

NDSU

MAGAZINE
NORTH DAKOTA STATE UNIVERSITY *spring 2016*





MUCH MORE THAN A BIG GAME

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JUSTIN EILER

NDSU

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EDITOR'S NOTE

FEBRUARY 25

February 25 was a rough day. Carson Wentz was participating in an NFL showcase, and news of his intelligence and maturity and talent was everywhere. It was also the day we learned of Scott Miller's death. One rising star, one too soon gone.

Carson embarking on an astounding career as a quarterback, just a nice young man from Bismarck making it big. Scott, who called Bison games on the radio for years and years, dying of melanoma. Even if you don't know him, you know him: "My oh my," his sincere trademark when things were going well for the team.

The emotional toll was maybe a little bit lighter, feeling that Scott was the kind of guy who would want us to savor the experience of Carson. How much our little hearts warm when yet another big-time analyst calls him the best quarterback in the draft in years. Marvels at his athletic ability, admires his humility. The governor of North Dakota is interviewed for Sports Illustrated, says "Our buttons are just popping." And the Sports Illustrated writer says: "... there's something, well, needed about a humble straight-A student (I mean, Wentz has never gotten a B in school) trying to become the state's best athletic export since Roger Maris left Fargo 62 years ago."

I can't imagine the radio voice of the Bison not loving that. I met Scott many years ago. He was kind to me, which I found amazing because I was young and didn't understand true kindness like his yet. I didn't get many chances to talk with him, but he always launched a big smile and a real hello any time we crossed paths. Fifty seven is awfully young to die.

No matter where you see those four letters,
those two colors, we are part of one identity.

This same week, we'd also mourned Jason Moszer, a 2009 NDSU graduate who served in the National Guard, became a Fargo police officer, and was killed in the line of duty, the first such death in Fargo in 134 years. Thousands of law enforcement officers from all over the United States and Canada showed their respects in a twenty-one mile long procession through town. The day was cloudy and a light snow was falling, and the miles and miles of police cars with red and blue lights silently turning was a gut-wrenching sight. Jason was only thirty three. Your heart just breaks for his family.

Seldom are the highs and lows so very stark, thank goodness. But how clearly it shows us who we are. We stand together, to celebrate a future and prop each other up in the face of loss and tragedy. What a privilege it is to share that bond with thousands of you.

APRIL 28

And as time does march on, we carry on, together.

Carson went second in the NFL draft. The buildup was like nothing we'd ever seen and there are no signs of the excitement fading any time soon.

It made me think about how many achievements go relatively unnoticed. Students at NDSU continue to discover and challenge and compete in all kinds of ways. They are, literally, making the world a better place. Curing cancer, protecting the safety of food, helping new Americans find their way here, developing inexpensive limb replacement options, and much, much more. What would we call a network devoted to coverage of these guys? The North Dakota State Amazing People Network — NDSAPN? Seems a little unwieldy, but you get the point.

And so this issue is meant to celebrate all of the wonderful people of NDSU. Beyond the astounding feat of five years at the top of a game. As wonderful and joyful and clear cut as those five wins are, they stand as the symbols of the zillions of other victories we all win every day. For the students in all of our 100-plus academic areas, for our 80,000-plus graduates, and maybe most of all for our sense of connection. No matter where you see those four letters, those two colors, we are part of one identity. It means we know about caring for each other, pushing each other to be better, grounding one another in a genuine humility, and when the time is right, hooting at the top of our lungs, in celebration.

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ndsu.edu/magazine

ON THE COVER



JON TWINGLEY is a frequent contributor to NDSU magazine, and seemed the perfect fit for an issue celebrating our connections. Like Carson Wentz, Twingley grew up in Bismarck, North Dakota, and is a proud Century High School graduate. He too has made it to the big city, a sought-after illustrator based in New York City. His work appears regularly in the New York Times, the Los Angeles Times, the Washington Post, the Chronicle of Higher Education, the Atlantic and the New Republic, among others. He earned a master of fine arts degree in illustration from the School of Visual Arts in New York City in 1998. And he has another connection with Carson Wentz. Since 2007, he's been a senior lecturer at the University of the Arts in Philadelphia.

A high-angle, wide shot of a massive crowd of people, likely at a sporting event. The majority of the crowd is wearing bright yellow hoodies and green hats, creating a sea of yellow and green. The text "INSTANT KARMA" is overlaid in the center of the image in a white, hand-drawn, blocky font. The text is arranged in two lines: "INSTANT" on the top line and "KARMA" on the bottom line. The background is a dense, textured mass of people, with some individuals in other colors like grey and black visible, but the yellow and green are the dominant colors. The overall atmosphere is one of a large-scale public gathering.

Allegiance is a curious thing. For most of my adult life I have preferred to avoid joining whomever would have me as a member. As a kid, I lasted about 18 months as a Boy Scout — didn't much like the other Scouts, liked the grownup leaders less. As for the usual sorts of personal identification with God, country, heritage, social class, race, birthplace, community ... eh. If I identify with anything, have faith in anything, it's as a writer, but if you think that qualifies as being part of a club or community or movement, you've never really known a writer.

But an imagined archaeology of my closet would reveal layers of sports loyalties: DC United soccer, Johns Hopkins University lacrosse, Baltimore Ravens football, Ohio University football, Cincinnati Stingers hockey, Cincinnati Bengals football, Cincinnati Reds baseball. I have driven 400 miles to cheer for a team in a national championship game, and 400 miles back glum over a loss, and once attended six events for six different Johns Hopkins sports in a seven-day span; one of those involved a 320-mile round trip to catch three glimpses of some cross country runners. Didn't seem odd at the time.

I know why I watch sports, beyond an appreciation of the power and grace and courage and skill of the athletes. A sporting event is one of the few places in my life where I can witness, and if I'm lucky experience, simple unalloyed joy, a burst of ecstatic happiness that transcends description, and on rare occasion a deep contentment that can last for weeks. And the opposite — do not underestimate the pleasure to be found in the deep ache of a heartbreaking loss.

