In most cases, if you don’t immediately attack the spill, it spreads and creates even more pernicious problems.”

In addition to oil cleanup, Dravid’s sponge can be engineered to capture microplastics or phosphate, a nonrenewable resource used in fertilizer. Dravid, who envisions his sponge as a “Swiss Army knife approach” to pollution mitigation, is also engineering coatings to capture nuclear waste.

GETTING THE LEAD OUT

PROBLEM: Pollutants in drinking water

SOLUTION: Nano-engineered water filters that target city-specific toxins

Contaminated drinking water has been a problem throughout human history, highlighted recently by the water crises in Flint, Mich., Jackson, Miss., and elsewhere. Chemist Omar Farha has developed a way to remove pollutants such as lead from water. Farha’s lab studies metal-organic frameworks (MOFs) — nanoscale materials that can be engineered to capture specific gases, vapors and other materials from air and water. To the naked eye, Farha’s MOFs look like vials of colored sand, each crystal containing millions of individual cavities.

MOFs can be especially useful in water remediation, says Farha, a chemistry professor at Northwestern’s Weinberg College of Arts and Sciences.

“Contamination in drinking water varies from one city to another, and generic water filters are typically mediocre. And most of us use generic filters,” Farha says. “I believe we should be aiming for ‘smart filters.’ Every city should test its water supply and use filters that can capture the toxins specific to each city. ... MOFs can play a big role because we have the ability to change the components to make them selective for different pollutants.”

Farha first applied MOFs to the degradation of poisonous chemicals known as nerve agents. He’s working with the U.S. Department of Defense to develop fabrics containing nerve agent–destroying MOFs for use in conflict zones.

Based on that work, Farha started engineering MOFs to break down plastics, and in a project supported by the Defense Advanced Research Projects Agency, he has since developed MOFs to extract water

from air in harsh and low-humidity environments.

Farha hopes one day to create MOFs that can capture carbon dioxide and convert it into fuel, as well as MOFs that can store hydrogen at room temperature, which could pave the way for hydrogen-powered cars and reduced dependence on fossil fuels.

“In my group, we do fundamental research that can benefit humanity and be translated into products,” Farha says.

MAKING PLASTIC MORE RECYCLABLE

PROBLEM: Unrecyclable plastics, such as rubber tires

SOLUTION: Chemical process that creates recyclable plastic for rubber tires and other products

Each year, the world generates about 800 billion pounds of plastic waste.



What can we do?

According to our experts, **here are a few ways we can help our planet:**

Buy only what you need:

This will reduce the amount of material going to landfills.

Eat less beef: Livestock are a major source of methane gas.

Reuse plastic bags: Grocery store bags can be used many times.

Dispose wisely: Pouring medicines down the drain can contaminate water sources.

That’s about 100 pounds per person per year. Of that plastic waste, about 20% is deemed nonrecyclable, with much of it ending up in incinerators or landfills. But chemical engineer John Torkelson has found a means to break down and reuse these previously unrecyclable plastics.

Thermoplastics, such as the kind used for milk jugs and soda bottles, are made up of linear polymer chains that can be recycled and remelted into new products. Torkelson is working with a specific class of materials called thermosets, which are used to create a broad range of products, including rubber tires and mattresses. Thermosets are made up of permanently crosslinked polymer chains that make the materials more durable but also make recycling impossible.

“You could take an empty 2-liter soda bottle and cut that into bits, reprocess it and form another bottle from that material,” says Torkelson, the Walter P. Murphy Professor of Chemical and Biological Engineering and Materials Science and Engineering at McCormick. “You can’t do that with a rubber tire because the chains are chemically crosslinked, and those are permanent. That prevents them from being effectively recycled.”

Using simple chemistry, Torkelson’s research team used “dynamic covalent crosslinks” to create polymers



that incorporate the durability of permanent crosslinks but also can be recycled, offering the best of both worlds. These dynamic crosslinks can come apart at high temperatures and come back together once they’re cooled. His lab is collaborating with Dow Chemical to develop this work.

Torkelson’s dynamic covalent crosslinks could be used to create crosslinked polymer materials, such as rubber tires and polyurethane foam mattresses, that can be recycled a number of times, significantly extending the life of the polymer and reducing landfill waste.

