



# CONTINUUM

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Northwestern

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Dear Northwestern friends,

I am proud to present our latest edition of *Continuum*, which showcases the School of Professional Studies, our academic programs, and the achievements of our faculty, students, and alumni.

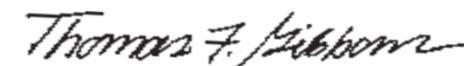
Our cover story on sports analytics reflects the kind of cross-disciplinary work we do at SPS. Drawing on the expertise of faculty from our successful Master of Science in Data Science program, we created a specialization in sports analytics for our Master of Arts in Sports Administration. SPS continually looks for new professional areas of study, new and meaningful credentials for our adult learners, and new trends in education delivery and technology.

Of course, at Northwestern it always comes down to quality. You will read in this issue about our commitment to Quality Matters, a peer-review process of more than 50 standards to evaluate our distance learning portfolio. This well-respected national endorsement sets a high bar in best practices for universities dedicated to offering superior distance learning experiences to students.

There is also the quality of our faculty, reflected in the article about brilliant short-story writer Stuart Dybek, a faculty member in our creative writing program and Distinguished Writer in Residence at Northwestern. And my greatest source of pride, the quality of our students, can be seen in Kristen Scotti, a gifted scientist who recently earned her undergraduate biology degree at SPS after being named regional winner of the 2016 Undergraduate Awards—known as the junior Nobel Prize—for her work on microgravity freeze casting.

No single issue of our magazine can capture all that is happening at SPS, but the stories you read here are a great reflection of our school's many exciting dimensions and our staff and faculty's commitment to our students' success in both their studies and their careers.

Sincerely,



Thomas F. Gibbons, Dean  
School of Professional Studies



# ALL ABOUT THE NUMBERS

For SPS sports fans,  
analytics is the new frontier

*In 1962*, when the Dallas Cowboys were fairly new to the NFL and desperate to put together a winning roster, team management made a groundbreaking move: they contacted computer giant IBM for help. The Cowboys wanted to improve on football's old-style scouting methods in order to find the best players available, so IBM sent a brilliant young Indian mathematician—who knew little about the game—to Dallas.

A. Salam Qureishi was asked to write a computer program that would sort through hundreds of athletes and statistics to quantify what makes a great football player. Dallas scouts and coaches provided him with characteristics and criteria ranging from speed and competitiveness to mental alertness and athletic success in college—and much more.

It was one of the first forays by a pro team into sports analytics, the method by which teams collect data, look for significant patterns, and draft the best players they can based on the results.

Once the Cowboys started using Qureishi's system, they began to find athletes who previously would have gone undiscovered. There were players from tiny schools, like Jethro Pugh from Elizabeth City State College, and Yale's Calvin Hill, who became the first Ivy Leaguer to be drafted in the NFL's first round. The Cowboys even discovered college basketball players like Cornell Green, who went on to play 13 seasons for the team. Though other teams initially doubted the new methods, a record-breaking string of playoff appearances by Dallas proved them wrong: the Cowboys have since become one of the world's most successful sports franchises.

*Today* nearly every professional sports team uses cameras and other devices to capture heaps of data. In the NFL, radio frequency identification technology embedded in players' shoulder pads tracks speed, position, and distance, and the NBA and professional soccer leagues use high-definition cameras above the playing surface to track the movement of the ball and of every player, for every second of a game. In basketball, sophisticated software and statistical algorithms produce data that include how many times someone touches the ball and where that player is most successful shooting and passing. Systems determine not only a player's shooting average but also the average after dribbling once versus twice, or when a defender is three feet versus five feet away from the basket.

"Analytics really involves moving beyond the traditional box score to find meaningful numbers that allow you to dissect and enjoy the game in new and innovative ways," says

Tom Robinson, professor of sports management analytics at Northwestern's School of Professional Studies. Today, says Robinson, who is also director of football research for the Cowboys, the team is fully invested in analytics, with a staff of experts on both the player and business sides. Robinson joined the Cowboys in 2010 after a 10-year corporate career, and in 2014 he earned an MS in predictive analytics from SPS.

"You're furthering your own understanding, and your organization's, about the drivers of success," he says. "We find good data that we can work with, then use tools and techniques used by other industries and sciences and apply them to the sports context to understand the game better."

*In the NFL draft* every team is trying to figure out a potential player's likelihood of success—will he become a starter? A perennial Pro Bowler? A role player or a backup? Every year, each pro team attends

the NFL Scouting Combine, a gold mine of statistical information. Some 300 players are measured in a consistent way, from height, weight, and arm length to performance on such benchmarks as vertical and broad jumps, timed agility drills, and the 40-yard dash.

The ideal player has size and athleticism, comes from a prestigious program, has had athletic success in college, and has put up big stats. But in one way or another, Robinson explains, almost everyone lacks something—even the best players have flaws.

"Some don't fit the right parameters for height and weight, but they can still be excellent football players," he says. "We're always looking for ways to figure that out."

While scouts and managers used to watch films of past games—a laborious and time-consuming process—Robinson notes that programs today break the field into a grid, capturing 10 measurements per second per player. "If you watch that over enough plays and games, you start to learn things," he says.