So the lure of spectating is no mystery. But why do I cultivate loyalty to individual teams? Why this afternoon will I pull on a Johns Hopkins sweatshirt before I drive off to watch a lacrosse game on a gray, cold, and drizzly day? Why do I turn over a portion of my emotional equilibrium to young men who chase a ball? Why do millions of us derive a bit of cheer from glancing at a stranger and

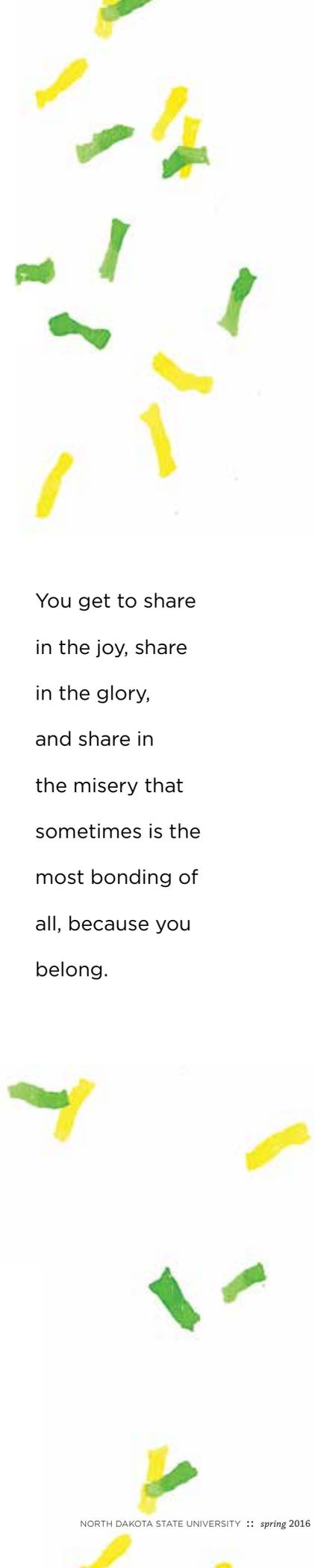
noting her baseball cap, his replica jersey, a whole family in garish team regalia?

I think it's because sport gives every one of us a chance to belong to something, even if we're moody grumps who consider "joiner" a pejorative. No matter how isolated, disaffected, disenfranchised, or alone you might feel, or might genuinely be, you can make yourself a member of a community by doing nothing more than wearing a ball cap or turning on the radio at game time. Nobody can tell you that you don't belong, that you don't fit in, that you don't have enough money or status or friends or connections. One day you declare your allegiance and that's it, you're a member in good standing and anybody who doesn't approve can take a hike. You get to share in the joy, share in the glory, and share in the misery that sometimes is the most bonding of all, because you belong. Your attendance will be noted, your vote will be counted, and you will have as much right to cheer and holler and cry as anyone else. Sometimes nothing feels better than that. Sometimes it's all you need.

So before you leave for the Fargodome, or for what has become that annual January trip to Frisco, Texas, you pull on your green-and-yellow Bison jersey. Or you pull on the hoodie, or you put on the cap, or you don all three. You do this. You do this even if you have no plans to leave the sofa that is your reserved seat for the television. You might have done this every day of the week leading up to the Jacksonville State game — you remember that one, for the fifth straight national championship? Afterwards, I bet you didn't want to take any of that stuff off because it felt so good. I live in Maryland and have only a few ties to North Dakota State, but what the hell ... Frisco 2017? Who's with me?

DALE KEIGER is editor of *Johns Hopkins Magazine* in Baltimore. He has been a Cincinnati Reds fan since age 6.

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You get to share
in the joy, share
in the glory,
and share in
the misery that
sometimes is the
most bonding of
all, because you
belong.

NATIONAL CHAMPIONSHIP ALBUM

Frisco, Texas. January 9, 2016





More photos from Frisco are online at [facebook.com/NDSU.Fargo](https://www.facebook.com/NDSU.Fargo). Under the "photos" tab, look for the albums titled "2016 National Football Championship" and "Championship Game Day."



excerpts

By all accounts, **CHRIS KLIEMAN** is the world's nicest guy. You might meet him some day away from work and never see that football coach on the sideline fighting-for-his-guys fire, and if you do get to see him in action, even when he's screaming at a ref, you imagine his harshest words are something like "gosh darn it my guys are working their tails off and you're making that bum call?" Watch one halftime interview and you quickly know he's a family man, not the sort of guy who ever complains or tries to place blame on anyone else. He's from Iowa, and he earned his bachelor's and master's degrees at Northern Iowa, but he seems to be enjoying life in Fargo, North Dakota, just fine.



It hasn't sunk in. I know I will look back 5, 10, 15, 20 years, whatever it may be and say, "Holy cow. Look at what we have done." Especially with the adversity that we faced this year when most people counted these guys out, you couldn't tell anybody in that locker room that we weren't still going to have an opportunity.

I have been here five years and we have never had a Christmas break yet, and I hope that never changes. The likelihood of us continuing to do this probably is not very good but you can't tell the guys in the locker room that.

This job is never the same. We have won five championships in a row. I was an assistant for one, I was a defensive coordinator for two, and I am the head coach for two and every year is different.

Family is my number one thing and always will be. I have a wonderful wife and three great kids at home. I think it is important for all these young athletes to see how we, as coaches, interact and treat our spouse, how we interact and love our kids.

I love parenting a girl. She is the love of my life and my sweetheart. She will always have a protective dad and about 105 guys on a football team that would always protect her if need be.

I will always battle for my guys. I love our football players and I have no problem telling them I love them.

We have unbelievable fans and we have high expectations. I would rather have high expectations where they expect winning records, to conference championships, to playoff runs to ultimately competing for national championships. I would much rather have that than to be at a place where "Boy, if we can get to be .500, what an unbelievable season we've had."

I knew full well what I was getting into when I took this job and the expectations for what had been accomplished previously, and not just by what Craig Bohl did. Craig did phenomenal things but dating back all the way into the '60s.

I have the Monday night radio show that I go on with Scotty Miller and we have had like four or five weeks where we have had just an abundance of calls. After Montana, we lost, after South Dakota, and then after Richmond, because they did not know what the Carson Wentz situation was. Those three were, because the fans want to know, what did I do here, what did we do here, and they were frustrated, and I would rather have that than to just sit on there on open air and not visit with anybody. I appreciate their passion and I appreciate the fact that they do get frustrated.