REPURPOSING GREENHOUSE GAS

PROBLEM: A dangerous greenhouse gas in the air

SOLUTION: Bacteria that convert methane into renewable fuel

Methane is a potent greenhouse gas that can have up to 84 times more warming power than carbon dioxide.

Amy Rosenzweig has spent much of her career studying methanotrophic bacteria, which consume methane. These bacteria convert methane to methanol, which can be used as an energy source. Rosenzweig’s team is looking specifically at enzymes in the bacteria, seeking to understand how they work in the hopes of harnessing them for methane conversion.

“These enzymes bind the methane and use either iron or copper to react with oxygen, ... break the bond in methane and convert it to methanol,” says Rosenzweig, the Weinberg Family Distinguished Professor of Life Sciences and professor of molecular biosciences and chemistry at Weinberg College. “If you understood on the molecular level how these enzymes work, you could ... make a catalyst that is modeled on what the enzyme does.”

Current methods of methane-to-methanol conversion require large industrial plants and expensive materials. Harnessing methanotrophic bacteria could provide a more portable and less costly method of making fuel from methane.

“The hope is that these bacteria could be used to make a smaller, more deployable solution,” Rosenzweig says. “You’re not going to build a giant plant next to a fracking site to harvest methane, and it’s difficult to transport the methane because it’s a gas. But you could have a solution where a bioreactor filled with these bacteria goes to the site and grabs all the methane, and the bacteria convert it.”

These bacteria also could be used to eat methane at landfills, where the greenhouse gas leaches into the air.

Rosenzweig has made several key discoveries about the conversion process, but there is still more work to be done. “We need to learn more about how the enzyme works to make these processes much faster and much more efficient,” she says.

FIGHTING ‘FOREVER CHEMICALS’

PROBLEM: Harmful ‘forever chemicals’ that exist all around us

SOLUTION: Breaking apart these compounds through chemical processes

Organic chemist and open-water swimmer Will Dichtel develops materials that remove pollutants from water, including pesticides, pharmaceutical agents and industrial chemicals. In the course of that work, he learned about a class of compounds called per- and polyfluoroalkyl substances, or PFAS.

Found in nonstick cookware, firefighting foams, waterproof cosmetics, water-repellent fabrics and products resistant to oil and grease, PFAS have been in use since the 1940s and ’50s. Today, they can be detected in drinking water — and in the blood of 97% of the U.S. population.

Dubbed “forever chemicals” in popular media, PFAS are really alarming, Dichtel says. “They don’t break down quickly in the environment. They accumulate in living organisms, including people, and they are associated with many negative health effects,” including developmental effects in children, greater risk of several types of



bonds. Heating the PFAS in a solvent with sodium hydroxide, a common reagent, decapitated the head group so that only the tail remained.

“That was really the eureka moment,” Dichtel

says. “When that head group falls off, ... the tail falls apart like a row of dominos.” What’s left behind, Dichtel says, is

fluoride, “the safest form of fluorine,” and carbon byproducts that are known to be safe.

Dichtel estimates that about half of PFAS have this particular structure and could be destroyed using his lab’s technique. The researchers are

optimistic that other classes of PFAS compounds will fall apart using similar principles.

Supported by a grant through the Northwestern Center for Water Research, in collaboration with investigators in Israel and the U.S., Dichtel’s team is testing their PFAS removal and destruction techniques in

wastewater in both Chicago and the Middle East. The aim of the grant is to

enable wastewater reuse, particularly in Israel, which already uses wastewater for agriculture. Removing PFAS so that these compounds don’t end up in agricultural products or meat is a huge goal, Dichtel says.

“This is more than just an academic discovery,” says Dichtel. “We’re trying to push beyond. We’re trying to make an impact.”

Clare Milliken is senior writer and producer in Northwestern’s Office of Global Marketing and Communications.

Editor’s note: Northwestern and several of the faculty named in this article have financial interests in companies that have been formed to commercialize technologies discussed in this article. For details and video of our researchers, see alummag.nu/Cleanup.

cancer, increased cholesterol levels, and decreased fertility and ability to fight infections. Similar to lead, several PFAS have been declared unsafe even at trace levels by the U.S. Environmental Protection Agency.

