

WEINBERG

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Number 1



RESILIENCE

Tales of Triumph
over Adversity

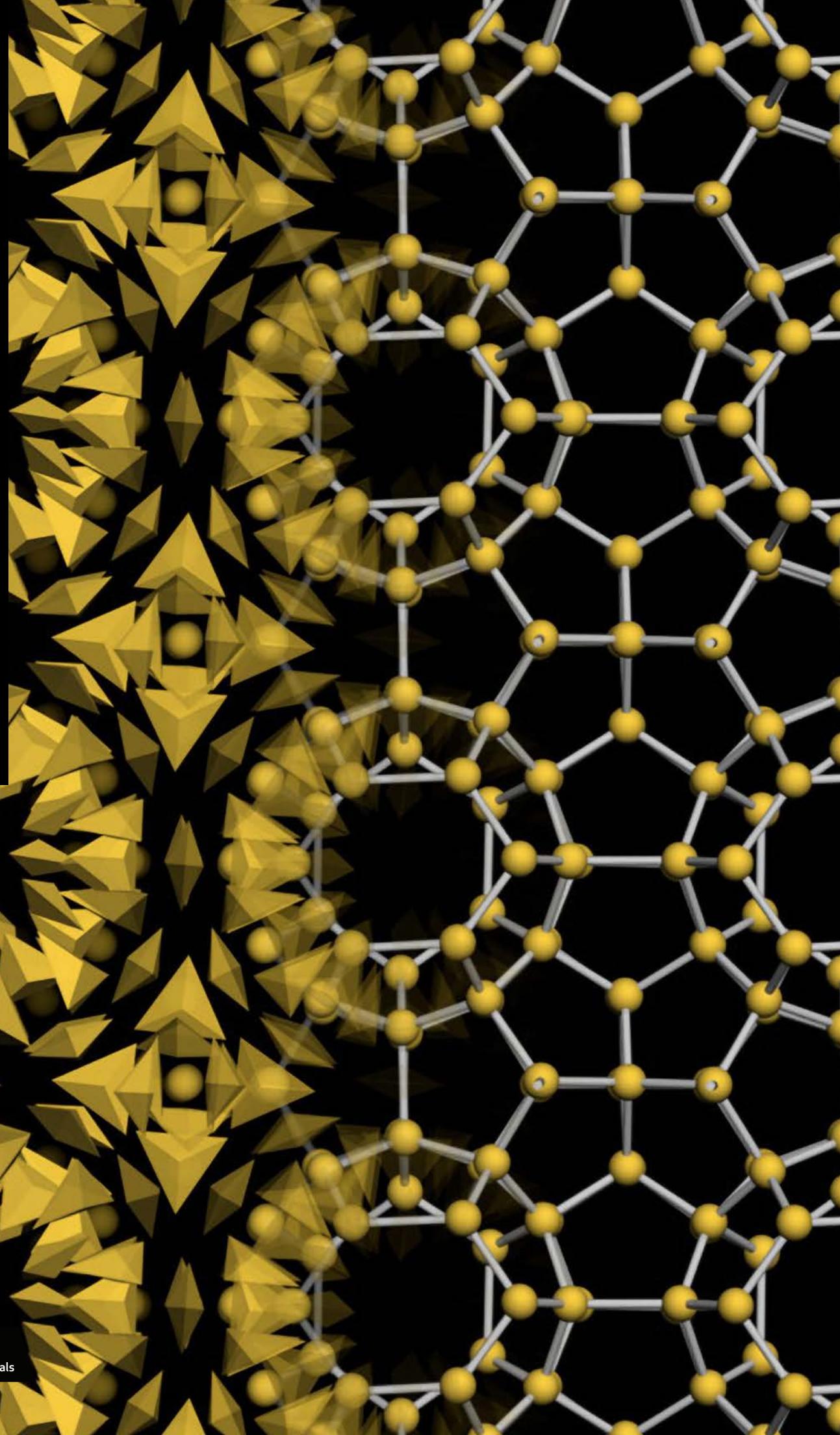
[WEINBERG LENS]

CRYSTALLINE COMPLEXITY

Materials that can change colors and patterns on command. Objects that can control light by blocking specific wavelengths. New kinds of lenses, lasers and even Star Trek-like cloaking materials.

These are just some of the applications that could result from new complex nanoparticle crystals developed by Northwestern nanoscientist Chad Mirkin, director of the International Institute for Nanotechnology, and Sharon Glotzer of the University of Michigan.

To create the crystals, the researchers harnessed the chemistry of DNA and combined it with nanoparticles whose shapes encourage a cage-like crystal structure called a clathrate. The result is the most complex crystal ever designed and built out of nanoparticles.



LEARN MORE ABOUT

the potential of clathrate crystals:
wcas.nu/nanoparticle-crystals



PHOTO: STEPHEN ANZALDI

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You Can't Say Something Nice. Now What?

BY ERIN PETERSON

The 2016 election season challenged the limits of civil discourse. How can we come together when we so passionately disagree?

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Resilience

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Some triumphs are born of challenge and tragedy. Meet five Weinberg College alumni who dug deep to transform and transcend their adverse experiences.

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Building Resilient Communities

It is a deeply human wish to inculcate desired characteristics into children and young adults. The period I study, 15th-century Italy, generated many manuals offering advice about such matters. In his dialogue *De Familia*, the humanist Leon Battista Alberti provided guidelines on raising children who would be pliant to authority, ambitious, and resilient. In the religious sphere of the period, the visual arts also offered up countless examples of patience in the face of adversity, which scholars today tend to see through a psychological rather than solely religious frame.

I am, therefore, only too aware that our focus today on "resilience" is not new. But it is, I think, topical. Growing inequality across our fragile globe has rendered many people vulnerable, and their suffering is more visible today than ever before. We are also increasingly attuned to the possibility of misinterpretation or offense as we seek to understand and bridge our differences. To many, this seems to be a precarious age, with the threat of violence hovering over myriad and sometimes conflicting perceptions of insult or hate. Our contemporary interest in resilience can be seen as a sort of antidote to this growing sense of vulnerability.

But a spirit of resilience should not imply that an individual under real or perceived threat bears the sole burden of enduring. Yes, we want students at the College to develop the type of mettle that will serve them when facing struggle or difficulty. But we also want to produce a resilient community, one that accepts differences, embraces disagreement, and maintains its integrity in the face of centrifugal forces.

One grand challenge for universities and, more broadly, municipalities, regions, nations and the world, is to develop the means of producing resilient communities. In our community, this means committing to values that are at the very heart of the liberal arts—diversity, interdisciplinarity, and freedom of expression. These do not guarantee resilience in our world, but I believe they are a firm foundation on which to build toward that goal.

Adrian Randolph
DEAN, WEINBERG COLLEGE OF ARTS AND SCIENCES

PHOTO: ROB HART



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The Power of Mentorship

Four faculty/student pairs share how the Posner Fellowship Program has made a difference in their lives.

Read more:
wcas.nu/posner-mentor-pairs



From Student to Working Professional

Young alumni return to campus to share what they wished they'd known before entering the workplace.

Read more:
wcas.nu/young-alumni-jobs



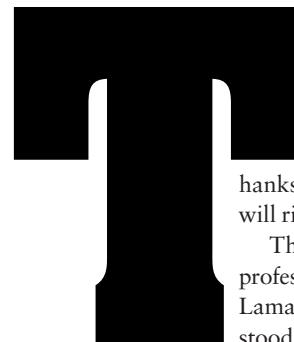
School Shootings and Unemployment

Sociologist John Hagan finds that gun violence at schools increases when those leaving school have a hard time finding jobs.

Read more:
wcas.nu/shootings-and-unemployment

THE LAMASSU, RESURRECTED

BY DANIEL P. SMITH



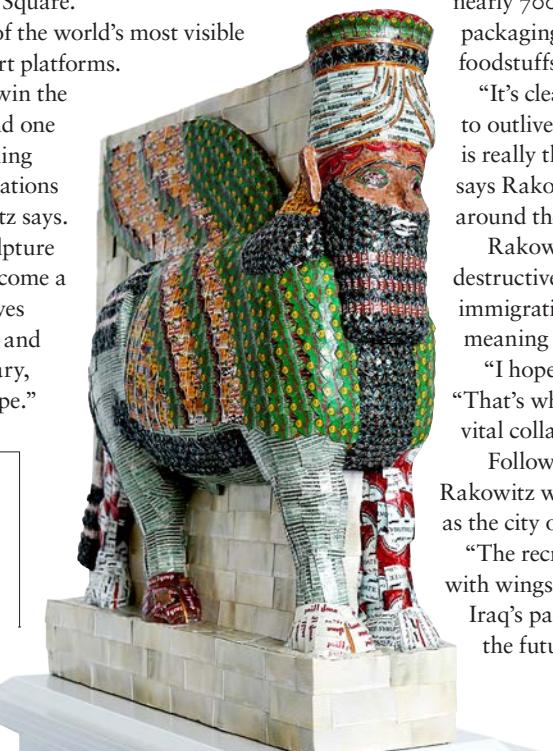
Thanks to Michael Rakowitz, the Lamassu will rise again.

