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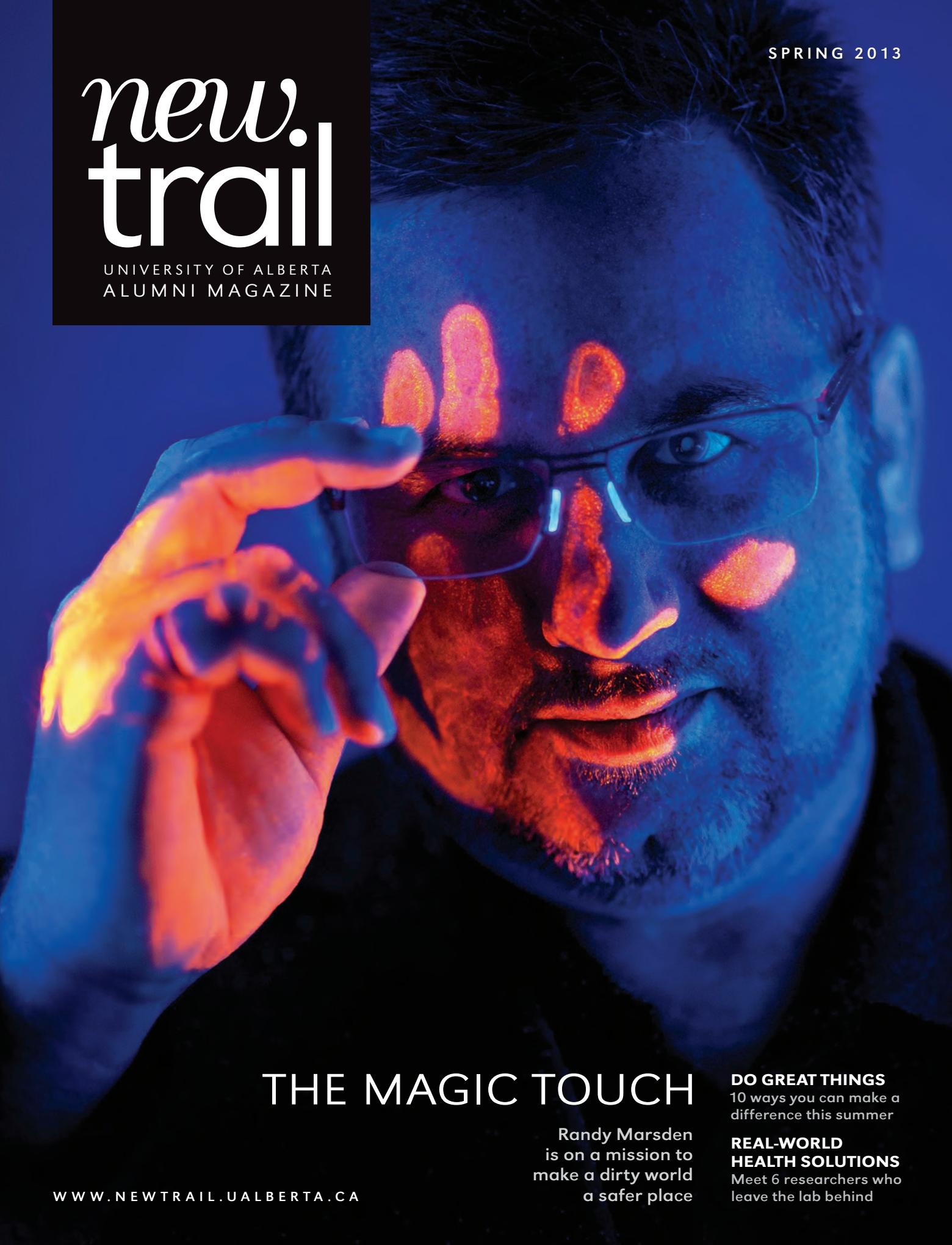