Dichtel’s team began working on ways to remove PFAS from the environment. Using cyclodextrin, a sugar derived from cornstarch, they designed a polymer that can remove PFAS from water.

And now Dichtel, the Robert L. Letsinger Professor of Chemistry at Weinberg College, has identified a way to destroy PFAS with simple chemistry. He and his team discovered that a significant portion of PFAS compounds have what they call a “head group” composed of oxygen atoms, and a “tail” of carbon-flourine

800 billion

Pounds of polymers and plastics produced worldwide each year, according to John Torkelson

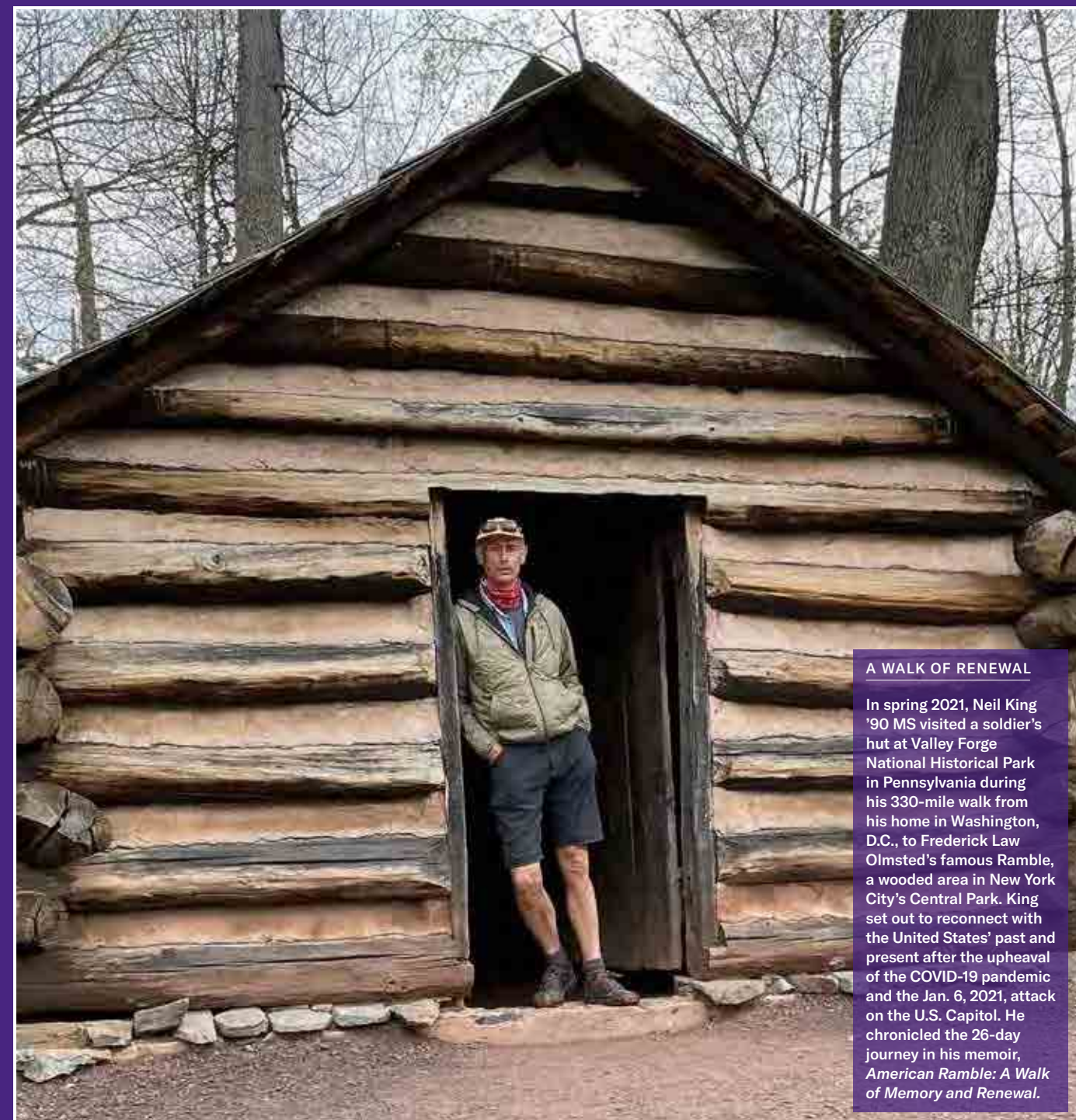
4 million

Tons of sponges thrown into landfills each year, according to Vinayak Dravid

10,000+

Types of PFAS, which are used in products such as fast-food containers, nonstick pans, dental floss and more, according to Will Dichtel