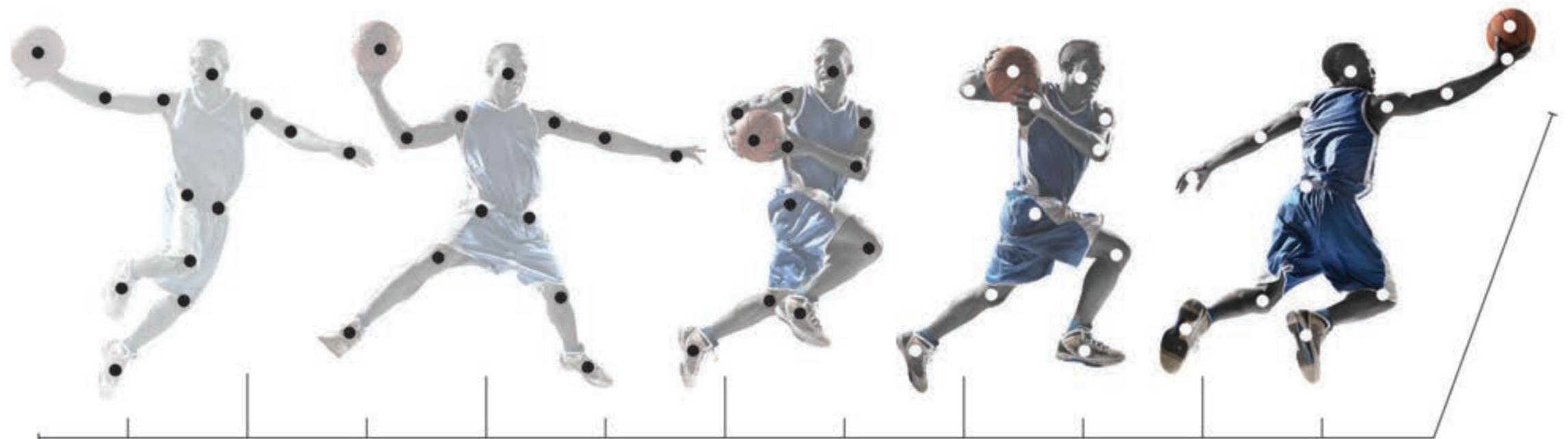
Perhaps the most effective approach is combining human and statistical evaluations of talent—in other words, old-school plus new-school scouting. "It's hard to argue against general managers who've been in the league for a long time with a lot of success, and at times it's because they have this internal computer in their head," Robinson says. "Through life experience and what they know about the game, they intuitively

make good decisions. But humans and computer models are imperfect, so using both approaches can provide a sound way to improve decision-making."

In his 2016 book *Sports Analytics and Data Science: Winning the Game with Methods and Models*, SPS's Thomas Miller, faculty director of the Master of Science in Data Science program (formerly the predictive analytics program), shows how franchises can use advanced data science and modeling to assess their competitive advantage and make more accurate predictions about future performance.

"More and more data are being collected about individual athletes and what's happening on the fields and courts," he says.

*High-definition cameras above the court track the movement of every player for every second of the game.*



“Teams recognize that these data are useful in making strategic decisions. They have to decide, for example, which players to include on the team—draft day and free agent decisions.” Such big decisions, and even contract negotiations, can be informed by data. “These data are extensive,” Miller adds, noting that on today’s NBA court, teams know 25 times a second the location of the ball and every player on the court. In baseball, it’s 35 times a second.

SportsVU is one of many tools teams use to measure their athletes’ performance. In baseball, the pro sport that has most fully embraced analytics, everything from a runner’s speed passing second base to the launch angle of the bat (and thousands of other statistics broken down by day of the week) is available. It’s why the Chicago Cubs have a 10-person analytics staff headed by Chris Moore, who has a PhD in neuroscience and machine learning. “There’s a strong push from the top to ingest data and maximize the use of analytics within the organization,” he says.

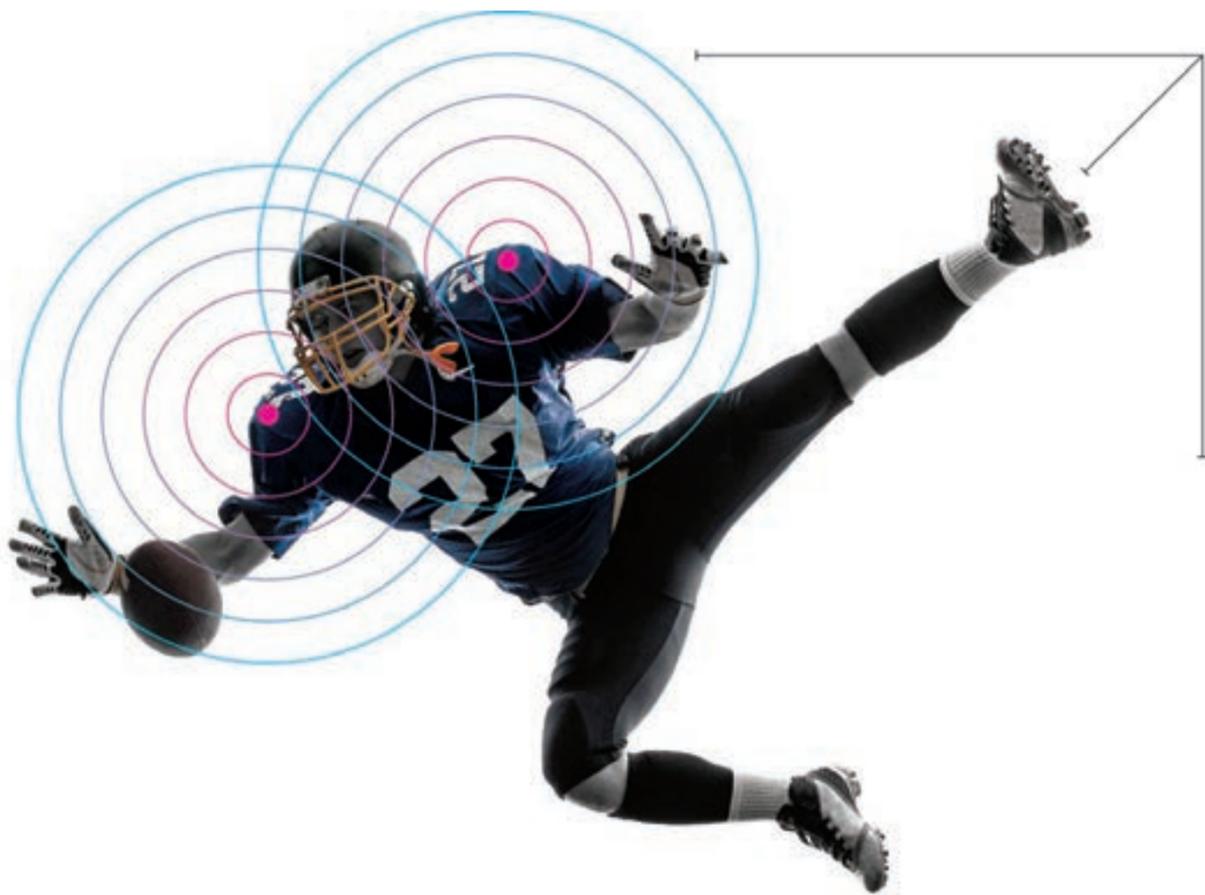
*Analytics isn’t just* for choosing the best players; it’s also good for business. Especially popular in ticket departments, analytics is used to determine prices and ascertain why fans attend games. Patterns in data inform decisions about how much to charge not just for tickets but even for beer—analysts track scenarios like whether fans will purchase more food at the arena when the beverage costs two dollars less.