We've lost three games since I have been the head coach and all three times they have stormed the field. That is a testament to what we have built here. We lost our first game, my first game as head coach, in week nine or ten in 2014 at Northern Iowa. When they beat us, everybody rushed the field, and I was like "Ok. We've created a monster here." When we lost to Montana, it was a bigger zoo of people trying to rush the field and us just trying to get off the field because there were 25,000 people there and it was a big win for them, and I told the guys in the locker room, "Guys this is what we created, don't let one game define you. It is not the end of the season. You don't win championships in August. You win them in December and January."

Something that I have tried to instill in these guys ever since I took over is, "guys, just stay humble and stay hungry." We are going to continue to attack the process every day to give ourselves a chance to have success on Saturday. We have talked about

the complacency card here for five years and we will talk about it again next year and my feeling on that is, if somebody beats us they beat us. Don't put it on the kids to say that they were complacent. I promise you our guys are not complacent. If somebody beats us, they are better than us, and if they beat us that year or are better than us that year, I'll tip my hat to them. That's a great thing, but can somebody sustain it like we have sustained it for as long as we have? That's the sign of a program, not just a team. This is the sign that where we are at as a program, we have sustained this for quite a while now at the Division I level. There is no question that somebody is going to catch us one year, but can they sustain that year after year.

It is an easy sell for me on weekends, especially to the people who don't know much about us, because they come to Fargo thinking they are going to see nothing but dirt roads and open fields and they are just amazed by not only the vibrancy of our community but how much NDSU is a part of our community.

We are so fortunate at NDSU to be able to work, and work with, because he would never say work "for," to work with Dean Bresciani.

I have a number of parents that visit here on Saturday and I talk to them for 20 minutes to a half hour and the one thing that they say about all of our coaching staff is that it is genuine. It is not a used car salesman. A lot of times that's what recruiting can be. They look at us and say we can tell this is a genuine place and these people are genuinely good people.

MUCH MORE THAN A BIG GAME



Meet Max. He is five years old and attends preschool at NDSU's Center for Child Development. When he was only six months old, he underwent a complicated procedure to repair a congenital heart defect, and on January 6, he celebrated his "new heart birthday" with a trip to Frisco, Texas, for the championship game.

He likes to cheer "move those chains," and is a big fan of the Gold Star Marching Band. While in Frisco, some of the band students heard about this and got him a special pass to join them for their practice on the field.

His favorite instruments in the marching band are the tubas, and he does a pretty mean air tuba to demonstrate. What did he think of the whole experience? "It was fun," he says, as wise five year olds do.

Max is the son of Bobby, NDSU athletic trainer, and Nikki Knodel, a faculty member at NDSU in athletic training. He is a proud big brother to Kate, who is one.



Max Knodel with Kyle Emanuel, former NDSU player now with the San Diego Chargers.



NDSU IN THE NFL

Eight seniors get a shot

Anyone with ties to North Dakota State University, or Fargo, or Bismarck, or North Dakota, has probably heard that the Philadelphia Eagles selected North Dakota State quarterback Carson Wentz as the second overall pick of the 2016 NFL Draft on Thursday, April 28. It's kind of a big deal. Wentz is the first quarterback drafted out of NDSU and the highest-drafted non-FBS quarterback, surpassing Steve McNair (3rd in 1995), Phil Simms (7th in 1979), Joe Flacco (18th in 2008) and Ken O'Brien (24th in 1983). McNair, Simms and Flacco are all Super Bowl winners.

Prior to Wentz, three NDSU players had gone as high as the second round in the NFL Draft, including linebacker Steve Nelson in 1974 to the Patriots (34th overall), wide receiver Stacy Robinson in 1985 to the Giants (46th overall) and defensive end Phil Hansen in 1991 to the Bills (54th overall).

North Dakota State has produced NFL draft picks three straight years including in 2015 when defensive end Kyle Emanuel was drafted as a linebacker in the fifth round by the San Diego Chargers, and in 2014 when left tackle Billy Turner went in the third round to the Miami Dolphins.

Left tackle Joe Haeg was drafted in the fifth round, and half of the Bison senior class had secured NFL opportunities soon after the draft ended Saturday evening.

The Indianapolis Colts selected Haeg with the 155th overall pick, giving NDSU multiple draft picks for the eighth time in program history and the first time since 2002. He was the third NDSU player drafted by the Colts, joining running back Bruce Airheart (1965) and center Rob Hunt (2005).

Linebacker Joe Mays in 2008 was the last NDSU player drafted by the Eagles.





CARSON WENTZ
Quarterback
First round, second pick
Philadelphia Eagles



JOE HAEG
Offensive tackle
Fifth round, 155th pick
Indianapolis Colts



CJ SMITH
Cornerback
Undrafted free agent
Philadelphia Eagles



ANDREW BONNET
Fullback
Undrafted free agent
Carolina Panthers



LUCAS ALBERS
Tight end
Minicamp tryout
Arizona Cardinals



JEREMY KELLY
Offensive guard
Minicamp tryout
Atlanta Falcons



BEN LECOMPTE
Punter/kicker
Minicamp tryout
Chicago Bears, Minnesota Vikings



ZACH VRAA
Wide receiver
Minicamp tryout
Minnesota Vikings



MEANWHILE, BACK ON CAMPUS

Here's the thing about telling the story of a lively, positive, thriving university: for every great example, there are hundreds more great stories about students and faculty who are doing amazing research to help solve problems around the world, students who volunteer, students who compete in their areas of expertise and more.





Graduate students compete in Three Minute Thesis challenge

Three Minute Thesis is a competition in which graduate students are challenged to describe their research projects in a way that a general audience can appreciate in three minutes or less. Thirty four students put their business suits on and literally wowed every person in packed competition rooms. The subjects were fascinating, the research impressive, the students articulate. Research on North Dakota ground water, and Kentucky bluegrass in the Dakotas, treatments of pancreatic cancer, vascular disease in people with diabetes, integration of African refugee women into the Fargo-Moorhead community, hearing loss in rural farmers, and more, more and more.

The judges could understandably have declared a 34-part tie, but they did manage to declare **MANPREET BAINS**, who described his work in studying the link between the brain and the body's microbiome, the overall winner.

Bains graduated from high school in Rochester, Minnesota, and came to NDSU for his undergraduate degree because he thought the tuition price was right. He found the faculty helpful and had great opportunities to experience research as an undergraduate, and so enrolled next in a doctoral program. His dissertation examines the link between the brain and the microbiome, and how that might affect obesity.