Alumni



A WALK OF RENEWAL

In spring 2021, Neil King '90 MS visited a soldier's hut at Valley Forge National Historical Park in Pennsylvania during his 330-mile walk from his home in Washington, D.C., to Frederick Law Olmsted's famous Ramble, a wooded area in New York City's Central Park. King set out to reconnect with the United States' past and present after the upheaval of the COVID-19 pandemic and the Jan. 6, 2021, attack on the U.S. Capitol. He chronicled the 26-day journey in his memoir, *American Ramble: A Walk of Memory and Renewal*.

Creation



IN THE WRITERS ROOM

Five Questions with Will Arbery '15 MFA Pulitzer Prize–finalist playwright discusses his Evanston-inspired off-Broadway play and what it's like to write for the hit HBO show *Succession*.

1

What inspired your play *Evanston Salt Costs Climbing*? I was in a class taught by [radio/television/film chair] Thomas Bradshaw in 2014. We had to write a short play based on a news article, and I thought, "What if I found a local news article that's deliberately boring?" There were a lot of snowstorms that year, and that headline, which became the title of the play, was unwieldy and bureaucratic. I wrote the play just to fulfill the assignment, but the

2

What other writing projects did you work on at Northwestern? We wrote screenplays and TV pilots. I wrote four full-length plays and a feature and a comedy pilot. The drama pilot that I wrote for [associate professor of instruction] Brett Neveu's class — my agents still use that as a sample. I have a meeting with HBO today, and that was one of the samples that my agents sent them.

3

Your Catholic, conservative upbringing features heavily in your plays. Is there more to explore there? My first three productions in New York — *Heroes*, *Plano* and *Corsicana* — all dealt directly with my sisters or my parents. I have seven sisters, and three have yet to be portrayed. If someone portrayed me onstage, I would feel super weird about it, so I wanted to give my family a break. There's definitely more I could

characters — these salt truck drivers and this public works administrator, Jane — stuck with me. And once I moved to New York, I found myself thinking about them.

I came back to Evanston in early 2020 and toured the salt dome, met with city officials and did research on emergent road de-icing technologies, including heated permeable pavers. In the play, Jane wants to use the pavers but knows it would make her friends, the salt truck drivers, obsolete.

write. But it's emotionally exhausting and delicate. So I'm giving myself a break, too. I do have projects on the horizon — some movies and an opera. But nothing has been publicly announced yet.

4

How have you dealt with that emotional exhaustion?

From my early 20s on, I was frantically working nonstop. Even if I was just watching TV, the motor in my brain was constantly running. I hit a breaking point when I realized I need to not just rest but redefine my relationship to work and not define my worth by how successful or productive I'm being. It's really easy to get into that mindset.

5

What was it like to write for season four of *Succession*?

I felt lucky that my first TV gig was on one of the best shows. But I was intimidated and shy. I spent weeks obsessing about how little I was talking.

Then, one of the writers said to me, "All you have to do is listen to the question that's being asked in that moment." And once I did that, I started talking on point because I was actually listening. It seems so simple, but it was a profound learning moment.

And then in terms of the writers room — I was surprised at how much a bunch of polite Brits all love doing karaoke. I would be mortified to do it, but I love that they can really let loose!

[Read more at *alummag.nu/Arbery*](#)

WILL ARBERY: ZACK DEZON; FOOD ART: HARLEY LANGBERG '10

YES, PLAY WITH YOUR FOOD!