Chicago-based Adam Grossman, coauthor of *The Sports Strategist: Developing Leaders for a High-Performance Industry*, teaches two courses in SPS’s Master of Arts in Sports Administration (MSA)

program. In Entrepreneurship in Sports and Sports Management Analytics, he outlines how analytical models are used to understand value on the business side and how data are used to drive decisions.

Grossman is also CEO and founder of Block Six Analytics, which uses models to measure the value of advertisements and sponsorship for clients that include Pepsi and the Cleveland Browns. When companies spend millions of sponsorship dollars on team sports, analytics is critical to determine the advertising value of stadium billboards that can be seen on TV, as well as the value of social media conversations around a particular team or game.

*In the NFL, radio frequency identification technology is embedded in players’ shoulder pads to track speed, position, and distance.*



Block Six uses its machine learning technology to accomplish these goals by automating data collection and analysis. For example, it determines how often a sponsor’s logo appears on a television screen during a game, how much of the screen it takes up, and how close it is to the center of the screen—all of which affect how many viewers see the logo.

When it comes to social media, Block Six can analyze posts and tweets, measuring positive and negative reactions as well as how many people are seeing posts and their overall value to the brand. The results are then housed on the company’s web-based platform, complete with insights into what drives value.

“My company has seen a big shift in people looking for data on sponsorship, event marketing, who goes to events, and levels of engagement,” Grossman explains. “Sports analytics is only going to grow as the technology and amount of data coming out get better. People want data and numbers more than ever to drive decision-making, and people who can communicate that will have a significant advantage.”

*For Bryan Joel*, assistant basketball coach at the University of Chicago, earning an MA in sports administration from SPS and specializing in data science have given him the math and computational skills he says are necessary for a future job in pro sports.

“I love coaching,” says the Caltech graduate, who played point guard and captained his team in college while earning a bachelor’s degree in mechanical engineering. “A lot of NBA organizations, along with a few college programs, have sports analytics teams to help guide their coaching staff, whether it’s for player acquisition, scouting reports, or how to help your team win. The SPS program gave me the skills I need, and I want to apply this skill set on the operations side.”

## EXPLORING SPORTS ANALYTICS

Interested in sports analytics? Students can take courses through the School of Professional Studies by pursuing any of these three routes:

Enroll in the **Master of Science in Data Science** program and choose Sports Performance Analytics and Sports Management Analytics as electives. (This fully online option requires 12 courses, with two focused on sports analytics.)

Enroll in the **Master of Arts in Sports Administration** program and pursue the Sports Analytics specialization. (This option requires 11 courses, with two focused on sports analytics. All classes are offered online, and the non-data science courses are also offered on campus.)

Enroll in the **Sports Analytics Certificate** program, open only to students with an advanced degree. (This online option requires four courses, with two focused on sports analytics.)

For more information on these degree and certificate programs, visit [sps.northwestern.edu](https://sps.northwestern.edu).

Current MSA student Kelly Noonan, who works in marketing for a food company, is focusing on the business end of analytics. “This is the most exciting change I’ve made in my career,” says Noonan, who’s already applied elements from the program at her current job. Her dream is to work for the new NHL franchise Vegas Golden Knights after graduation. “The MSA program is a great synergy of my passion for marketing with sports—an industry that I love,” she says.

That industry will only keep growing. “Computers are getting smarter, we’re getting smarter, and algorithms are getting smarter,” concludes Doug Bakker, faculty director of the MSA program and associate athletic director at DePaul University. “Analytics is the new frontier.”

—Anne Stein

To create change in the world, Sherrell Pyatt Harrison decided not to go to law school—instead, she decided to earn a master’s in public policy and administration from Northwestern. Having worked as a paralegal, she came to believe that “law is reactive. If you want change, you have to effect it at the policy level.”

Pyatt Harrison lived in North Carolina while she pursued her degree, taking classes as her work and family schedules allowed. Her courses covered topics

from the way Congress works to quantitative methods—a course

most people don’t take “unless they’re economics or statistics majors,” she says. “Now I can look at a report and understand the data.”

## Change Agent Sherrell Pyatt Harrison

When she finished her degree in 2015, Pyatt Harrison took a job with the US Postal Service,

monitoring all bills introduced in Congress for the effects they might have on the agency as well as briefing USPS liaisons before meetings with legislators.

“Policy changes are more immediate and have a greater impact than legal changes, which are more reactive than proactive,” she says. At USPS, Pyatt Harrison was directly involved in educating secretaries of state on how to increase voter turnout through more efficient mailing and processing of ballots. “We then saw states actually implement these recommendations,” she says.

Her next move is to Immigration and Customs Enforcement, where she will help officials prepare testimony about particular cases. Her three children were born during her time at SPS, and she appreciated being able to pursue a degree and “still have a life, have kids, get married, and have a full-time job. I knew I wouldn’t feel slighted in my education by taking courses online.” —David Lewellen

### CLOSE-UP



## REWIRE IT AND THEY WILL COME

As tech-industry jobs proliferate, SPS is increasingly the choice of adult students eager to join and climb the virtual ranks. As SPS dean Thomas Gibbons notes, cyber-minded students are changing the face of higher education. The only requirements? Interest, a laptop, and Wi-Fi.

“Technology that has drastically altered course delivery methods—removing constraints of time and place—continues to evolve and provide robust learning experiences,” says Gibbons, long an advocate for technological education and market-driven curricula.

Millennials who cut their teeth on smartphones are casual about this shift. Twenty- and thirtysomethings expect a seamless integration of technologies that will continue to shape their lives and careers.

“It’s less about ‘I want to be a doctor,’” says Erica Wilke Bova, assistant dean of international and professional education programs, “and more like ‘I want to eliminate AIDS in Africa. What systems and data do I need?’ At SPS we are positioned to stay on top of the needs of our students.”

For many students, objectives include higher salaries and greater job satisfaction. The average salary for a computer programmer is \$77,530, and software developers command six figures, according to the US Bureau of Labor Statistics. SPS is primed to be the Midwest’s talent pipeline to the tech sector as demand for trained information technology professionals surges by an expected 12 percent annually through 2024.