... and so much more:

Engineering team excels at NASA Rover Challenge

A team of engineering students topped competition from around the world in NASA's Rover Challenge, where they maneuvered a vehicle they designed through an obstacle course simulating terrain of other planets or moons. The team took third place in the University Division and won the division's Most Improved and Technology Challenge awards. The team (pictured at right, with faculty adviser **GHODRAT KARAMI**) included **AUSTIN KARST**, **ALEXIS BARTON**, **RUPERT COOPER** and **CHRISTOPHER BENSON**.





Ben Gillis and Aaron Codden

Students present at global initiative event

Another batch of students were selected to present their ideas to a national audience at the Clinton Global Initiative in Berkeley, California. Architecture students **BEN GILLIS** and **AARON CODDEN**, for example, are developing a design proposal to create small-scale shelters in underused areas of downtown Fargo. The shelters would serve as temporary refuge for the homeless and residents in need.

Master of Public Health student **LINDSEY MONTILEAUX MABBUTT** is developing a website to help prospective students find and apply for scholarships aimed at American Indians and Alaska Natives.

Nursing students honored with awards



LEAH HERMANSON, a junior in nursing, has been named the North Dakota Student Nurse of the Year for 2015-16. "I was surprised to have been chosen, especially amongst the other worthy candidates,"

said Hermanson. "I am truly honored and humbled to have received this award." After graduation, Hermanson, who is from West Fargo, plans to work at a hospital in the Fargo area.



TAMSEN STAR O'BERRY won the "Legendary Nurse: Rising Star" award from the North Dakota Center for Nursing for her contributions to the profession, including development of a

nursing model from the cultural perspective. Her passion is serving diverse populations, including veterans with PTSD and Native American adolescents. She works as a nurse and is pursuing her doctor of nursing practice degree at NDSU Nursing at Sanford Health in Bismarck.

Grad student combines pharmacy and public health



Robert Willborn is the first student to graduate from NDSU with both a doctor of pharmacy degree and a master's degree in public health.

In the five years needed to pursue his doctor of pharmacy

degree and his master's degree in public health, he also took advantage of opportunities such as a graduate assistantship in pharmacy practice, presentations at regional and national public health and pharmacy conferences, NDSU's Three Minute Thesis competition, and publication of research in which he participated.

Willborn recently had a commentary titled "Pharmacy's Influence and Opportunities in Public Health" accepted for the student contributions section of the American Journal of Health-System Pharmacy. His research regarding diabetes and depression also was published.

"The MPH program has supplemented my pharmacy education in many ways, and will ultimately improve the care I deliver to patients in the future," he said. As part of his professional training, Willborn completed pharmacy rotations in West Fargo, Valley City, and Fargo, North Dakota, as well as in Sauk Center and Robbinsdale, Minnesota, Silver Springs, Maryland, and Rice Lake, Wisconsin.

Willborn also has his sights set on future professional opportunities. "I am setting myself up to pursue a career as a clinical pharmacist providing patient care services within a larger health care system or teaching hospital," said Willborn. "However, I would like to find a vocation in which I can utilize both my education in pharmacy and public health, which could include options such as the U.S. Public Health Service."

He is from Cambridge, Wisconsin, and completed his undergraduate degree in pharmaceutical sciences at NDSU.

National Science Foundation grants prestigious fellowships to NDSU students

Four NDSU students have been awarded fellowships from the National Science Foundation Graduate Research Fellowship Program. Through a competitive process, the program selects top students throughout the country who are pursuing research-based graduate degrees in science, technology, engineering and math fields. The students who received these prestigious fellowships are **LOREN ANDERSON**, undergraduate in mathematics; **JESSICA BAIR**, alumna in psychology; **LIZ CAMBRON**, graduate student in cellular and molecular biology; and **CODY RITT**, undergraduate in civil and environmental engineering.

Students clone tumors for personalized cancer treatments

PRAJAKTA KULKARNI and **MATTHEW CONFELD**, who are pharmaceutical sciences students, are working on a method to clone tumors, so treatment can be tested outside of a cancer patient's body. This will help find the optimal treatment and reduce side effects. Kulkarni and Confeld won first place in the service category of NDSU's annual student innovation competition.

Engineering students launch amazing businesses

ANDREW DALMAN is racking up recognition. He's been named to Forbes magazine's 30 under 30 list, which recognizes the country's best and brightest young people, and has opened many doors. Dalman was recognized for developing a patented composition for the production of 3D-printed artificial bones and for helping develop a prosthetic arm for children. He is a graduate student in mechanical engineering, and has already moved on to be CEO of a company called Advanced Bone Technology, which is focused on SimBone, a product designed to look, feel and react like human bone so users can do testing, training and development on something other than a human cadaver or animals.

Now he's been invited to Vienna for an event called the Pioneers Festival, for the top early-stage start ups around the world. "It's been a cool adventure. Going from being someone with no ambition to travel when I got into this, now I've gone to Boston, Tel Aviv, Boston again, Vienna and I'll be going to Palo Alto. It went from zero to 'Holy cats, everything happened at once.'"

COOPER BIRSCHIED was part of the group with Dalman, and has now founded a company called Protosthetics, working to commercialize the 3D prosthetic. Dalman and Bierscheid were both part of a student research team that develops new types of dental and bone implants.



Andrew Dalman



Cooper Bierscheid

"It went from zero to 'Holy cats, everything happened at once.'"

Bierscheid won first place in the product category at NDSU's annual Innovation Challenge, and he has big plans to have an impact in the world. "We want to reduce the acceptable price tag for medical devices so that they are accessible for anyone who needs them, especially in underdeveloped countries," he says. "Our team is continuing to develop new products. We are working with major

prosthetic clinics across the United States to get the devices to people who need them. Our ability to create interchangeable replacement parts allow amputees to feel comfortable wearing their device, instead of being ashamed of it, and allows them to efficiently perform their daily activities."

Faculty achievement should also be on this list.

Here are just three examples. We'd need another 100-page book to tell you all of the great stories.

Wind energy study

NILANJAN RAY CHAUDHURI has received a \$502,810 National Science Foundation award to study a system to more reliably and efficiently integrate wind energy into the grid. "North Dakota is uniquely positioned to lead the wind energy integration efforts in the nation. The proposed research is very timely and has the potential to act as a game changer in solving different energy challenges not only in the U.S., but the rest of the world."