Harley Langberg '10 turns the "edible into the unforgettable." Using everyday grocery items, he creates likenesses of celebrities, animals and film characters, including Winifred from Disney's *Hocus Pocus* (right), made from dyed spaghetti, spiral sweet potatoes, zucchini, dyed mashed potatoes, pear, eggplant, turnip, mustard greens, squash and mashed purple sweet potatoes. He has worked with Food Network, MTV and others to create food art for their social media and marketing campaigns. Langberg says his 2-year-old daughter, Blake, inspires — and often eats — his creations. [See more of his food art at *alummag.nu/HarleyLangberg*.](#)



ENTREPRENEUR

The Plug Drink



Justin Kim, left, and his brother, Ray

For Justin Kim '15 and his older brother, Ray, a healthy body depends on a healthy liver.

After their grandfather died from pancreatic cancer when Kim was a child, Kim spent a decade researching the effects of liver health on the body. Drawing from his business and investment background, he and his brother worked with a manufacturer and bottler in South Korea to develop The Plug Drink, an all-natural herbal beverage.

Now the company's chief operating officer, Kim says The Plug Drink can be helpful in daily liver support or after a night enjoying cocktails. Made with

13 different plants, flowers and fruits, the drink contains no added sugar or caffeine.

Since its launch in 2019, several athletes and celebrities, including NBA player Myles Turner and rapper Jack Harlow, have invested in the company.

Kim, who majored in Asian studies at Northwestern, says family is a driving force for him, both in life and in business.

"There is no doubt that the love, work ethic and accomplishments of my Korean immigrant parents inherently fueled my desire to succeed. ... And given the COVID-19 pandemic and the accompanying increase in alcohol consumption, our mission is now more relevant than ever," Kim says, noting the rise of liver diseases in the U.S. over the past decade.

In October 2022, the company launched a second product, The Plug Pill, which Kim describes as a daily liver detox supplement.

Kim was included on *Forbes*' 30 Under 30 Food and Drink list in 2023. "It proved to me [the value of] hard work and dedication," he says. "If someone like me can enter an industry and within three years be part of the *Forbes* list, then anything is possible."





Riccardo Muti, right, coaches conductor Nicholas Koo at Teatro Alighieri in Ravenna, Italy.

ORCHESTRAL CALLING

Unforgettable Sound

Alum wins a coveted spot at conductor Riccardo Muti’s Italian Opera Academy.

Growing up in the Bay Area, Nicholas Koo ’18 MMus, ’22 DMA sang in choirs and played guitar, clarinet, saxophone and piano. Thinking he’d become a doctor, he studied biology at the University of California, Berkeley. But after seeing the university’s orchestra perform during his senior year, he delayed his graduation and instead pursued what he’d wanted to study all along: music.

At that point, the only available course that fit his music requirements was a class on conducting. “I fell in love right away,” Koo says. “You come out of it knowing yourself like you would never have believed.”

After earning his doctoral degree from Northwestern’s Bienen School of Music, Koo was one of five people selected to attend the highly competitive Riccardo Muti Italian Opera Academy

in Ravenna, Italy, in December 2022. He studied with Muti ’14 H, world-renowned conductor and music director of the Chicago Symphony Orchestra.

“I’d watch [Muti] conduct and think, ‘This man is touching sound,’” Koo says. “He demonstrated how I could pull the sound out of the orchestra with just movement. I was completely in awe.”

The academy culminated in a performance of Giuseppe Verdi’s *Messa da Requiem* at Ravenna’s Teatro Alighieri, conducted jointly by the cohort’s students, an experience Koo calls “unforgettable.” He has since taken what he learned from Muti to Denver, where he serves as a conductor for the Colorado Symphony Orchestra.

“Muti told me that our mission is to be as sincere as possible,” he says. “We do what the music asks, and we connect to it as human beings.”

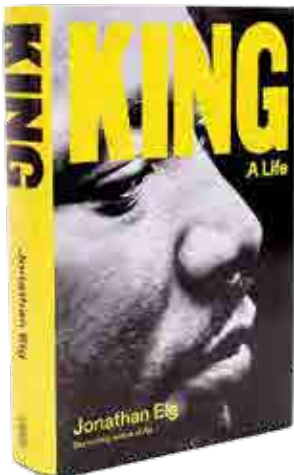
THE MAN, NOT THE MYTH

King: A Life by Jonathan Eig

“Before King, the promises contained in the Declaration of Independence and the U.S. Constitution had been hollow,” Jonathan Eig ’86 writes in the prologue of *King: A Life*.