The newcomer to the school’s advanced-degree track is the accelerated Master of Science in Information Systems program. Launched in 2015, the two-year degree is available exclusively to alumni of SPS’s undergraduate information systems program and requires a weekly 10-hour commitment from students, who are often working professionals (although two go-getters completed the coursework in just a year and were the program’s first graduates last fall).

As cloud computing, artificial intelligence, and the internet of things (web-connected household devices) become accepted as today’s strategic tools, the master’s program emphasizes design, implementation, and evaluation of tech applications and theoretical models. The goal? To create well-rounded IT

experts. As faculty director Faisal Akkawi notes, “Anyone can build a database, but not everyone can build a database that performs well.”

The master’s program provides opportunities for students—a group that includes CEOs, information officers, and tech managers—to network with one another, and they’ve been known to turn those opportunities into job offers. Akkawi says salary negotiations are not uncommon, recalling an overheard discussion in which “one student offered to hire another student at his company for \$100,000.”

—Molly Woulfe



## SETTING ONLINE SCHOLASTIC STANDARDS

Northwestern University's online courses are vetted by one of the oldest and most respected certification agencies of its kind. The University subscribes to Quality Matters, an independent nonprofit agency committed to training and guiding faculty to meet its high, clear-cut digital standards.

The agency's peer-review process employs eight general standards and 43 specific review standards to evaluate courses. Critical components include learning objectives, assessment measurement, instructional materials, course activities and learner interaction, and technology.

Funded by a three-year federal grant in 2003, Quality Matters began with "a handful of community colleges" as charter members, says executive director Deb Adair. Today the agency's members number more than 4,500.

Due to the nature of the business, QM must stay gigabytes ahead of members, as colleges constantly update their online offerings. "We will continue to change our own tools and practices," Adair says—just as SPS is doing.



## BY THE BOOTSTRAPS

Intended for tech novices, coding boot camps are intensive, hands-on, on-site immersions in the basics of coding, app building, and website design—drawing rookies from multiple professions and walks of life. The website Course Report estimated that boot camps would graduate 22,814 students in 2017, a tenfold market increase since 2013. (As a point of comparison, 79,650 bachelor's-level computer science students graduated from accredited US universities in 2016.)

Fall 2016 marked the debut of SPS's inaugural coding boot camp, a comprehensive sequence of three in-person classes per week that steep beginners in JavaScript fundamentals, mobile-app and web-based development, database design, and server-side programming. A typical "camper" is 30 years old, has 6.8 years of work experience, and has never worked as a programmer. The first 42 students earned their certificates of completion in April 2017.

That group included Aisha Ahmad, a biomedical researcher in her 20s who was mindful that her job at the time was subsidized by dwindling federal grant money. She retired her lab coat even before the camp's final grades were posted, and a fresh-meal delivery service recruited her as a software engineer.

The Skokie, Illinois, resident's meticulousness comes in handy in her work on the company's interactive website—and in expanding her coding skills. Codes (or programming languages) like Java, Ruby on Rails, and Python are not unlike Latin, English, or Spanish. Pick up one, Ahmad says, and you can grasp another. "If you learn to write algorithms and web apps in one language, they can translate easily into another program."

Similar to their military and fitness counterparts, coding boot camps are intensive and challenging. Though rookies often fret over their inexperience, SPS student success manager Adrienne O'Leary tries to assuage their fears. She points out that most students are juggling jobs and families along with an academically rigorous course. "We say, 'Wait! You've only been doing this for two weeks,'" she says.

And after just a few more weeks, those rookies are designing simple apps, such as a virtual coin flip, with industry-insider instructors doubling as coaches and cheerleaders. Instructor Mark Thompson, a lead software engineer at Accertify, salts his lectures with Chris Tucker impersonations and pop culture references to relax the neophytes.

"There's a lot of fear because of the subject matter," he says. "I want to make this process as inviting as possible so students can feel comfortable giving it their best shot."

SPS's first camp has expanded to multiple offerings in Evanston and Chicago to keep up with demand—approximately 125 students now work with 15 instructors and teaching assistants. Building on this success, SPS launched a new data science boot camp this fall.

The transformation in continuous learning has even expanded the Northwestern brand. While most applicants are from the Midwest, SPS fields inquiries about online degrees from across the country and now delivers many of those programs nationwide and around the globe.

—Molly Woulfe

Cathy Beres never thought of herself as a writer—until the blog she'd started to deal with her husband's terminal cancer reached 50,000 page views. After her husband died 11 years ago, she

### CLOSE-UP

began to take writing classes at other schools, eventually applying to Northwestern's Master of Fine Arts in Creative Writing program. When she was accepted, she was "more excited than when I got into college."

Her classes, with adult students of all age groups, were a challenge, "but I really enjoyed the challenge," she says. "I liked assignments, deadlines, and the people. It was a wonderful variety of working and nonworking, older and younger." In the company of other writers, Beres learned about the writing craft and the literary world, receiving feedback from her diverse group of classmates.

Her work has since appeared in half a dozen publications. Parts of her master's thesis, a collection of essays with a narrative thread, have been published, and she hopes a larger collection of those essays will become a book. Beres continues to write, with support from former classmates.

At first, she admits, writing was a hobby, but "now it's an important part of my life. The program helped me become more serious about my writing." She also

teaches yoga, publishing pieces in yoga magazines as well. Beres's older son earned his law degree from Northwestern in 2013, and his younger brother is an editor at Mashable—they're both proud of their mom's achievements. Age 59 when she began at SPS, Beres spent five years in the program. Shortly before her graduation ceremony last June, she said—if she could figure out how to decorate it—her mortarboard would quote the Beatles: "When I'm 64."

—David Lewellen

## The Write Place Cathy Beres





## A PLACE AND A TIME

In his short stories and poems,  
SPS creative fiction professor  
and Chicago native Stuart Dybek evokes  
a singular vision of the city.

**S**tuart Dybek remembers the moment he fell in love with writing. As a fourth-grader writing a geography composition about Africa, he'd just discovered metaphor. The technique, of course, had been used by generations of writers before him, but for a nine-year-old, writing "the trees scraped skies" was a breakthrough.

"I had this emotional reaction," Dybek says of his clever turn of words. "A bolt went through me." From that point on, his teachers encouraged his creativity and singled out his work in class, often reading aloud what he'd written.