Pancreatic cancer research

NDSU researchers **SANKU MALLIK** and **D.K. SRIVASTAVA** are receiving an NIH grant of up to \$9.62 million to establish a research center aimed at early diagnosis and treatment of pancreatic cancer. The center will support the research of three junior investigators and will help recruit other researchers interested in complementary areas of pancreatic cancer research.

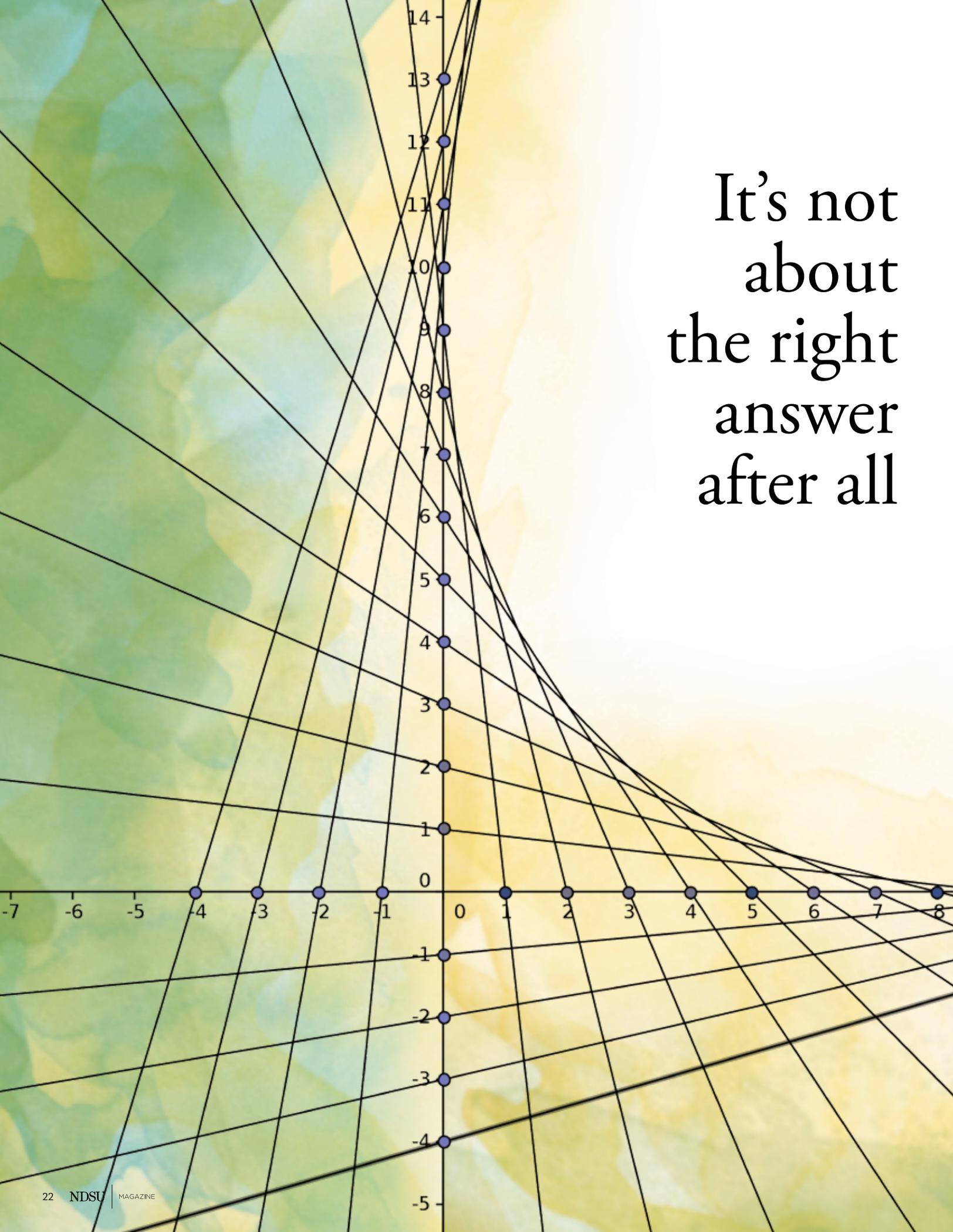
Veterans' experiences



NDSU's **CHRISTINA WEBER** received a \$201,104 grant from the National Endowment of the Humanities to help the community and state better understand what happens when soldiers return from war. The yearlong project will include creation of an oral history archive, writing and ceramics workshops for veterans and a series of public programs.



It's not
about
the right
answer
after all



A math professor walks into a second grade classroom (really, no joke.) Benton Duncan, chair of the North Dakota State University mathematics department, comes bearing strips of paper, narrow and long. He takes the two ends of a strip to make a loop. But instead of folding one end over the other to make the kind of simple loop used in a construction-paper garland, Duncan matches both outside ends, resulting in a twisted loop. It's a Mobius strip — a mathematical phenomenon with no inside or outside. The circle of 7-year-olds, a little puzzled, a little uncertain, make one themselves.

Duncan then cuts down the center line of one of the strips. Now it's a longer strip with two twists. The kids try it and then do it again, this time twisting more. Smiles, shared loops, hands in the air. "Look at mine." "It's cool." "Show me again." Next they cut the many twisted strips down the middle. "Let's see what happens now," says the professor. The kids agree to try it, curious, engaged, lots of loops, little hands. Patterns begin to emerge, and more complex questions.

This is not the elementary math class of my youth, the 1960s. That summons memories of sitting in rows of metal desks,

penciling answers on endless and repetitive worksheets, the mimeograph paper, damp and aromatic, white with sky blue numbers. Something different is happening here. There's excitement, exploring, thinking in new ways, experimenting, questioning, laughing, sharing.