Released this spring, this book provides the most complete account to date of Martin Luther King Jr.’s life, his relationships, his brilliantly strategic mind and his flaws. Eig’s biography draws on hundreds of interviews with King’s family, close friends and others who knew him; thousands of FBI documents that have been declassified in recent years — White House phone recordings, personal letters, unaired TV footage; and other previously unpublished materials. It is also the first to make use of recently discovered audio recordings by King’s wife, Coretta Scott King.

“This book tells the story of the man who, in a career that spanned a mere 13 years, brought the nation closer than it had ever been to reckoning with the reality of having treated people as property and secondary citizens,” Eig writes. “But in hallowing King we have hollowed him.” Eig’s book instead encourages readers to study King as “not a saint, not a symbol” but rather a deep thinker, a radical human being and, undeniably, “one of America’s founding fathers.”



KOO: © ZANI/CASADIO - COURTESY OF RICCARDOMUTIMUSIC.COM; KING: SHANE COLLINS



PLACES, PLEASE!

Next Stop, Broadway

Mark Hoebee leads the Tony Award-winning Paper Mill Playhouse.

At 15, Mark Hoebee fell in love with musicals when he saw a production of *A Chorus Line* at the iconic Shubert Theatre on Broadway.

“I remember thinking, ‘This is the life I want to lead,’” says Hoebee ’82. “I didn’t want to be a star; I didn’t care about that. I just wanted to be a dancer in a Broadway show ensemble.”

Eventually, after years of study and training — including four years in

Northwestern’s theater program — he got his wish: At age 28, Hoebee finally danced on the Great White Way.

After dancing for another eight years in “about 10 Broadway shows,” Hoebee embarked on a successful career as a choreographer and director of musicals before joining Paper Mill Playhouse in Millburn, N.J., in 2000.

Now, as Paper Mill’s producing artistic director,

he manages a staff of about 50 full-time employees and leads an artistic department that includes associate artistic director Jen Bender ’01 and associate producer Christopher Slavik ’00. Hoebee’s team puts on five productions per season, almost all of them full-blown musicals.

“The scale and scope of what we produce is the same size as a Broadway show,” Hoebee says. “In fact, many of the designers, actors and creatives who work in New York also work at Paper Mill, because we’re just 17 or 18 miles outside of Manhattan.”

Under Hoebee’s direction, Paper Mill has staged five musicals that have gone on to

successful runs on Broadway, and it has launched several other productions on national tours. In the spring, Paper Mill premiered Disney’s *Hercules*, the theater’s fourth new musical collaboration with Disney Theatrical Productions and composer Alan Menken. Each year Paper Mill draws nearly a quarter-million visitors, and in 2016 the theater earned a Regional Theatre Tony Award.

Looking back at his time at Northwestern, Hoebee says, “Everything I learned there helped shape me into the person I am today. I learned how to build relationships, both professional and personal. I learned the strict discipline and dedication it



Mark Hoebee

takes to have a career in the arts. ... It takes a complete immersion in the life to survive, let alone succeed. My time at Northwestern set me up for that.”

Read more at alummag.nu/PaperMill.