Now on the faculty of SPS's creative writing program, the award-winning Dybek holds the title of Distinguished Writer in Residence at Northwestern. It's a fitting honor for the Chicago native, whom the *Atlantic* called "one of America's living masters of the short story." His most recent collections, *Paper Lantern Love Stories* and *Ecstatic Cahoots* (both published by Farrar, Straus and Giroux), have earned praise from such sources as the *New York Times*, which referred to Dybek as "not only our most relevant writer but maybe our best." His poetry and fiction have appeared in publications including *Harper's*, the *New Yorker*, and the *Paris Review*.

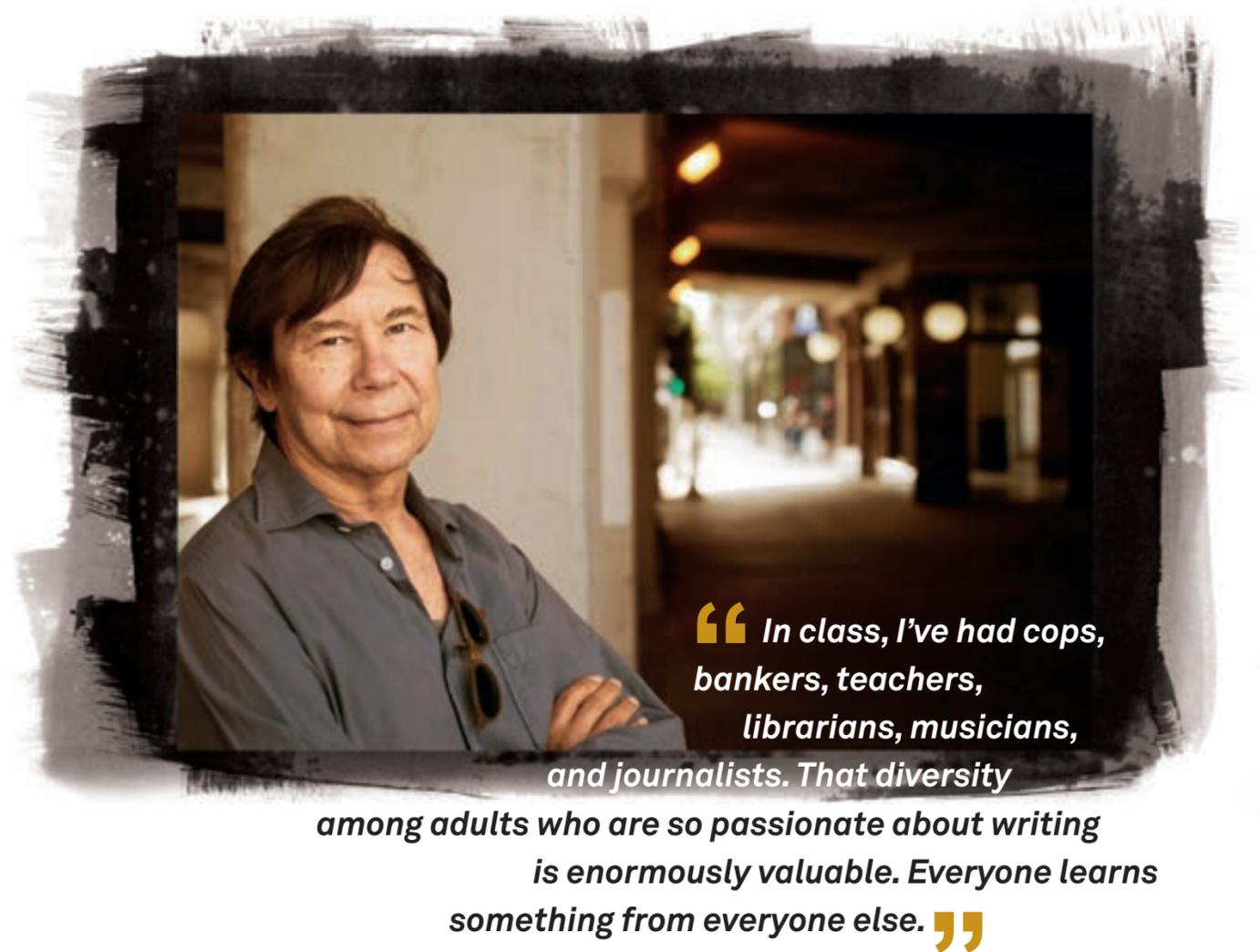
Born in 1942, Dybek received his BS in 1964 and MA in 1967 from Loyola University Chicago. After a short stint as a caseworker and a brief teaching career in the Caribbean, he earned his MFA in 1973 from the University of Iowa Writers' Workshop. An English professor at Western Michigan University for more than three decades, he returned to Chicago in 2006 to continue his teaching career at Northwestern—and was named a MacArthur Fellow in 2007.

"I love it here," says Dybek, who teaches writing to undergraduates and creative fiction in SPS's master's program. "Northwestern is a school that loves writing. And SPS has the exact kind of students I love: they come in with life experience."

He finds something in each student's piece—point of view, dialogue, or scene development, for example—that's pertinent not just to the writer but to the entire class. "I've had cops, bankers, teachers, librarians, musicians, and journalists," he says, "and that diversity among adults who are so passionate about writing is enormously valuable. Everyone learns something from everyone else. Couple that with the different ethnicities and races, and it makes for really vigorous classroom sessions."

Dybek himself is a product of working-class Chicago, raised by a Polish immigrant father and first-generation American mother who settled in Pilsen before later moving to Little Village. In the 1940s, when he was growing up, "Pilsen was a port-of-entry neighborhood for eastern and central European populations," says Dybek, who draws most of his material from his Chicago roots. "It was an exciting free-range childhood, and I've always been grateful for the gift of it."

In Dybek's hands, Chicago is an imagined and mysterious place, though it doesn't mean there aren't familiar locales and streets in his stories. Like all great artists, he has a distinctive, recognizable voice, and his is shaped in large part by his Chicago experience; it's through the filter of Pilsen that Dybek writes about class, the American dream, ethnicity, culture, and religion. The city "contains such a potent mix of quintessential literary material," he says.