The Department of Art Theory and Practice professor has been commissioned to recreate the Lamassu—a winged bull and protective deity that stood in Nineveh, Iraq, from 700 BCE until it was destroyed by the Islamic State in 2015—at the Fourth Plinth in London's famed Trafalgar Square.

The Fourth Plinth is one of the world's most visible and thought-driving public art platforms.

"It is a complete honor to win the Fourth Plinth commission and one made more urgent by worsening immigration and refugee situations in the Middle East," Rakowitz says. "For London to want this sculpture at this time, allowing it to become a surrogate for those human lives that cannot be reconstructed and are still searching for sanctuary, heartens me and gives me hope."

Professor Michael Rakowitz's recreation of the historic Iraqi sculpture will grace London's Trafalgar Square.



Rakowitz's sculpture, which will debut in March 2018 and remain until 2020, will be the 12th work to appear on the Fourth Plinth since the public art project's 1998 launch.

The 14-foot sculpture will be constructed of 3,000 to 4,000 empty metal Iraqi date-syrup cans, recognizing a once-renowned Iraqi industry that has since been decimated by conflict.

"The salvage of date-syrup cans makes present the human, economic and ecological disasters caused by the Iraq wars and their aftermath," Rakowitz says.

The Lamassu is part of *The Invisible Enemy Should Not Exist*, Rakowitz's ongoing 11-year effort to recreate over 7,000 looted or destroyed archeological artifacts from the National Museum of Iraq. Thus far, Rakowitz, with the help of some two dozen other artists (including Northwestern alumni), has completed nearly 700 works using the recycled packaging of Middle Eastern foodstuffs and Arabic newspapers.

"It's clearly a project that is going to outlive me and my studio, which is really the point: history cannot be reconstructed," says Rakowitz, whose works are displayed in collections around the world.

Rakowitz hopes the Lamassu reminds viewers of the destructive cost of war and stimulates discussion about immigration. But he hesitates to ascribe any specific meaning to the work.

"I hope people see things in it that I don't see," he says. "That's what excites me about art: people are enlisted as vital collaborators in the production of meaning."

Following its two-year run on the Fourth Plinth, Rakowitz would like to see the Lamassu reestablish its place as the city of Nineveh's gatekeeper.

"The recreation will stand outside [in Trafalgar Square] with wings raised, still performing his duty as guardian of Iraq's past and present, hoping to return [to Nineveh] in the future," Rakowitz says. ■



CITY AS CANVAS

BY LISA STEIN

A painting on canvas enjoys the comfort of a museum's shelter, but a mural must brave the elements and stake its claim in the most public way. A mural takes the pulse of a whole neighborhood, then reflects its rhythms, colors and complexity back to everyone: *Look at me!*

"Murals are very much about community and architecture, and bringing art out of museums and onto the streets. They're meant for poor and working-class people," says **Rebecca Zorach**, the Mary Jane Crowe Professor in Art and Art History.

Last spring Zorach led a first-year seminar exploring Chicago murals created from 1964 through 1978, a period of profound cultural change and new awareness of civil rights. In the late 1960s, the Chicago Mural Group helped launch a nationwide movement with bright, dynamic imagery splayed across the city's buildings, walls and billboards.

Zorach's students researched and documented dozens of murals. Their work culminated in the exhibition "We Are Revolutionaries: The Wall of Respect and Chicago's Mural Movement," on view at the Mary and Leigh Block Museum of Art through June 18, as well as an online collection of images and their stories.

Some of the murals are overtly political—revolving around themes of racism, violence and gentrification—while others are abstract and playful. "Black Women Emerging" (pictured) by Justine DeVan, considered one of the mothers of the mural movement, and Mitchell Caton, a prolific Chicago painter, depicted women striving for professional success and drawing on their ancestral strength.

Unfortunately, murals' exposure leads to their demise. Few in the exhibition exist today due to weather, vandalism or demolition. "This is a recovery project," Zorach says. "We can show people what was once there." ■

[LEARN MORE ABOUT](#)

the Chicago Mural Movement:
wcas.nu/chi-mural-movement-1



An Evening with Ta-Nehisi Coates

Meaningful social change starts "with what you love doing," the National Book Award-winning author says during a campus talk.



The Roots of Political Violence

Over the past 25 years, political scientist **Will Reno** has studied warfare in the heart of Africa.



Before "Straight" and "Gay"

From a historical perspective, the late 19th century's straight-gay paradigm looks a little "stodgy," professor **Deborah Cohen** writes.



Making Art with Polynomials

Mathematician **Laura DeMarco** explains how to build beautiful 3-D fractals out of the simplest equations.



Six Countries in 11 Weeks

Margot Zuckerman '18 wins a \$9,000 Circumnavigators grant to spend the summer researching food security around the globe.



Faculty Win Record Number of NEH Grants

Four professors earn fellowships to study topics ranging from early Confucianism to sexuality in Shakespeare's time.



PHOTO: CHICAGO MURAL MOVEMENT PROJECT

Read more: wcas.nu/coates-talk

Read more: wcas.nu/roots-of-violence

Read more: wcas.nu/victorian-gender

Read more: wcas.nu/fractal-art

Read more: wcas.nu/circumnavigator-2017

Read more: wcas.nu/record-NEH-fellowships



Fidak Khan

History and
Biological Sciences
Class of 2019

INTERVIEW BY STEFFANEE WANG '17

On a bitterly cold day in early February, hundreds of Northwestern students gathered near the Multicultural Center to protest an executive order by President Donald Trump temporarily banning immigration from seven Muslim-majority nations.

It was one of many powerful moments this year for Muslim student **Fidak Khan '19**. As the Associated Student Government senator for the Muslim-cultural Students Association, the sophomore has worked to raise awareness about issues concerning Muslims at Northwestern.

Weinberg recently sat down with Khan to learn more about Northwestern's Muslim community and why the McSA's work matters more now than ever.

What role does the McSA play on the Northwestern campus?

We provide Muslim students with a community and a safe space. Even though we're only a community of about 80 to 100 undergrads, we have a big presence on campus. We also help students in the wider Northwestern community learn about Islam from their peers.

How do you create that space for dialogue?

We have weekly meetings that are open to everyone. We have speakers come and talk about issues that are relevant to Muslim students, like maintaining spirituality in college. We try to bring in diverse voices, like basketball player Kareem Abdul-Jabbar and Academy Award-winning filmmaker Sharmeen Obaid-Chinoy, who can provide interesting content for the wider community to learn about Islam and what it's like to be a Muslim in the public eye.

[LEARN MORE ABOUT](#)



Have you found support from non-Muslims at Northwestern?

Definitely. We often see our non-Muslim peers and professors at a lot of our big events, and we're happy that McSA can provide a space for them to engage with Islam in an interesting, positive way.

What are some practical issues that you have been working on?

We've been working to open a prayer room in Tech, because a lot of our constituents are pre-meds and engineers and that's where a lot of them are all day. Our project came to fruition at the end of February, when administrators were able to set up a room for us. The McSA is very grateful for that.

What do you want to convey to the Northwestern community?

We want to reinforce that McSA is a place for you, even if you don't come to our meetings or you only come once a year. We also want to emphasize that Muslim Americans are still Americans. We belong here, we were born here, we were raised here. And we have a lot to provide the wider Northwestern community and the whole country. ■

PHOTO: ROB HART

HAMILTON ON CAMPUS

BY DANIEL P. SMITH



W

hen Broadway actor Anthony Ramos pointed his microphone at the crowd, the Northwestern audience didn't hesitate to respond.

"Alexander Hamilton," hundreds of voices roared back in a hip-hop rhythm.

An original cast member in the acclaimed Broadway hit *Hamilton: An American Musical*, Ramos visited Lutkin Hall on Feb. 3 to perform and share his thoughts about the show's relevance to today's America.

"The musical's about revolution, how everybody's fighting for something," said Ramos, who played both John Laurens and Philip Hamilton on Broadway. "The words are timeless...and it's a show that is relevant for every moment in time."