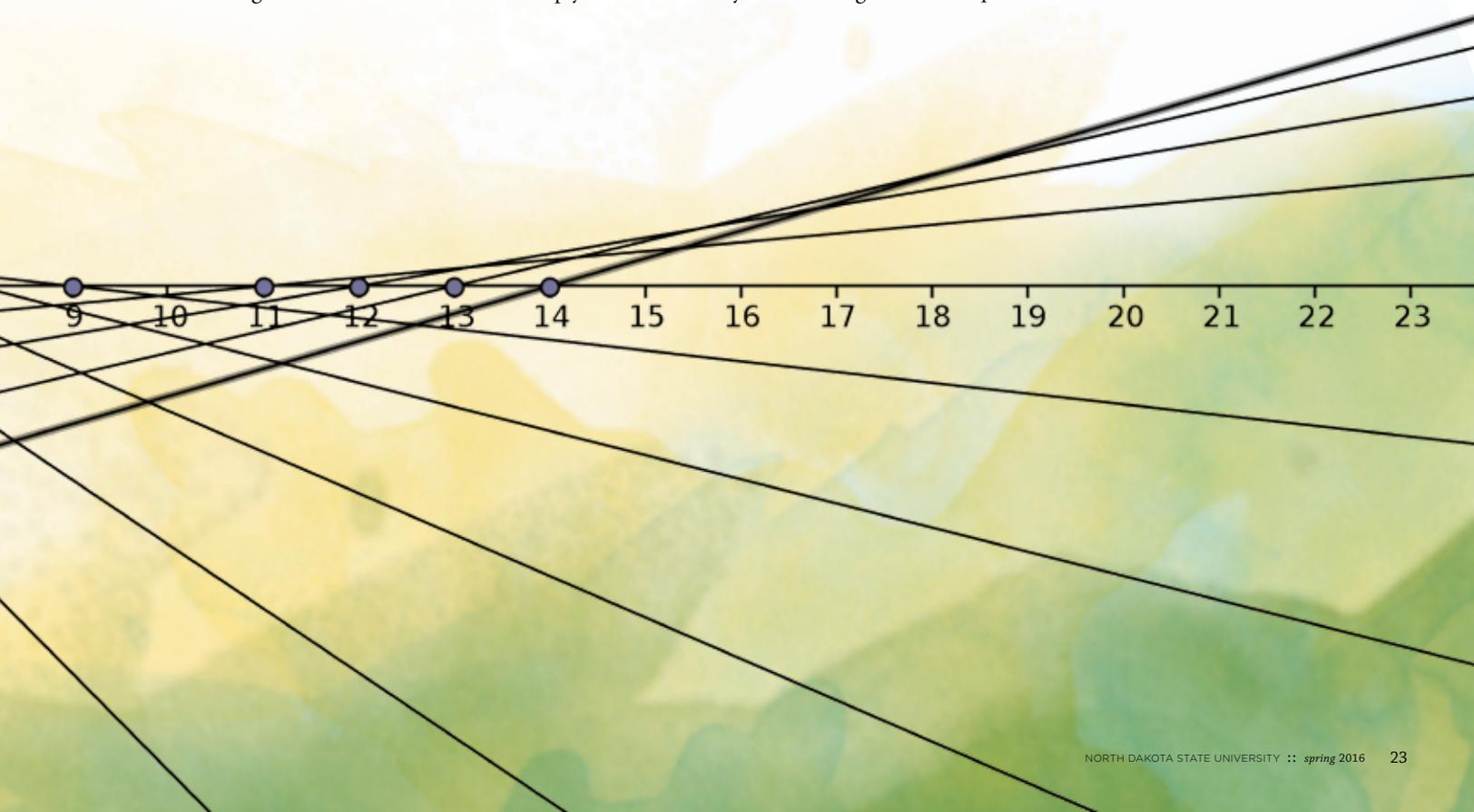
Members of the mathematics faculty at NDSU are, in fact, spending lots of time in elementary classrooms. Take Maria Alfonso, for instance. She's visited kindergarten where she asks students imagination-capturing questions: How many 5-year-olds would it take to reach the moon if everyone held hands? Or Jessica Striker who visited her own child's class one day where she and the kids counted M&Ms of different colors and discovered there were hundreds of combinations of colors and patterns possible.

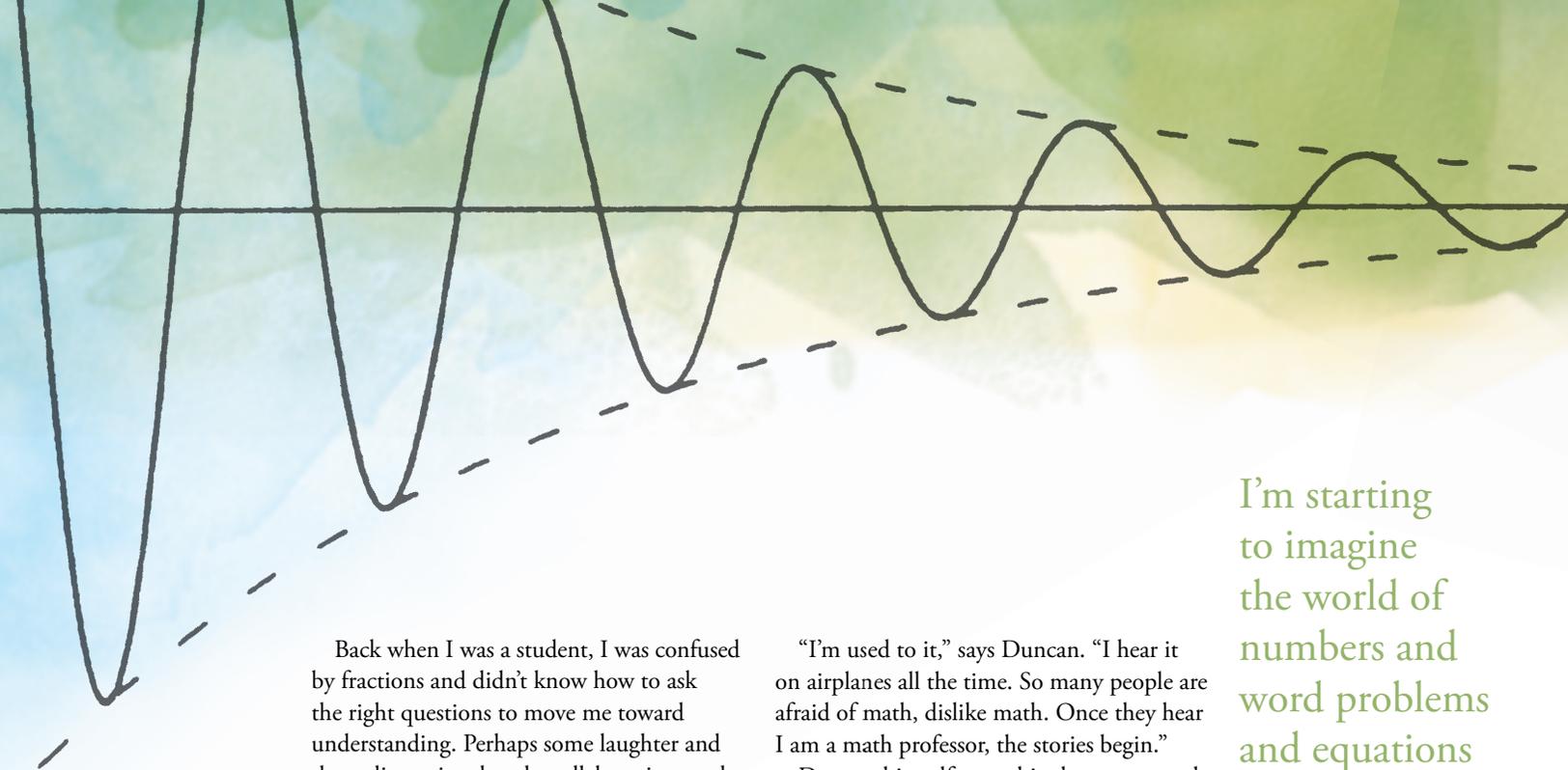
There's a good reason mathematicians are venturing off campus. They understand mathematics not only as a tool that can be fun. They understand it as the tool that allows us to think deeply about the world around us. Duncan and his colleagues want the world to benefit from more people who have those kinds of mathematical skills. "It's simply not about what you're learning this