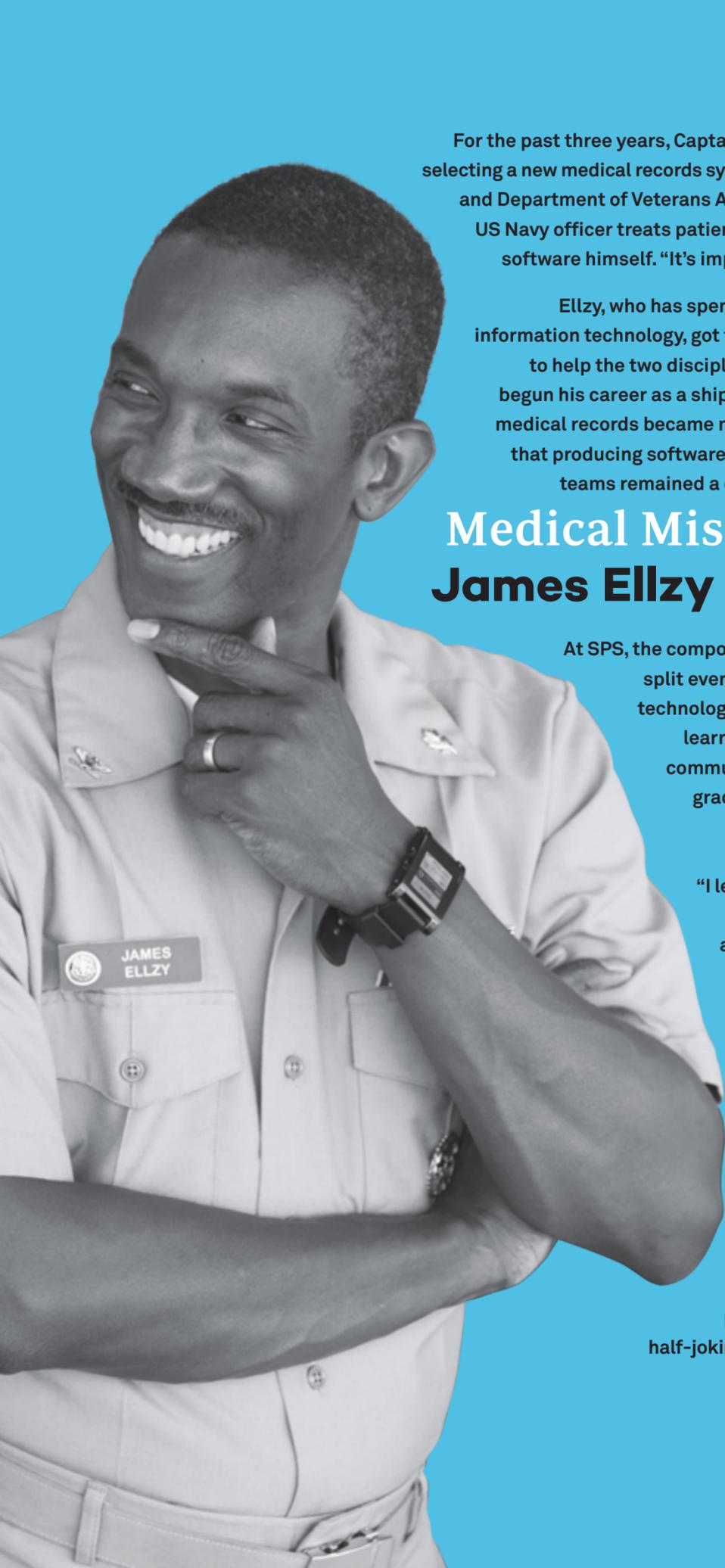
**“ In class, I've had cops, bankers, teachers, librarians, musicians, and journalists. That diversity among adults who are so passionate about writing is enormously valuable. Everyone learns something from everyone else. ”**

His writing has been described as magical realism, and that's how he views the craft of writing itself: "Science hasn't figured out how these abstract marks on the page make us laugh or cry. Everyone knows the power of the written word, but you can't touch or feel it like you can painting or sculpture."

Dybek is grateful to be included in the pantheon of Chicago authors. "A writer is fortunate growing up here," he says. "There's a Chicago school of writing that's wonderfully diverse, from Nelson Algren and Saul Bellow to Gwendolyn Brooks and Richard Wright. Chicago writers are neighborhood writers—Brooks lived in Bronzeville, James T. Farrell wrote about the South Side Irish.

"I was lucky to have my own neighborhood," says Dybek, who now calls Evanston home. "If you look at the everyday goings-on, at what you see, hear, and smell, and bring those to life, you'll automatically be writing about the great things of literature."

—Anne Stein



For the past three years, Captain James Ellzy, MD, served on the team selecting a new medical records system for the US Department of Defense and Department of Veterans Affairs. To ensure the system works, the US Navy officer treats patients two days a month so he can use the software himself. "It's important that I have credibility," he says.

Ellzy, who has spent his working life in both medicine and information technology, got that credibility by going back to school to help the two disciplines learn to talk to each other. Having begun his career as a ship's doctor, he watched over the years as medical records became more and more automated. He saw, too, that producing software to meet the complex needs of medical teams remained a challenge. That's why Ellzy, who got his

## Medical Mission

### James Ellzy

bachelor's degree from Northwestern in 1992, returned to get his master's in medical informatics from SPS in 2011.

At SPS, the composition of Ellzy's online program cohort, split evenly between students with medical and technology backgrounds, required that students learn to explain themselves. "We learned to communicate with each other," he says. "Your grade depends on it."

In the distance learning program, "I learned so much outside the classroom," Ellzy says, including at conferences and via message boards with his cohort.

Today he remains active in the Washington-area NU Club and participates in alumni interviews.

The medical information technology that Ellzy works to improve has potentially wide-ranging and long-term benefits: shared patient information across healthcare systems, algorithms to analyze that information and recommend treatments, and advancements in patient safety—because, he says, only half-jokingly, "doctors have messy handwriting."

—David Lewellen

#### CLOSE-UP

## I MEANT TO CLOSE THE WINDOW

Where are those terror  
ful nights we suffered  
as children? Look in  
boxes under the eaves,  
unless attics have also  
fallen away, like child-  
tiny rooms crowded  
with headlights that  
slip over walls, square-  
split by branches and  
sirens. I can tell you  
how it was, so yes, god  
needs me (I will fast  
asleep, packed into this  
narrow world) but is it  
enough? I ask him  
for sight and he gives  
me his. I ask for teeth  
and he brings them  
all. I am rich with small  
sharp stones sprouting  
along shoulders, arms,  
seaming each finger. I  
ask him to come near,  
come nearer, for a glass  
of water, the rest of his  
breath. I ask for all one  
can give to another,  
a click in another's dark.