Ramos recalled a moment after the November election when the New York audience spontaneously applauded after he sang the line "Tomorrow there will be more of us."

"That made me think: 'What am I doing to lead?'" Ramos said. "One thing I've learned is, don't be oblivious," he added. "You should be informed so that you know what you're fighting for."

For the roughly 200 students enrolled in two Hamilton-focused Weinberg College courses this winter, Ramos' visit was a highlight of the quarter.

One class, "Hamilton's America," examined Alexander Hamilton the founding father as well as the eponymous Broadway sensation. History professors **Geraldo Cadava** and **Caitlin Fitz** designed the course to help students appreciate the ways that history shapes and then reshapes the world.

Fitz, who focuses on early American history, covered Hamilton's life and politics along with Revolutionary-era notions of honor and masculinity, marriage and infidelity, and freedom and slavery. Cadava, a Latino historian, explored the contemporary resonance of the musical, whose cast is dominated by people of color.

The College's second Hamilton-themed course, "Hamilton: Bullets, Banks and Broadway," examined "the real history of the moment, as well as the core elements that bind our nation together," said **Laura Beth Nielsen**, a professor of sociology and director of legal studies. "This interdisciplinary journey was about giving students a set of tools to analyze today's constitutional debates."

The legal studies course brought in an array of faculty from African American studies, political science, English and history to show how different scholarly disciplines approach *Hamilton* the musical, Hamilton the man and America's founding principles.

The highlight of the course? A live performance of the musical in downtown Chicago on Jan. 12.

"I loved the opportunity to grapple with history and reality while also appreciating the artistic value of the show," said **Chelsea Hammersmith '18**. She added that she found

Ramos' visit particularly enlightening. "To learn about the research he did and what he tried to bring to the role added depth to the very topics we're exploring in class." ■



PHOTOS: STEPHEN ANZALDI

“It’s a show that is relevant for every moment in time.”

BROADWAY CAST MEMBER ANTHONY RAMOS

WHO'S MOST INFLUENTIAL?

Thirteen Weinberg College professors have landed on the research group Clarivate Analytic's recent list of the world's most influential scholars:

Chemistry

Antonio Facchetti
Omar K. Farha
Joseph T. Hupp
Tobin J. Marks
Chad A. Mirkin
SonBinh T. Nguyen
George C. Schatz
Karl A. Scheidt
J. Fraser Stoddart
Richard P. Van Duyne

Economics

Lawrence J. Christiano
Martin Eichenbaum

Psychology

Gregory E. Miller

The list, which focuses primarily on the sciences and social sciences, was assembled through an analysis of top-cited research papers published between 2004 and 2014.

[LEARN MORE ABOUT](#)

Clarivate Analytic's list of "Highly Cited Researchers":
wcas.nu/clarivate-list-2016

**Gift Promotes Indigenous Studies**

A \$1.5 million Mellon grant will establish Northwestern as a hub of scholarly activity in Native American and indigenous studies.

i Read more:
wcas.nu/indigenous-mellon

DIGITAL TRANSFORMATIONS

BY LISA STEIN

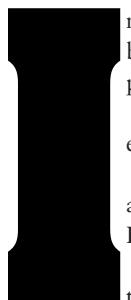
“

Our vision was to make specialized fields visible to other fields—to make the studio a window into interdisciplinary work.”

JOHN BRESLAND

**Great Lakes and Native American Writing**

Students in English professor **Kelly Wisecup**'s class created an interactive digital map illustrating the history and achievements of Chicago's indigenous people. One point on the map highlights the Foster Avenue Underpass Bricolage, a mosaic portraying Native Americans such as Maria Tallchief, the first famous Native American ballerina (left). Other points identify places that have evolved since the land was inhabited by the Pottawatomie tribe, such as Indian Boundary Park on the city's Far North Side. "Students saw how using digital tools requires them to work across disciplines and media," Wisecup says.



In today's multimedia world, learning isn't circumscribed by the classroom, and scholarly work isn't limited to paper-and-ink research papers.

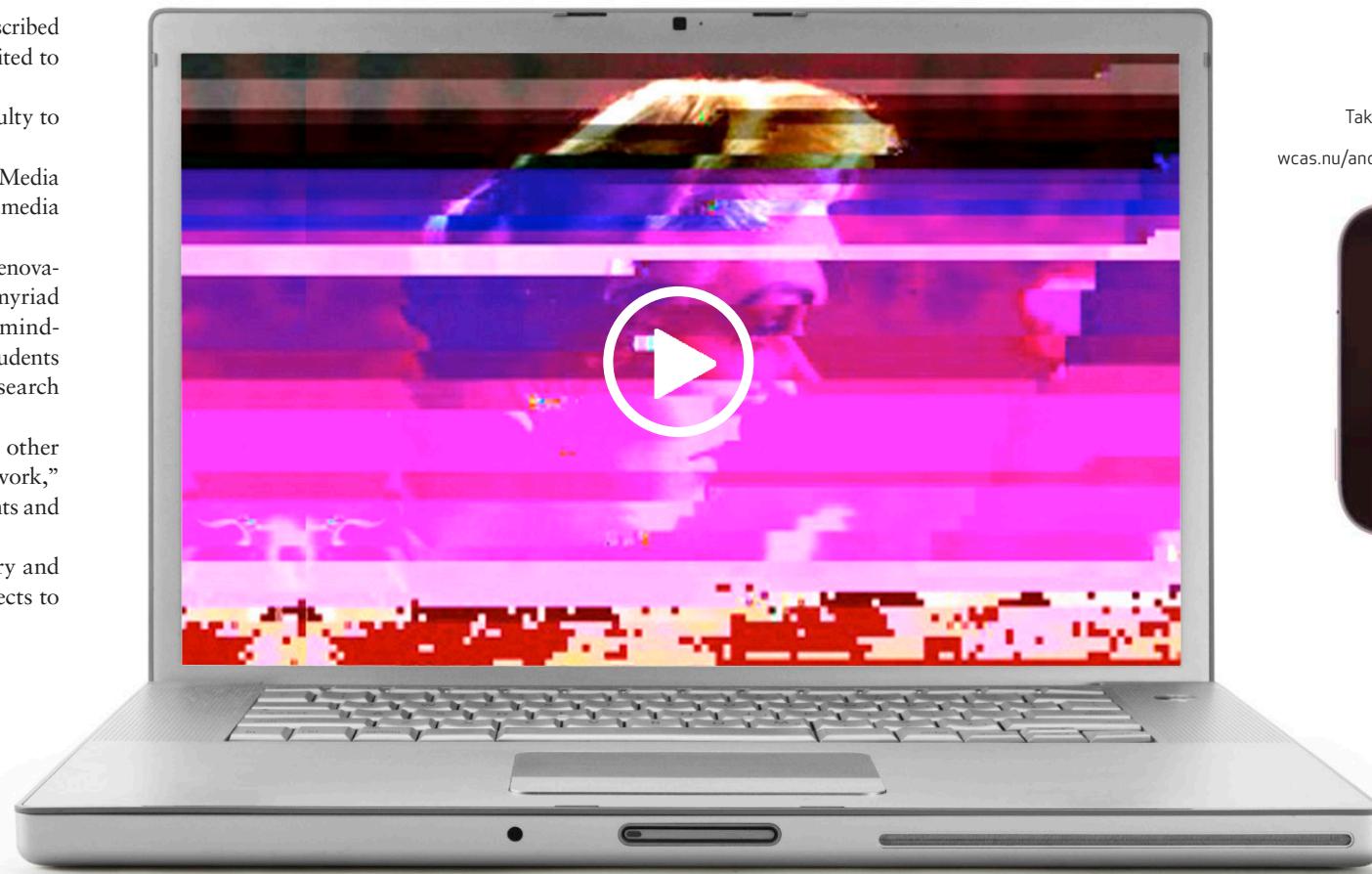
So it only makes sense for students and faculty to extend their work into new dimensions.

Teaching them to do that is the mission of the Media and Design Studio, formerly known as the Multimedia Learning Center, or "the MMLC."

The studio, which recently underwent a gut renovation along with the rest of Kresge Hall, offers myriad services that can transform traditional scholarship into mind-expanding digital imagery. Its staff can guide faculty and students to create exciting video and audio projects out of their research explorations.

"Our vision was to make specialized fields visible to other fields—to make the studio a window into interdisciplinary work," says studio director **John Bresland**. "We want to help students and faculty tell stories about their research."