year in math class," says Duncan. "It's not even about adding, subtracting, multiplying or dividing. It's about where you can be, the kind of thinker you will become, if you stick with it, keep learning, keep accumulating math skills."

That's worth a whole lot of M&Ms and Mobius strips and lines of kindergarteners that reach the moon. As Duncan sees it, everything exciting about the future is about the thinking skills kids learn in math: space travel, global communication in a digital world, politics, environmental issues. "All innovation," he says, "all invention and new thinking will come from thinkers who are literate in math."

Research shows that by the third grade a student's relationship with math is solidified — and it's very difficult to change that trajectory. Unlike other academic subjects, math education is absolutely cumulative. It builds on itself, year after year, concept after concept. If students miss one major concept, say fractions, for instance, they are almost certain to fall behind and not catch up, not ever. In fact, missing key concepts, by fourth grade, means learning nothing at all in subsequent math courses.





Back when I was a student, I was confused by fractions and didn't know how to ask the right questions to move me toward understanding. Perhaps some laughter and three-dimensional tools, collaboration, and discussion would have helped. I still feel a certain anxiety when faced with percentages. As I talked to Duncan, I began to have a different sense of my "math allergy" as I have called it over these decades of numerical apology and shame.

Indeed, many people suffer from what John Allen Paulos, a Temple University math professor and author, calls innumeracy — the math equivalent of not being able to read. On national tests, nearly two-thirds of fourth graders and eighth graders were not proficient in math. More than half of U.S. fourth graders taking the 2013 National Assessment of Educational Progress could not accurately read the temperature on a neatly drawn thermometer. And adulthood does not alleviate our quantitative deficiency, Paulos reports. A 2012 study comparing 16- to 65-year-olds in 20 countries found that Americans ranked in the bottom five in general numeracy.

I'm a freelance writer, a poet, and a therapist. My lack of math skill has become, by mid-life, a part of my identity. In college, I chose programs that did not require college algebra: political science, English. Eventually, I entered a master's program in clinical counseling that required a course in statistics. Thanks to helpful fellow students and a generous and understanding instructor, I passed, barely. Now I understand that my professional fate likely had its roots in early elementary school, my career path, in part, sculpted by fourth grade.

"I'm used to it," says Duncan. "I hear it on airplanes all the time. So many people are afraid of math, dislike math. Once they hear I am a math professor, the stories begin."

Duncan himself spent his elementary and high school years in southern California. "Back then I wanted to be everything," he says, "an architect, a city planner, a writer." He majored in astrophysics at New Mexico Tech and soon discovered that you could choose math as a profession without having to be a high school teacher, something he didn't see himself doing. "I was honestly looking for a cheap college education that was "mathy," says Duncan. Next came a master's and Ph.D. from the University of Nebraska and a yearlong commitment to NDSU that has turned into eleven years and counting, tenure, and the department chairmanship.

Duncan sees mathematical illiteracy as a symptom of our education system's approach to math education — teaching that too often focuses on finding a specific answer rather than on how to think about complex questions. "When early math learning is reduced to an answer-seeking exercise," says Duncan, "it's easy for students to get lost in the symbols and formulae and leave all meaning behind, to fall behind and stop learning." Those students become adults on airplanes who hate math, fear math, feel math incompetent. And they are.

Math as a way of thinking and exploring and inventing isn't part of math class until college sophomore or junior curriculum. "Then we finally get to the good stuff," says Duncan, "math as a tool that leads to innovation and invention, new ideas and new theories and new solutions."

I'm starting to imagine the world of numbers and word problems and equations anew, as something alive somewhere that could be exciting and rewarding to explore.



Students who make it through higher-level high school math, advanced algebra, calculus, physics, and to the second year of college almost always had a teacher somewhere in their early educational biography who loved math, could teach concepts and transfer their love of math — and the possibilities that math opens up to their students. “Sadly,” says Duncan, “the reverse is true, too. For people who don’t like math, there is often a teacher in their history who empathized with their math struggles instead of offering support and sympathy.”

While we tend to think of empathy as a good thing, in this sense empathy sounds like: “I know math is difficult. I don’t like it either.” Students need math sympathy which sounds like: “This is difficult and you can do it. Just stick with it. Here’s another way to look at it.”

Duncan wants more math teachers who can sympathize and teach through students’ struggles, who can model their own love of math and belief in math as a powerful way to think and affect the world.

Games and video games can be part of that, hands-on experiments, M&Ms and trips to the moon. “I’m fine with the gamifying of education,” says Duncan. “I’m in favor of anything that keeps building students’ math skills and supports them reaching years 14 and 15 (sophomore and junior years of college) of their math education, where knowing math concepts really changes how you can think about everything.”

In a Washington Post article, educational writer Moriah Balingit says, “Everything around you is a combination of the arts and some form of math, technology and engineering.” Duncan agrees. Math is that

fundamental to understanding the world and creating a better future.