TV TREASURE

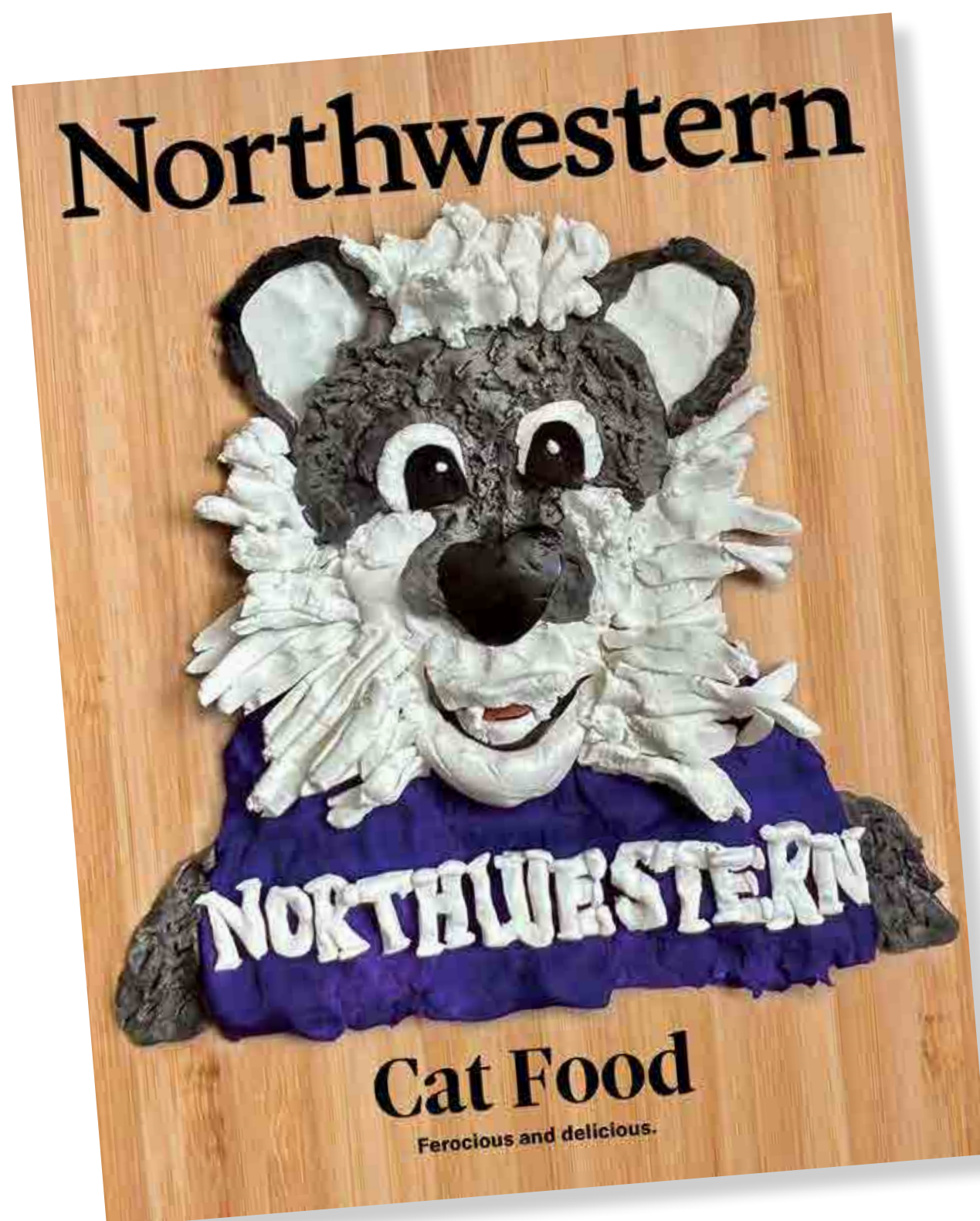
Report on the Boston Strangler

On her final day at WBZ-TV in Boston in July 1965, reporter Joanne Desmond ’58 heard that the old news reels were going to be destroyed, so she asked her news director if she could take a roll of film from her reporting on the Boston Strangler. Her news director obliged.

That film clip was restored and featured in Hulu’s 2023 film *Boston Strangler*, which stars Keira Knightley as Desmond’s real-life news counterpart Loretta McLaughlin. In a scene that sets the stage for the action, Desmond’s report plays on TV as the characters watch. “I had to beg our news director to let me write, stage and deliver that report,” says Desmond. “As the only woman on the news team, I knew how terrorized women were. The Strangler knew where I worked and sent me letters. I was scared to death, frankly.”

Desmond, who attended the March premieres in Boston and New York City, is finishing her memoir about her days as one of the nation’s first evening news anchorwomen. “How exciting it was to interview Martin Luther King Jr., the Kennedys, the first Mercury astronauts and many more newsmakers,” she says. “I loved being part of that incredible era.”





Food artist Harley Langberg '10 whipped up an illustration of Willie, made from fondant, cookie dough, plum and apple. Learn more about Langberg on page 41.

HARLEY LANGBERG '10



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Images from the past six decades of Black student life at Northwestern.

The photos, including this one of the Northwestern Community Ensemble in 1975, are part of the McCormick Library of Special Collections and University Archives' "I know them!" crowdsourcing campaign. By adding descriptions to these photos, the project aims to improve understanding of the Black student experience. **Read more on page 45.**