Created by students in courses focusing on film, history and architecture, these images represent just a few of the projects to come out of the studio since its renovation. ■



Take the Ancient Rome in Chicago walking tour:
wcas.nu/ancient-rome-in-chicago

**Ancient Rome in Chicago**

Students in classics professor **Francesca Tataranni**'s course explored the influence of the Romans on Chicago's architecture, evident in buildings such as the Field Museum and the Federal Reserve Bank. They then created videos that examined the city's quest for identity through the ways the buildings engaged with ancient Rome. Finally, they embedded the videos into a virtual walking tour that is accessible to the public. The students "uncovered so much interesting historical information about places you pass by every day but don't think about," Tataranni says.

**Beauty Sick**

In a new book, psychologist **Renee Engeln** explains how our cultural obsession with beauty harms girls and women.

**"Beware the Beginnings"**

Using the Holocaust as an example, historian **Peter Hayes** shows how power magnifies the ideas of those who hold it.

Hitchcock and Beyond

After writing a traditional analytical paper on Hitchcock's work, students in English professor **James Hodge**'s class re-edited animated clips to reveal new thematic aspects of the director's oeuvre. This pixelated image from *Vertigo* that **Ryan McGannon '20** "glitched" to disrupt the male gaze is one example. "It's basic video editing in the service of analyzing the film, so they can take creative ownership of what they're studying," Hodge says.

[LEARN MORE ABOUT](#)

the Media and Design Studio:
wcas.nu/madstudio-1

i Read more:
wcas.nu/beauty-sick-interview

i Read more:
wcas.nu/beware-the-beginnings

INTERVIEWS BY LISA STEIN

WHAT MAKES PROSE

Beautiful

INDIRA RAMAN
is the Bill and Gayle Cook Professor of Neurobiology.

THE PRECISION OF LANGUAGE — making use of the wonderful richness and delicate nuances of the denotative and connotative meanings of words to transfer a vivid, evocative, high-resolution understanding of the ideas of one mind into another mind—even better when the writer has a sensitivity to the sonorities of phrases and the cadences of speech,

SO THAT THE TRANSMISSION IS LESS OF A LECTURE AND MORE OF A SONG.

JORG KREIBENBROCK
is an associate professor of German and comparative literature.

The German-Jewish philosopher, writer and critic Walter Benjamin points out a peculiar proximity between prose and poetry: “A period that, constructed metrically, afterward has its rhythm upset at a single point yields the finest prose sentence imaginable.” What makes prose beautiful, if one follows Benjamin’s insight, are those single points where prose and poetry coincide. Beautiful prose is upset poetry.

THE FINEST PROSE SENTENCE IMAGINABLE IS THE RESULT OF A DISTURBANCE, AN UPSETTING IRREGULARITY, THE CAESURA OF THE LYRIC.

What makes prose beautiful, then, is not a fascinating plot, interesting characters, or moral/political messages, but singular instances of rhythmic upsets, yielding the finest prose imaginable.

DAN CHAON '86, whose most recent novel is *III Will* (Ballantine Books, 2017), teaches at Oberlin College in Ohio.

In college, I fell in love with the last paragraph of James Joyce’s story “The Dead.”

ITS PROXIMITY TO POETRY.

Another way of putting this is to say that, for the reader, prose is beautiful when it strikes that lovely balance between recognition (the expression of feelings or ideas that ring true to one’s own experience) and surprise (the use of language that is not full of the “dead metaphors” of our everyday linguistic register). The writing can be simple, of course, or baroque; it can be earthy and direct, or exquisite and slant. But what matters most is that it’s very close to singing. As a beginning writer, I thought this was the only true goal. But while this kind of aria-like writing can swell the heart, it always runs the risk of becoming an Adele song, arms thrown wide, theatrical and slightly corny.

Some writers rarely choose that operatic register. Joy Williams’ prose is often oddly wooden, and George Saunders plays with the language of jargon and slang — though they are writers I admire. What I look for in my students’ work is simply “surprise”—something that’s vivid, that has an indelible image or observation in it, that’s concise while still being open to the mysterious and uncanny.

EVIE SHOCKLEY '88 is an award-winning poet, essayist and critic. She teaches African American literature and creative writing at Rutgers University.

As a poet, I’m inclined to say:

TO POETRY.

Another way of putting this is to say that, for the reader, prose is beautiful when it strikes that lovely balance between recognition (the expression of feelings or ideas that ring true to one’s own experience) and surprise (the use of language that is not full of the “dead metaphors” of our everyday linguistic register).

The writing can be simple, of course, or baroque; it can be earthy and direct, or exquisite and slant. But what matters most is that it is at once absolutely apt and excitingly unfamiliar, capturing a truth that we can feel as deeply as our own organs, even as we are able — forced — to see it as if for the first time.

Some writers rarely choose that operatic register. Joy Williams’ prose is often oddly wooden, and George Saunders plays with the language of jargon and slang — though they are writers I admire. What I look for in my students’ work is simply “surprise”—something that’s vivid, that has an indelible image or observation in it, that’s concise while still being open to the mysterious and uncanny.

JEANNIE VANASCO '06 is a poet and memoirist. She teaches creative nonfiction at Towson University.

IN BEAUTIFUL PROSE, THE SHAPES AND SOUNDS OF WORDS FORM AN EXPERIENCE. AND EACH WORD, LIKE A GOOD CITIZEN, HELPS ITS NEIGHBORS.

“Porch,” for example, makes a colorless word such as “or” sound extraordinary. But if each sentence is selfish, caring only about its own beauty, then the larger passage risks sounding incoherent instead of incantatory. When I revise my writing, I survey my sentences like a census taker: *How many stressed syllables live here? Are all the words working? Are any of the words related despite their different names?* I could yack on about practical tactics (land hard on a word that sounds hard), but not every sentence needs perfect acoustics. And I hate to be too prescriptive. When it comes to writing, successfully

BREAKING THE RULES STRIKES ME AS MORE BEAUTIFUL.

NORA HARRIS '18 is a Weinberg College creative writing major.

In her book *Cultivating Humanity*, Martha Nussbaum argues that literature is essential for creating world citizens, because it cultivates “in ourselves a capacity for sympathetic imagination that will enable us to comprehend the motives and choices of people different from ourselves.”

PROSE IS BEAUTIFUL, BECAUSE IT CREATES EMPATHY.

It allows us to walk in another’s shoes briefly as we experience what life is like in another body. Prose is beautiful, because it connects us all as human beings, despite our broad range of experiences and beliefs. ■

INTER(ior) View

BY REBECCA LINDELL



1

Exploring an explorer's backpack

Patricia Beddows leaves little to chance when she and her team pack for the study trip she leads to Mexico's Yucatán Peninsula each spring. Beddows, an assistant professor of instruction in earth and planetary sciences, typically stuffs about 600 pounds of gear into 12 suitcases. She'll need all of it as she leads a dozen students through the Yucatán, where the earth readily yields clues to the changes wrought by time.

Over 10 days, the group journeys across the area to discover how the landscape has evolved over millennia. Their first stop is the actively growing Meso-American barrier reef, the second longest in the world. They then visit a lagoon, a beach face and a modern beach ridge before heading inland to explore progressively older features. Together they study quarries, where ancient reefs and beaches are again exposed to the sun, and jungle-water pools where the bedrock has collapsed into underground caves. "It's a very tactile, visceral and immersive experience that goes well beyond their textbooks," says Beddows (below left).



1 Helmet and headlamp

Caves are an essential part of the geology of the Yucatán. Wearing protective headgear, Beddows and her students spend ample time exploring them.

2 Measuring tape

"Cave systems are massive underground rivers," Beddows says. "What we're first interested in is the physical structure: how did they form, where is the water coming from, where is it going to?" Using measuring tape, Beddows and her students survey these subterranean waterways to see if they might have formed when the sea level was at a particular height.



PHOTO: REECE ELLING



3 Erasable whiteboards

Each day, Beddows uses a whiteboard to sketch out geological processes. The boards eliminate the need for paper in the water-soaked Yucatán and allow Beddows to illustrate phenomena such as the movement of water through lakes and channels to the final discharge into the Caribbean Sea.

3



PHOTO: EDWARD MALLON



4

4 Compass and clinometer

Using these tools, Beddows and her students triangulate their way through the caves. The compass (left) establishes the deviation from true north, while the clinometer (right) marks changes in elevation. Together, the instruments provide more evidence of the history and evolution of the area.



7

5



5 Sieve stack

This stack features a series of filters with progressively smaller holes, so that students can separate larger sediment from smaller, finer grains. "Then we weigh the amount of sediment that ended up on each of the different layers and graph that," Beddows says. The exercise yields clues to the amount of energy within a system. Larger grains, for example, require more energy to move.