Duncan’s commitment and passion about the possibilities within the mysteries of math, have gotten me thinking. I’m starting to imagine the world of numbers and word problems and equations anew, as something alive somewhere that could be exciting and rewarding to explore. And suddenly I see that people who work at NASA and in Silicon Valley are just like me, except for one thing: They learned math, they likely love math, and they know how to use it to explore and expand the world we share.

The elementary school visits by Duncan and his colleagues may be the largest endeavor of its kind locally, but nationally and globally, efforts to increase math skills among children have been growing since at least 1998 when the Mathematics of Science, Art, Industry, and Culture began sponsoring a series of interdisciplinary mini-conferences and festivals highlighting and celebrating mathematical connections in the different fields. “What we’re doing is not new,” says Duncan. “Larger more organized versions exist around the world.” Still the NDSU math department is doing its part.

Duncan’s concerns around kids and math and the future do not include the international race in test scores. “I’m not moved by all the press that says students in China and other countries are ahead of American kids in math,” says Duncan. “They might be ahead in the kind of education that makes math about seeking the right answer to a problem, but that’s not what math means to me. And it’s not the kind of math that is going to change the world. I’m interested in the kind of thinking

that math competency creates, the kind of thinking that leads to a cultural willingness to go deeper, to think about knowledge and beliefs in ways that create new knowledge, innovation, and possibility.”

In fact, the brightest possible future will include kids all over the world learning that kind of thinking. Solving the big problems we share with all our fellow earth dwellers — water issues, food insecurity, environmental issues, space exploration, robotics role in the future, privacy, and more — depends on it.

So how about a mathematician for president? “Absolutely,” says Duncan. “In math you can’t get away with sloppy thinking. I want the people in charge to think clearly, logically, critically, creatively, and originally. That’s math.”

CAROL KAPAUN RATCHENSKI is a counselor in private practice in Fargo, a fiction writer, poet and storyteller. A North Dakota native and graduate of NDSU, she also is on the North Dakota Humanities Council board of directors.

STEM building opens

The STEM Classroom and Lab Building is the first of its kind at NDSU and in North Dakota. The concept breaks from the tradition of an academic building belonging to a particular discipline or department. It is a student-focused structure made up entirely of classrooms, labs and study areas, with an emphasis on science, technology, engineering and mathematics courses. It is designed for flexibility, interdisciplinary collaboration and teaching innovation.





9
classrooms

13
collaborative work
and study spaces

23
labs



5,000
students can
use the building daily

119,505
square feet

Johnsrud awarded honorary degree

Myron D. Johnsrud was awarded an Honorary Doctorate of Agriculture at spring commencement. Johnsrud, a Watford City, North Dakota, area native, received a bachelor's degree in agricultural mechanization from NDSU in 1957 and began his tenure with the NDSU Cooperative Extension Service in 1965 as an assistant county agent in Williams County. He took study leave to complete master's and doctorate degrees at the University of Wisconsin, then returned to NDSU in 1969 as director of personnel and program development for the Extension Service.

In 1971, he went to Washington, D.C., as director of staff development for Extension Service USDA. He returned to NDSU in 1973 as associate director of Extension and became director the following year. Johnsrud remained as NDSU Extension director until 1986, when he returned to Washington, D.C., as administrator for the Extension Service USDA, a position he held for more than seven years. He then joined the National Association of State Universities and Land-Grant Colleges, where he served as director of Extension and outreach. He retired in 2002, concluding a 37-year career in Extension.

He served on the National 4-H Council's board of trustees from 1985 to 1993. In 1990, at the end



of the Cold War era, he was commissioned by the secretary of agriculture to establish the first major adult education program in Poland on managing a business in a market-driven economy.

Among the many awards

Johnsrud has received are the Meritorious Executive Award from President George H.W. Bush, induction into the International Adult and Continuing Education and National 4-H Halls of Fame, NDSU Alumni Achievement Award, NDSU Harvest Bowl Agribusiness Award and Epsilon Sigma Phi National Distinguished Service Ruby Award.

"Dr. Johnsrud had an exceptional career in leading Extension at NDSU and nationally at the U.S. Department of Agriculture and the National Association of State Universities and Land-Grant Colleges," wrote nominators Chris Boerboom, NDSU Extension Service director, and Ken Grafton, vice president, dean and director of agricultural affairs. "The impacts of his leadership are present with us today."



Spring commencement

Visit the NDSU Facebook page to see photos, stories and videos, or visit the NDSU app.



Friendly barista contributes to supportive community at NDSU

LaVon Whipple learned compassion from her mother, an elementary school teacher. She learned patience as a stay-at-home mom of two boys. She learned perseverance and persistence from her husband as he battled cancer. But by all accounts, she was born with radiant positive energy.

She has a great smile, and clearly gets great enjoyment from helping other people.

As the barista at NDSU's Barry Hall Coffee Shop, she is the first face people see when they come through the door.

Her passion to make friends and take care of people at Barry Hall extends to her student coworkers. She often attends NDSU events to support international students who don't have family in Fargo. She's also had a few coworkers over for holiday meals when they are unable to make it home.

During this winter's commencement, Whipple weaved her way through a crowded hallway to congratulate College of Business students on a job well done. She beamed with pride as she headed back down the hall to find her seat for the ceremony. Her students appreciated the gesture. "She's the friendliest person I've ever met — not just at NDSU — but, in my entire life," NDSU graduate Peter Turner said.

Whipple is an active member of the campus community. She volunteers to direct traffic on move-in day and helps serve a late-night breakfast at the Residence Dining Center during finals week. "I have the best job ever," she says with a huge grin. "I love it at NDSU."

To read class notes and obituaries, and to submit information, visit [ndsu.edu/classnotes](https://www.ndsu.edu/classnotes).

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JUSTIN EILER

POWWOW NDSU was the host institution for the 27th Annual Woodlands and High Plains Traditional Powwow in April, in collaboration with Concordia College, M-State and Minnesota State University Moorhead. The theme this year was “Educate. Empower. Continue the Legacy!” More than 200 dancers and 1,500 spectators from the region, including visitors from tribes such as the Hidatsa, Lakota, Mandan, Arikara, Sac and Fox, and Chippewa Nations, attended. “A traditional powwow is a time to celebrate and renew friendships,” said Jered Pigeon, NDSU powwow committee chair. “In addition, this powwow celebrates the educational success of area American Indians in higher education and the sharing of tribal cultures.”