—Virginia Smith Rice

Virginia Smith Rice is the author of the poetry collection *When I Wake It Will Be Forever*, published in 2014, and the chapbook *Whose House, Whose Playroom*. Her poems have appeared in the *Antioch Review*, *Baltimore Review*, *Cincinnati Review*, *Denver Quarterly*, *Massachusetts Review*, and *Southern Poetry Review*, among other journals. She is poetry editor at *Kettle Blue Review* and associate editor at Canopic Publishing. Rice earned her MFA in creative writing in 2011 from SPS, where she received the Distinguished Thesis Award for her poetry manuscript "One Voice May Survive the Other."



# Exploring the science of ice

After entering a NASA Community College Aerospace Scholars competition in 2012, she emerged as one of 50 winners and spent four days at the Marshall Space Flight Center in Huntsville, Alabama. Later that year, she was awarded a Jack Kent Cooke Scholarship that allowed her to transfer to a four-year university, all expenses paid.

Still, Scotti was reluctant to begin a new life as a full-time student. “Even though I had the scholarship, I wasn’t completely convinced I could quit my job and start over in a totally different field,” she says. “It was scary, plus it would be a huge pay cut. And I had a child”—her daughter is now 14—“so it was taking a risk.”

Scotti entered SPS in the fall of 2014 as a sophomore transfer student, focusing on chemistry and biology. Three nights a week and every Saturday, she drove 90 minutes from North Aurora to school; after six months, she moved to Evanston. “The more research I did, the more I realized I didn’t want to do science and school on the side,” she says. “I wanted to spend my time in the lab.” Scotti quit her job and continued at SPS, working in a lab during the day, while her daughter was at school, and taking classes at night.

## Defying gravity

As an SPS undergraduate, Scotti had the opportunity to conduct freeze-casting experiments for three years on NASA’s zero-gravity flights based in Houston. A simple, low-cost method of creating novel porous materials, freeze casting has uses as diverse as new batteries, solar cells, advanced filters, and biomedical implants.

In freeze casting, solid particles are dispersed in water that, when frozen, rejects them because they are not soluble. Gradually, as the ice grows, the particles bond and ultimately become locked in an irreversible solid structure. Once the mold is dried and the ice melts, the solid structure is retained.

Because porous materials are less dense and thus lighter (which is why evolution gave us porous bones), freeze casting extends to applications where weight is important, such as transportation. The technology might even be used to create lightweight building materials for an eventual outpost on the moon or Mars.

NASA uses a modified Boeing 727 to fly parabolic routes at high altitudes, creating short periods of zero gravity that simulate the weightlessness of space. Scotti led three flight teams over four days, experiencing 40 parabolas a day with 25 seconds of weightlessness during each maneuver.

She’s now collaborating with University of Illinois at Urbana-Champaign engineers to put a satellite into orbit to run freeze-casting experiments. And in 2018 Scotti will begin work on a freeze-casting experiment for the International Space Station. “If we understand how gravity affects the process of freeze casting,” she explains, “then we can understand how to better control what we’re creating on Earth and in space.”

One of Scotti’s strengths as a scientist is her “amazing capacity to synthesize a wide range of knowledge into a whole that is easy to understand and grasp,” Dunand says. “She has put hundreds of articles on freeze casting into a searchable, interactive website that users can query to achieve an overall understanding of a field that before was quite scattered.”

Her hard work has paid off. After a summer of research on campus, Scotti is continuing her studies at Northwestern, working toward a PhD in materials science and engineering at the McCormick School of Engineering and Applied Science.

—Anne Stein



With all her accomplishments, you might think that Kristen Scotti’s career in science has spanned a decade. But it’s only since the 36-year-old decided to go back to school for a bachelor’s degree that her extraordinary talents have flourished.

The gifted young scientist, who earned her degree in biology from SPS this past June, was named regional winner in the 2016 Undergraduate Awards—known as the junior Nobel Prize. Her paper on microgravity freeze casting was chosen as the highest-performing paper in the United States and Canada in the mathematics and physics category.

“She is my best undergraduate student in my 30 years working with students at MIT and Northwestern,” says Scotti’s adviser, materials science and engineering professor David Dunand. “And I’ve had some very good ones.”

## Slowly but surely

When family circumstances dictated that Scotti get a job after graduating from high school in 1999, college wasn’t part of the picture. “I wanted to go, but I had to support myself,” says Scotti, who worked a series of jobs, from circuit court clerk to paralegal to credit manager, earning promotions along the way.

But without a college degree, she was concerned about job security, so in 2011 Scotti started night classes at Harper College in Palatine, Illinois. She hadn’t planned to study science, but after enrolling in astronomy, she was hooked.

“I wasn’t exposed to science a whole lot growing up,” admits Scotti, who had taken a single science class—biology—at West Chicago Community High School. “I was pigeonholed because I was female and because I was an art student and played piano.”

Beginning with his famous debate with Khrushchev, President Richard Nixon turned the kitchen into a symbol of US freedom against Soviet totalitarianism. While Nixon thereby erased historical discrimination, Kate Baldwin (liberal studies) sees the kitchen as symptomatic of such erasure. In **The Racial Imaginary of the Cold War Kitchen: From Sokol'niki Park to Chicago's South Side** (Dartmouth, 2016), Baldwin employs Cold War-era literature, film, and photography from the US and the Soviet Union to connect issues of race, gender, and social difference across national boundaries.

**Last Lake** (Chicago, 2016), the tenth book of poems by Reginald Gibbons (literature), immerses readers in many different places and moments of intensity. Gibbons's vividly presented scenes range from a lake in the Canadian north to a Chicago neighborhood, from a horse caravan in Texas to an archaeological dig on the steppes near the Volga River. *Booklist* praised his poems' "sharp, stereoscopic vision... at once vitally attentive to the present and acutely aware of the weight of history."

Laurie Lawlor (creative writing) offers middle-school readers inspiring biographies of 20th-century trailblazers in **Super Women: Six Scientists Who Changed the World** (Holiday House, 2017). Lawlor profiles a mathematician, an ichthyologist, a cartographer, an anthropologist, a pharmacologist, and an astrophysicist who all defied prejudice to break new ground, crack glass ceilings, and advance understanding of the world in the process.