8

6 Ping-pong balls

Beddows fills ping-pong balls with varying amounts of water to measure how fast a current is moving. Heavier balls float in salt-loaded, higher-density marine water. Lighter balls bob in bodies filled with more rainwater. "They literally let us see where the water is flowing," Beddows says.

6



7 Hammer

"We're bashing rocks all the time," Beddows says. "An exposed rock is usually weathered and covered with dirt and vegetation. We use the hammer to get at the fresh, raw rock that's underneath." The fossils and patterns in the rocks indicate the various environments, such as the lagoon or the beach, where the sediment was deposited.

8 Underwater camera

Regular cameras don't hold up very well in the wet and rainy Yucatán. In addition to being more durable, Beddows' underwater camera features high-definition video, a GPS system and a microscope mode that enables on-site analysis of sediment samples. ■

WATCH A VIDEO

about this year's trip:
wcas.nu/yucatan-field-trip-2017

PHOTOS: ROB HART



THE 2016 PRESIDENTIAL CAMPAIGN CHALLENGED THE LIMITS OF CIVIL DISCOURSE.
HOW CAN WE COME TOGETHER WHEN WE SO PASSIONATELY DISAGREE?

YOU CAN'T SAY SOMETHING NICE. NOW WHAT?

BY ERIN PETERSON

ART: LARA HARWOOD

there was one thing that everybody could agree on about last year's presidential campaign, it was this: we'd all be glad when it was over. Endless political talk had divided families and decimated Facebook friend lists. Surely, many assumed, we'd begin to heal on Nov. 9.

And yet months into a new administration, political passions remain high. Some on the right sneer at liberal "snowflakes," while others on the left mock the president's every move. In some cases, political disagreements have turned violent—even deadly.

Pundits may decry the state of political civility and constructive dialogue in the country today. But the truth is that pursuing these goals has never been easy.

To get a broader perspective on the moment we're in, we talked to three Weinberg College professors about the lessons they've drawn from their own disciplines about political debate, civil dialogue and developing empathy for those with whom you disagree. They share why—and how—to apply these ideas in our own lives.

IT

1). THE HABITS OF MIND THAT SEPARATE US CAN ALSO BRING US BACK TOGETHER.

In an era when nearly every controversial news story gets slapped by someone with the “fake news” moniker—regardless of its accuracy—there was one article that particularly stood out to **Gary Alan Fine**, the James E. Johnson Professor of Sociology.

Shortly after the inauguration, he recalls, a journalist for *Time* magazine reported that the bust of Martin Luther King Jr. had been removed from the Oval Office. For those already worried about a

Trump presidency, it felt like an ominous start.

The problem with the story was that the bust hadn’t been removed—it just happened to be out of the line of sight of the reporter. “Why did he make that error?” muses Fine. “While it was unintentional, maybe it seemed to make sense. Trump didn’t seem like he was pro-civil rights, and therefore he would remove the bust. It seemed plausible,” he says.

The larger lesson is not that the story turned out to be inaccurate—even the best reporters make mistakes—but that it so quickly grabbed hold of much of the public’s imagination before it was corrected.

While we all know that there are some stories that are too good to be true, Fine points out that the opposite is also true: sometimes “there are stories that are simply too good to be false.” In other words: we want to believe what we want to believe. Sussing out the truth is hard, even for professionals. We can fall prey to stories that simply *seem* like they’re true.

Adding to the challenge is the fact that there are mountains of information available to support nearly any case or political viewpoint we want to build. That makes it easy to spend all our time marinating in a media environment that confirms our point of view.



We should question easy claims. Given the uncertainty of so much information, we must make sure that we are taking extra steps to verify the claims that we would most naturally support.

Gary Alan Fine

True engagement with other people and ideas requires us all to spend time examining the flaws that we bring to our own thinking. “There are things that make so much sense to us that it’s hard to look at them and say, ‘Where did I get that information?’” says Fine. “Too often, when things make sense according to our world view, we lower our standards for our belief.”

In general, says Fine, there is much to appreciate about today’s vibrant and vigorous political debate. The history of the United States shows that we are not strangers to deep political disagreement. But in today’s divided climate, civil discourse demands not only that we hold high expectations of others, but also of ourselves.

Fine hopes that we all examine our own biases a little more closely as we engage with those whose views we don’t share. “We should question easy claims,” he says. “Given the uncertainty of so much information, we must make sure that we are taking extra steps to verify the claims that we would most naturally support.”

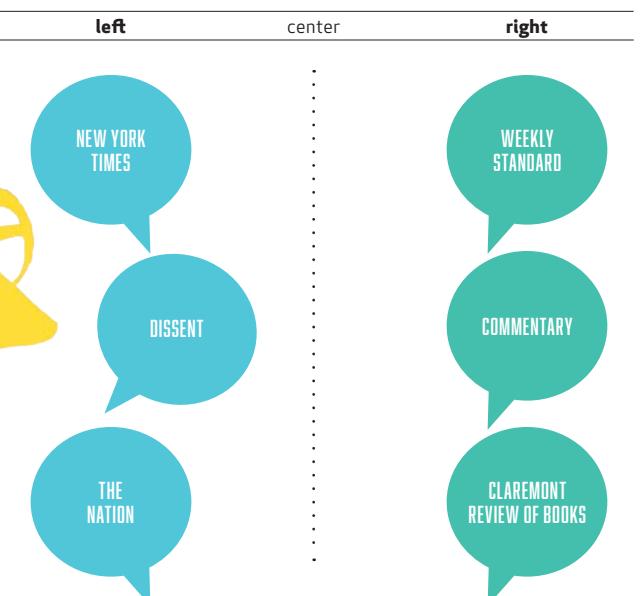
TAKE ACTION: Confront your biases

Getting out of your media echo chamber can help you understand how people across the political divide think. Even better, you can start the moment you finish this article. Bookmark a few of these sites on your browser, visit them regularly, and challenge yourself to see from their perspective.

“We don’t live in a place where we can’t hear other points of view, like the Soviet Union,” professor Gary Saul Morson says. “All you have to do is click on stories in these publications. It’s very easy, and you risk absolutely nothing.”



PROFESSOR GARY SAUL MORSON’S SUGGESTIONS FOR GETTING A RANGE OF OPINIONS ACROSS THE POLITICAL SPECTRUM



2). LITERATURE GIVES US THE TOOLS TO SEE ONE ANOTHER MORE CLEARLY.

If you have the capacity to get caught up in a great book, you’re exactly what democracy needs right now.

While a dog-eared novel might not seem to have much sway in today’s climate, literature and politics are more relevant to each other than you might think, says **Gary Saul Morson**, the Lawrence B. Dumas Professor of the Arts and Humanities.

Take *Anna Karenina*. If you have ever found yourself swept up in that particular tale, it’s probably not because you’ve actually been a Russian socialite in a complicated



Great literature allows us to see the world from different points of view.

It lets us identify with someone of a different gender, social class or culture. Great literature broadens our horizons.

Gary Saul Morson

love triangle—it’s because you’re able to relate to the thoughts and emotions of someone who is unlike you. “Great literature allows us to see the world from different points of view,” says Morson. “It lets us identify with someone of a different gender, social class or culture. Great literature broadens our horizons.”

Even if your reading tastes tend more toward *Twilight* than Tolstoy, novels can teach us to accept the existence of ambiguity and the validity of opinions we don’t entirely share. Most of all, they can teach us empathy.

What concerns Morson most about the political environment he sees today is how little evidence he sees of that trait. Even on college campuses, he says, he worries about what he perceives to be an ever-narrowing list of acceptable-to-voice opinions. “I think what we’re seeing today is not just a failure of empathy, but a refusal of empathy.”

But much like the country’s messy but extraordinary democratic experiment, universities are designed to thrive on diverse and sometimes controversial ideas that get discussed, debated and tested in labs and in real life.

And that’s why literature can play such an important role in this process. A willingness to consider ideas and perspectives that are different from our own can take root while reading a great book. Literature, Morson says, offers us a way to “escape our little island in time, culture and space.”

But these adventures in empathy must not end there. They must be a jumping-off point for the empathy and respect we can feel for anyone who expresses a view of the world that doesn’t coincide with our own. “When you can see how an intelligent, decent person might have a specific view of the world given their experience, that is when you have the possibility of democracy and civil forums,” he says. “We must be able to see from others’ points of view.”

3). IDENTIFYING ASSERTIONS WE CAN AGREE ON WILL ENCOURAGE MEANINGFUL DEBATE.

If you listened to the most extreme political partisans last year, you could be forgiven for thinking they lived on entirely different planes of reality. Was Trump a dangerous demagogue—or was he the only person who could fix a politically broken country? Did Hillary Clinton belong in jail—or was she the most qualified person ever to run for president?

Politics has long encouraged people to champion their “team” while demonizing their rivals. But last year there seemed to be less common ground than ever before.

That’s a problem, says **Laurie Zoloth**, a Charles Deering McCormick Professor of Teaching Excellence.

“You have to agree that you’re living in the same universe with the same reality parameters before you can have a serious discussion about how to act in the face of these facts,” says Zoloth, a bioethicist and professor of religious studies.

This divide, Zoloth argues, is partly due to the declining number of institutions viewed as credible across the political spectrum. Science, universities and journalism, for example, were all once widely trusted. Today, they face increasing politically driven skepticism.

There may be grounds for this mistrust. Advances such as polio vaccines and antibiotics generated enormous goodwill for science in the 1950s, Zoloth notes. But there have

also been missteps in the years since then: the Fukushima nuclear power plant disaster in 2011; birth defects caused by the drug thalidomide; technologies that have failed to live up to their hype. Perhaps it’s not surprising that some view science-based issues such as immunizations and climate change with a more skeptical (and political) eye.

But even in a world that appears to have fewer undisputed foundations of truth, we can still look for the premise we can all agree on. For example, not everyone will concur on



We don’t need to be afraid of disagreement, even about critically important things. The better goal is for all of us to develop clear, articulate arguments, and to find the best argument to shape our policies.

Laurie Zoloth

the cause of climate change, but most are willing to acknowledge its existence. That matters. “If we can agree that the climate has changed, then we can have a real discussion—even if we disagree about what caused it and what we ought to do,” Zoloth says.

Digging for the assertion that people can agree on will help make our disagreements clearer and more productive. Civil dialogue, says Zoloth, is not necessarily about trying to build bridges or connections. “We don’t need to be afraid of disagreement, even about critically important things,” she says. “The better goal is for all of us to develop clear, articulate arguments, and to find the best argument to shape our policies.” ■



Resilience

What does it
take to triumph
over adversity?
Five Weinberg
College alumni
share their
hard-won
wisdom.

INTERVIEWS BY ANNE STEIN

The loss of a job or a spouse. A devastating diagnosis. Relationship problems. A failure to reach career goals. Few lives are immune to such setbacks, which can feel humbling, if not overwhelming.

Some people crumble in the face of these challenges, while others adapt under adversity and emerge stronger and more focused than they were before. What makes the difference?

Often, an ability to find meaning in the midst of hardship can help individuals hurdle misfortunes that might hobble others.

"People can find surprising ways to develop new sources of purpose and meaning in life," psychology professor Greg Miller says. "In some cases, their levels of psychological well-being exceed what they were before the adverse event."

Some things are easier to make sense of than others, of course, and some people have resources in their lives—supportive family members, mentors and friends—that make it easier to bounce back. For others, the task is harder. "But people are not anywhere near as fragile as psychologists or the cultural narrative assumes they are," Miller says. "People find ways."

An alumni magazine is often a place for graduates to tout promotions, entrepreneurial successes and best-selling books. But the following profiles celebrate achievements born of challenge or tragedy, transformed through perseverance and self-reflection. Whatever the circumstances, these alumni embody resilience and the ability to create new meaning and purpose out of crisis.

I wrestled for several years at Northwestern, and throughout my life I've always kept in pretty good shape—weights, running, going to the gym, hiking.

During my senior year, I earned my pilot license with several of my Sigma Chi fraternity brothers. After graduating, I became an orthodontist, and had one practice in Chicago and another in Dixon/Sterling, Ill. I flew my two-engine Beech airplane between the offices hundreds of times over the years.

In July 2006, I was flying to the Dixon airport when I hit a patch of dense fog that hadn't been predicted. First my right engine failed, then my left, and I had to glide in.

At that point, I realized I had lost power, and my training took over. I just concentrated on flying. I passed through the fog and saw the ground approaching. The last thing I remember seeing was the green of the cornfields before I crashed.

I was in the cornfield for three hours before I was rescued. At first I was dazed, and then I became very aware. I saw I had a few minor cuts and knew that I had a spinal cord injury. My cell phone kept ringing with calls from friends and my wife. But I couldn't reach it.

In the hospital in Rockford, Ill., I found out that my spine had broken near the T12 vertebra and I was a paraplegic. But it could have been so much worse. I was lucky—I have full upper body [mobility] and no traumatic brain injury.

I was at the Rehabilitation Institute of Chicago for the month of August. One doctor asked, "What are your goals?" I remember saying, "I want to be as independent as I can possibly be." I'm a calm, logical person. I look ahead, I don't think "poor me." By October I could drive, and by December I started seeing patients again.

My wife, my kids and my friends all helped me get through this. We have a Northwestern tailgaters group, and the autumn after the crash I was at almost every home game. Someone at RIC introduced me to hand-cycling as a way to get back into shape. And now I have a new group of friends—the hand-cyclists I train and race with. I'm hooked. In so many ways, exercise has been a lifesaver.

Ted Moss '71

on where to begin:

The first thing is to accept your situation. It's not good to look back continually at where you were. You need to go forward and focus on whatever is possible for you.



PHOTO: ANDY HAGEDON



I went to St. Ignatius College Prep in Chicago and always got good grades, so when I first came to Northwestern, I felt confident. But college is different. I started as a pre-med and really overloaded myself with classes: AP bio, physics, calculus, French. I didn't do well. I got Ds and Cs and maybe one B.

I was devastated. I went to see the dean to find out what I could do, and he encouraged me to drop my major. But once I told him I wanted to stay pre-med, we made a plan. I dropped physics and started meeting with my biology professor on weekends.

What really helped me was taking a summer enrichment course that prepared students to be successful in medical school. It was geared particularly toward African American, Hispanic and Asian students. The course was a combination of mentoring, MCAT prep and shadowing doctors. Our counselors were medical students, so we could talk to them about what it was like to be in medical school. We were all students of color and we weren't embarrassed to ask questions. We had people telling us, "You can do it. This is how we did it and we're going to help you get those tools."

I and other African-American pre-meds at Northwestern were trying to feel comfortable in an environment that was very different than what we were used to. There were definitely opportunities to get help, but at that time you had to know where to go to seek them out. It took me getting Ds to get some help. I was wondering, "Am I as smart as my counterparts?"

The next year was like night and day; I was so focused and studied so hard. I got tutoring when I needed it, took summer courses and made sure I did well on the MCATs. It was a mindset change. I became a lot more confident and I knew I could achieve it. I discovered that having a temporary failure or setback was not who I was.

I learned that I had to persevere. And I did: I went to medical school and I am now a hospitalist in obstetrics and gynecology at Carle Foundation Hospital in Urbana, Ill.

Dawne Collier '93

on regrouping:

Everyone who has been successful has failed a few times before. Don't let that be the final chapter. Give yourself time to be upset or sad, then figure out a plan to approach your goal again if it's something you really want.



John Trautwein '84

on facing challenges:

Stop. Breathe. Take your time. Secondly: surround yourself with people you love. Share with them, and they will help you see the good and the hope that is indeed there!

M

y wife Susie and I suffered the worst tragedy in 2010 that a family can experience: the suicide of our 15-year-old son Will.

Will, the oldest of our four children, was a freshman in high school when he lost the will to live. He was big and strong and healthy. He was very popular. He was a good student. He was in a band and wrote music. He played lacrosse. He was a leader.

And we lost him.

Five days before he died, I looked at him and said, "Do you want to trade places? Look at how much fun it is to be you—you're just starting high school, you have all these cool friends and wonderful opportunities!" I was so excited for him. That's how clueless I was. I never once in a million years saw that Will was hurting or suffering.

Within hours after Will's death, I was contacted by suicide prevention and mental health groups that I didn't even know existed because nobody talks about it. We learned that one in six of our kids is suffering from depression. Teenagers today live in a 24-hour cycle of negative news and are under constant, extreme academic pressure. With the Internet and cell phones dominating their lives, everything they do is recorded and available for anyone to see. As adults, we don't know what it is like to have that type of exposure and pressure as a teenager—it simply did not exist in our day!

My wife and I decided we were going to talk about these issues to spread awareness that our kids are struggling. We started the Will to Live Foundation, a nonprofit that focuses on teen mental health and suicide prevention. The message is for kids to reach out and love each other. We sponsor sports teams and events, a music festival and an annual 5K run, have a "Club Will to Live" in 15 high schools and give scholarships. I give about 200 talks a year around the country.