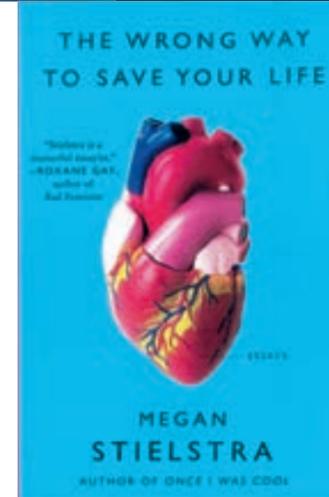
The only book of its kind, **Sports Performance Measurement and Analytics: The Science of Assessing Performance, Predicting Future Outcomes, Interpreting Statistical Models, and Evaluating the Market Value of Athletes** (Pearson, 2016) is designed to meet the growing demand for data science in college sports. A lifelong athlete, author Lorena Martin (data science) introduces performance measurement and analytics for football, soccer, baseball, basketball, and tennis. Combining applied behavioral science, quantitative methodologies, and exercise physiology, she explains how to assess athletic performance critically and interpret statistical models.



A debut collection from Colombia-born Juan Martinez (creative writing), **Best Worst American: Stories** (Small Beer, 2017) brings together 24 wide-ranging tales of displacement, exile, and identity. Martinez observes the world's wonders and horrors through characters who are often alone, unloved, and confused. *Kirkus Review* called the "semiexistential" stories a promising debut and noted that Martinez "has an interesting way of injecting absurdity into everyday life and humor into the phantasmagorical... Martinez even makes the frightening funny."



Simone Muench (creative writing) and Dean Rader, two idiosyncratic poets, unite to create a unique lyrical conversation in **Suture** (Black Lawrence, 2017), a book of sonnets. The authors collaborate not only with each other but also with the first lines of other authors' poems, suggesting the ability of language to unite us all. Putting old lines into conversation with new ones, they transform a hallowed traditional form.



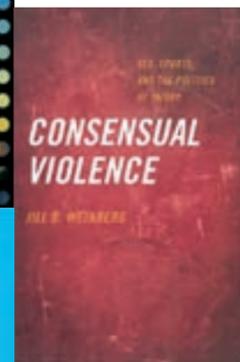
Chicago newspaper humorist George Ade's paean to late 19th-century tavern culture has been rereleased with an introduction and notes by former bartender Bill Savage (literature). **The Old-Time Saloon: Not Wet—Not Dry, Just History** (Chicago, 2016) pays homage to the saloons where gentlemen gathered for free lunches and salty conversation. Savage's thoughtful notes provide details about politics and personalities and about the relationship between the saloon, entertainment culture, and vice.



**The Virginity of Famous Men** (Bloomsbury, 2016), a collection of stories on the human condition by celebrated author Christine Sneed (creative writing), features protagonists attempting to make peace with their personal and professional choices. Long intrigued by love and loneliness, Sneed takes readers through both familiar and uncharted emotional landscapes. These stories explore the compassionate and passionate impulses that are inherent in, and often the source of, both abiding joy and serious distress.

In **The Wrong Way to Save Your Life: Essays** (HarperCollins, 2017), Megan Stielstra (creative writing) writes about warding off both personal and universal fears and striving toward a better way to live. Whether she's imagining the implications of open-carry laws on college campuses, recounting the story of going underwater on her first mortgage, or revealing the unexpected pains and joys of marriage and motherhood, Stielstra is witty, wise, warm, and achingly human.

A synthesis of criminal law and ethnography, **Consensual Violence: Sex, Sports, and the Politics of Injury** (California, 2016) takes a new approach to understanding consent. Jill Weinberg (sports administration) presents two case studies of consensual violent activities that are treated differently under criminal battery law. Noting that participants in both cases engage in a form of social decriminalization, Weinberg lays the groundwork for a sociological understanding of the process of decriminalization.



## SPS BOOKSHELF

**Beyond Blaxploitation** (Wayne State, 2016), the first book-length anthology of scholarship on blaxploitation film, fills a substantial gap in black cinematic narrative and film history. Co-edited by Gerald Butters (liberal studies), the book features canonical blaxploitation films along with others that influenced or significantly extended the movement. The 11 essays examine such topics as spectatorship, marketing, melodrama, the transition from novel to screenplay, and racial politics and identity.

Algorithmic trading is booming as theories, tools, technologies, and markets themselves rapidly evolve. Ernest Chan (data science), author of several books on quantitative trading, adds to his advice in **Machine Trading: Deploying Computer Algorithms to Conquer the Markets** (Wiley, 2017). Chan's step-by-step instruction covers the latest, easier-to-use algorithmic platforms; previously unavailable markets; and new strategies that are applicable to stocks, options, futures, currencies, and even bitcoins.

When Jim Donahugh enrolled in night classes at Northwestern in the 1970s, he had a wife, a new baby, and two jobs. It may not have seemed practical to major in English, but he knew what he was doing.

“It was a terrific confidence builder,” says Donahugh, who in the years since has risen from salesman at Madden Graphics, a printing company with 20 employees, to CEO of what became Madden Communications, a marketing company with 300 employees—and he was instrumental in the transformation.

## CLOSE-UP

But studying business never appealed to him, “even once I was running the company,” Donahugh says. “I didn’t want to treat Northwestern like a trade school.” In the ensuing decades, Donahugh remembered what he had learned from professors in those evening classes: how to think critically, how to write, how to speak. In sales calls and business negotiations, his degree put him “on an equal footing with senior management of Fortune 500 companies. I felt comfortable in my abilities.”

## Marketing Mettle Jim Donahugh

Donahugh and his wife, Debbie, have put their three daughters in “a position where they could chase their dreams but would still have to work,” he says. They’re all pursuing arts-related careers, though Donahugh himself has enjoyed the world of business: “It’s interesting and challenging, and I’ve met such a broad range of people.”

He’s also helped put 17 nieces and nephews through college and has served on the boards of several educational institutions. “I’m very proud of my association with Northwestern,” Donahugh says. He and Debbie, often seen at Wildcats sporting events, are generous contributors to the Wildcat Fund, which supports nearly 500 Northwestern student athletes in 19 sports.

—David Lewellen



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- Join us in Evanston at the annual SPS Homecoming tailgate.
- Connect with SPS graduate students and alumni at the annual SPS Symposium.
- Support SPS scholarship programs by contributing to the SPS Alumni Fund.

For more information, visit the Northwestern Alumni Association website at [alumni.northwestern.edu](http://alumni.northwestern.edu) or email [spsalumni@northwestern.edu](mailto:spsalumni@northwestern.edu).

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