I don't know how I would have gotten through it had my kids, my friends and their friends not put together this extremely positive foundation. My friends and teammates from Northwestern were instrumental in my healing when we lost Will. They were the example of the "life teammates" concept we give to kids now: reach out and love each other, and you will deliver hope to each other as well. Life's hard, but if you can be there for one another, it can be great.

As a result of losing Will, but keeping him alive through the foundation, my focus has changed. I used to spend 80 percent of my time thinking about and planning for tomorrow. Now I spend 90 percent of my time on today. I take it a day at a time. Carrying Will's light enables me to do just that. It motivates me every day.

I came to South Africa in 1993 because I wanted to be part of the first elections there, and then I stayed. In 1998, I went to Zimbabwe to start an HIV/AIDS program for a U.S.-based non-governmental organization. I was 27, and it was a well-funded project; Zimbabwe had the world's highest HIV infection rate.

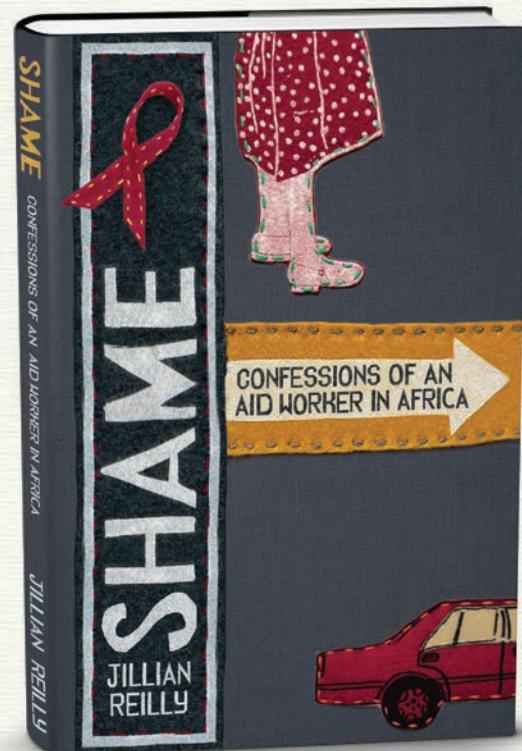
The experience opened my eyes to the limitations that aid organizations face in bringing about change. It was a real period of disillusionment for me. There I was, a young female outsider in charge of a lot of money to reduce the HIV infection rate, and what we were doing wasn't working. HIV had a huge stigma. People regarded me simply as access to money and funds. They'd tell me whatever they thought I wanted to hear, rather than speak honestly about what was going on.

I realized that if change was going to come, it wasn't going to happen because of people like me—it would be through Zimbabweans themselves. It was humbling and eye-opening for someone who had spent the previous 10 years thinking I'd go out and change the world.

I left my dream job and went back to the United States. At home, people thought I was an amazing Mother Theresa type. But that wasn't true. I had a 401(k) and had made a hefty salary. I felt incredibly alone and isolated.

So I started writing about the experience and working as a consultant to NGOs to challenge them to address what's going on more strategically. The whole process forced me to ask, "What can I uniquely offer to promote and support social change?" The answer was to use my writing and communication skills. I wrote a book, which helped me make sense of what happened.

I also established my own consultant organization, Troublemakers. I created it because I wish I had been one. Too often I signed off on projects I knew were wrong. Now I talk about courageous leadership in organizations and society and the willingness to speak your own truth, as uncomfortable as that might be. I credit the College with helping me to discover my calling. Knowing what you want to do and why you want to do it makes it easier to navigate all that comes your way.



Jillian Reilly '92

on trusting yourself:

Let your instincts and intuition guide you. They will help you stay the course whatever challenges come your way. If your internal compass is properly set, then you can better bounce back from temporary challenges.



PHOTO: JARED SOARES

Larry Irving '76

on finding support:

It's the three Fs: faith, family, and foundation. My faith is a comfort and helps me in times of stress. Family will give you moral support and encouragement. And my foundation is my friends, the people I work with, and my clients. If I have any doubts, I think about these people and realize they will sustain me. Hopefully no one goes through this journey alone.

W

hen I was diagnosed with cancer in late 2007, I found out that there's an endpoint to this great journey. There's actually a date on my personal milk carton. My wife had cancer when she was 21, so I knew it was survivable. But cancer does make you focus.

It also helped me re-think some of my career goals. Over the years, I have consulted and worked for various huge companies, such as Hewlett Packard. But now I've decided I want to use technology to assist people, rather than just comfort the comfortable and enrich the affluent.

Fortunately, I've had a lot to draw on professionally to pursue this. After Northwestern, I went to law school, and then I went to work at a large law firm and later on Capitol Hill. Eventually I worked for the Clinton administration as an assistant secretary of commerce and helped develop our nation's first Internet policies. In 2008, six months after I had surgery, I was asked to serve on President Obama's transition team. I served from November to February, and then I started radiation in 2009. Subsequently, I had some great job offers, but they weren't satisfying. Ultimately, I wanted to do more for nonprofits and startups.

To cope with my diagnosis and treatment, I relied on my faith, my wife's experiences and her faith, my family, great clients and good work to do. I just kept pushing through it. Most people who knew me didn't know I was sick until I took time off. I didn't feel sorry for myself, but it did make me take stock.

Today, I use the skills I've learned and the people I know to continue beating the drum about using technology in a positive fashion. I'm working on a book about the disruptive power of technology and what we can do with it to improve life. How do we put the citizen back into the process?

Sometimes when unexpected things happen, they give you a reason to pause and ask, "Am I optimizing my time here?" I hope I am a better steward of my talents and gifts as a result of that diagnosis of cancer, knowing that tomorrow's not promised. ■

Matt Forti '00

built an organization that fights poverty in Africa

BY DANIEL P. SMITH



WHAT DID YOU DO WITH YOUR ARTS AND SCIENCES DEGREE?

Cristina Henríquez '99

turned her passion for creative writing into her profession

BY KAREN (BARRETT) GIROLAMI CALLAM '88

**David Reitze '83**

leads a team of pioneering space researchers at LIGO

BY ANNE STEIN

When **Matt Forti** graduated from Northwestern in 2000, he knew he wanted to do some good in the world.

What Forti did not know, however, was just how fortuitous his double major in economics and sociology would prove to be. Economics had provided Forti with a grounding in markets and resources, while sociology had exposed him to the human side of those concerns.

Today, the Philadelphia native combines his dual degrees into a single role as the managing director of One Acre Fund, a 10-year-old organization that finances and trains smallholder farmers in Africa.

"It's a balance of the head and the heart, of understanding human beings and how they relate to one another, [combined with] a sound business acumen," Forti says of his role at One Acre.

But when he graduated from Northwestern in 2000, Forti wasn't so sure he'd ever find such an inspired opportunity. He tackled "a few pro bono [nonprofit] cases each year" as

a management consultant with the New York-based firm Marakon Associates, but yearned to make a deeper impact.

"I really wanted to make a more substantial difference in people's lives," he says.

In 2004, Forti returned to Northwestern to pursue his MBA, focused on bringing business expertise to the nonprofit world. Kellogg School classmate **Andrew Youn** soon approached Forti with the idea of addressing poverty in Africa by providing farmers with higher-quality seed and fertilizer and basic business training.

Though Forti says he knew "nothing about Africa or agriculture" at the time, he was attracted to the entrepreneurial idea, as well as the magnitude of the problem.

"Seventy percent of the world's poor are farmers," Forti notes. One Acre quickly became Forti's mission.

For seven years, he voluntarily filled his nights and weekends with board meetings, overseeing a group of fellow volunteers as they built the organization's website and oversaw its finances.

Meanwhile, Forti maintained a full-time role at the Bridgespan Group, a nonprofit advisory firm that quite serendipitously provided access to skills and connections that helped One Acre grow.

Forti joined One Acre full time in 2013 as the organization's work in Africa took off. With Youn overseas, Forti became One Acre's domestic presence, overseeing areas such as fundraising, communications and corporate finance, as well as evaluating the organization's impact on areas such as nutrition and women's empowerment.

One Acre, which began with 40 Kenyan farmers, now works with some 400,000 families in six African nations. By 2020, Forti and his team hope to reach at least 4 million people.

"And if we can work with 4 million people, then you have to believe the next Nelson Mandela is in that group and will be the next agent for change in Africa," Forti says.

And that would most certainly be good for the world. ■

During her childhood trips from Delaware to visit her grandparents in Panama, **Cristina Henríquez** would sit and listen to her grandfather's stories. She loved how they made her feel part of something bigger.

In high school, Henríquez began to dream about telling her own stories as a writer. During a campus visit to Northwestern, she sat in on an English class and found the fuel for this emerging idea. The stimulating and supportive literary environment "was everything I'd been waiting for my whole life," she says.

Today, Henríquez has built a career as a successful and respected fiction writer. But it took some persistence to turn her passion into her profession.

Henríquez's family was delighted when she was accepted to Northwestern, but they hoped she would study journalism, which they viewed as a more practical career choice. "My dad was nervous I wouldn't get a job as a graduate with an English

major," she laughs, remembering. "Then I took my first fiction class. I loved writing dialogue and creating momentum in the narrative. I was hooked."

Inspired, Henríquez applied to the creative writing program—and was devastated when she was rejected. Undeterred, she kept writing. "I realized I had this fire within me and the commitment to stick with it," she recalls. At a campus literary event, she ran into her poetry professor **Joanna Anos**, who encouraged her to apply again. This time, she was accepted.

"Rejections are part of a writerly life," Henríquez emphasizes. "They hurt no less now than they ever did. Still, experiencing one early on at Northwestern was a blessing. That conversation with Professor Anos was also a huge moment of validation. Years later, I wrote to her, thanking her for helping me to believe in myself."

With guidance from faculty and classmates, Henríquez learned to apply her powers of observation to character development.

Again, she drew from her grandfather's storytelling. "He would hold court in the living room until people were falling off their chairs from laughing so hard at his stories," she recalls. "I didn't know Spanish, so my mom would translate. I had to notice things in a way I maybe wouldn't have if I had understood the words."

Today, Henríquez travels the country speaking about her most recent novel, *The Book of Unknown Americans* (Alfred A. Knopf, 2014). The love story about immigrant Latino teenagers has resonated with readers beyond Henríquez's expectations. High schools, universities and entire towns have chosen it as their community read.

"I wrote about what could be a controversial topic," she explains. "But when I'm invited to speak, it's not about immigration. It's about bigger themes like community and belonging. We all need places to tell our stories—like my grandfather did—and we all need someone to listen." ■

As a teenager gazing at the night sky in Pompano Beach, Fla., **David Reitze** knew that his future lay in the cosmos.

So eager was he to explore the sky that at age 15, following directions from a magazine for amateur astronomers, he built his own reflecting telescope. "It allowed me to see deeper into the universe," Reitze recalls. "I was pretty happy, actually, with how it turned out. It worked!"

Now, as executive director of the Laser Interferometer Gravitational-Wave Observatory at the California Institute of Technology, Reitze is helping to lead a team that's peering deeper into space than ever before—and the results have been spectacular.

With the support of scientists worldwide, the LIGO lab in 2015 detected two black holes that were locked in orbit and eventually collided to produce a new, bigger black hole. Researchers detected the phenomenon by measuring tiny displacements of space produced by gravitational waves—an event predicted in 1916 by Albert Einstein.

"Conventional astronomy uses telescopes to collect light," explains Reitze. "With our detectors, we're looking at a fundamentally different part of the universe."

Though neither of his parents had a college degree, Reitze was always set on a science career. He chose Northwestern "because the campus was beautiful and they had a telescope."

"I majored in astronomy because I wanted to understand the universe," he says. "But I had to take a lot of physics first, so by the time I was a junior, I'd already taken six or seven physics classes and I was really jazzed. You can write down equations that explain how things work and how the world works, and you can solve them! That really excited me, and it was also hard, which I liked, so I switched to physics with a minor in math."

Two classes taught by Professor **Martin Baily** were critical to developing Reitze's scientific curiosity and understanding: Introduction to Thermodynamics and an independent study

on general relativity. "I got a very formal and rigorous science education and that's what I needed," says Reitze, who went on to earn his Ph.D. in physics at the University of Texas in Austin.

"But more importantly, Northwestern required us to take courses outside the major—a good deal of literature, philosophy, economics and psychology. I learned critical thinking skills and how to construct compelling arguments. Probably one of the most valuable parts of my education was learning to communicate."

"I interact with a lot of people," he explains, "from the public to funding agencies to scientists. I make hiring decisions and give lots of talks. I'm so glad I went to Northwestern because as a scientist, I got exactly what I needed." ■

WERE THE POLLS REALLY SO WRONG?

BY STEPHAN BENZKOFER



Pity the poor pollsters. They're just trying to make a living.

They provide the data that help officials govern wisely, politicians reach consensus and businesses make better products.

But you, the American public, avoid pollsters like the plague. You want no part of the work they do, no part of those invasive dinnertime interruptions from phone numbers you don't recognize.

To make matters worse, a series of apparently embarrassing polling failures last year—most notably surrounding Brexit and the U.S. presidential election—surprises you and prompts you to demand to know how they could miss so miserably.

What's a put-upon pollster to do? Hang it up?

Hardly, but it does raise interesting questions about how polls work in the digital age and what poll numbers truly mean.

The "response rate" is the term pollsters use when discussing the increasingly difficult task of getting people to pick up the phone. In the 1970s, about 80 out of 100 calls paid off with interviews. So 2,000 calls netted more than enough responses for a reputable poll. To get the same number of responses today, a pollster has to make 32,000 phone calls.

Some experts say that statistically, such low response rates shouldn't affect poll accuracy so long as the sample is still random. Others disagree.

"I actually am surprised that the polls are as accurate as they are," says Northwestern economics professor **Charles Manski**, who adds that pollsters don't know if nonresponse actually is random. "It is potentially a major issue."

Another daunting problem facing political pollsters is predicting who will vote. Based on election data and census trends, the pollster tries to create a "likely voter" model. That can be tricky, though, because one of the few groups harder to pin down than the American public is the American voter. "The people responding to your poll often don't even know themselves if they are going to vote," observes political science professor **Jamie Druckman**.

So what's the answer?

Manski says polling organizations, the media and the public need to get more comfortable with uncertainty. He argues that while concrete numbers are comforting and easy to understand, ranges more accurately represent the poll data. For example, compare these two sentences:

- 1) "Candidate A has 52 percent support to Candidate B's 48 percent (with a margin of error of plus or minus 4)."
- 2) "Candidate A's support is 48–56 percent vs. Candidate B's 44–52 percent."

With No. 1, Candidate A is sitting pretty. No. 2 is messier, no doubt, but better illustrates how close the race is. This approach would have better shown how tight last year's campaign was and that the results from nearly all of the major polls fell within their margins of error.

Some 15 years ago, Manski went a step further and floated an idea about changing the way the poll questions are asked. Instead of "Will you vote on Election Day," Manski suggested the interviewer ask, "What's the percent chance, 0 to 100, that you will vote on Election Day?"

The USC/L.A. Times Daybreak tracking polls adopted this probabilistic polling method—and were the only surveys in

2016 to predict well ahead of November the victory of Donald Trump.

"I've been arguing for years that this would make polling more accurate," says Manski, who notes that the same uncertainties plague the federal government's economics reports: GDP, jobless rates, inflation. Those numbers guide government policy and business decisions worth millions of dollars.

Understanding the ambiguity that surrounds these figures would be well worth our time. "The major issue is that polling has been oversold," Manski says. "We would be better off facing up to the uncertainty."



Weinberg magazine welcomes letters to the editor. Please email your comments to weinberg-communications@northwestern.edu. Comments may be edited for grammar and brevity.



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[BREAKTHROUGH]

Three Strikes and You're...Out

BY LISA STEIN

Business travelers and tourists aren't the only ones who suffer from jet lag's well-known symptoms — fatigue, confusion and temporary cognitive deficit, among others.

It turns out that major-league baseball players also experience those effects, according to a recent study by neurobiologist **Ravi Allada**, a Cubs fan interested in exploring the impact of long-distance travel on individuals' circadian, or 24-hour, clocks.

MLB players provided an ideal data set, because they travel across the country frequently and don't have time to adjust their sleep schedules. Allada and his co-researchers examined data from 4,919 games played between 1992 and 2011 for which players traveled across at least two time zones.

They discovered that teams traveling eastward almost always performed worse than those traveling westward. They also found that when teams returned home, they exhibited impaired offense, likely due to the less-aggressive performance of their base runners.

The big surprise for Allada: Jet-lagged pitchers, whether at home or on the road, give up more home runs. "The effect was so large that it negated the home-field advantage," says Allada, the Edward C. Stuntz Distinguished Professor in Neuroscience.

That effect translates to one home run every 10 games. That might not sound like much, but as Allada points out, it is "the difference between a playoff team and a team that's far from making it to the playoffs." ■

LEARN MORE ABOUT

Ravi Allada's research on jet lag and baseball:
wcas.nu/allada-baseball

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