THE MAGIC TOUCH

Randy Marsden is on a mission to make a dirty world a safer place

DO GREAT THINGS
10 ways you can make a difference this summer

REAL-WORLD HEALTH SOLUTIONS
Meet 6 researchers who leave the lab behind

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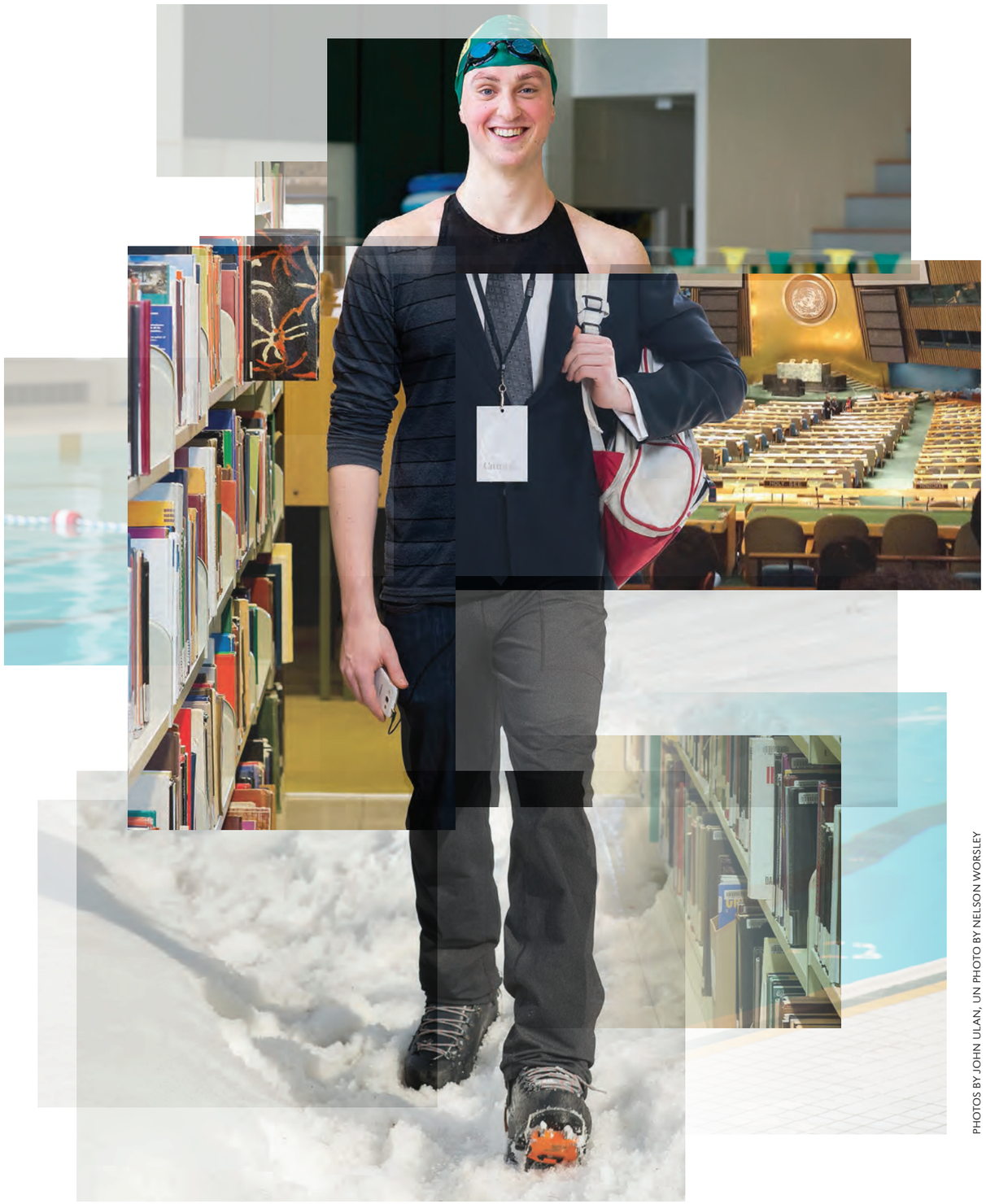


PHOTOS BY JOHN ULAN, UN PHOTO BY NELSON WORSLEY

BUILDING a better Undergrad

by OMAR MOUALLEM | photos by JOHN ULAN

Gone are the days when undergrads spent four years stuck in lecture halls. The 21st-century student publishes in journals, travels the globe and then does volunteer work at home. Meet the global citizens headed into the real world armed with so much more than a degree.

It's no longer enough for undergraduate students to just attend classes and study hard. Students like Justin Selner pack a variety of interests and experiences into their undergraduate years.

A WEEK AFTER TONSIL SURGERY, 16-year-old Justin Selner was at home holding a bowl under his mouth to catch the blood. It was gushing, he was choking, and his mother, a recent nursing grad, was panicking. She drove him to a St. Albert hospital where, he recalls, "I'm getting an IV in both arms and a doctor and five nurses are working on me."

After the anesthetic wore off, he awoke in the back of an ambulance. "We're rushing you to the University hospital," said a paramedic.

The University of Alberta is where Selner was always headed, but not so soon and definitely not under these circumstances. A competitive swimmer who'd competed internationally and once dreamed of the Olympics, he was just months from becoming a Golden Bear varsity athlete. After losing four litres of blood and 14 kilograms, he spent the next year and a half recovering.

"My goals never changed," says Selner, who will graduate with a BA(Hons) this spring, "but my body changed. Mentally I was still committed, but the physical reality didn't match that." Stroke after stroke, he saw teammates' hands touch the wall before his. It would take him a year and a half to merely match his old lap times. "It was hard to watch."

Today, he's wrapping up an honours political science degree, but at the time he didn't even have a major. As he puts it, "I was the athlete-student, not the student-athlete." For Selner, an admitted overachiever, his education had to match the demands of his swimming, which would seem impossible for someone who was in the water more times a week than there are days. But through the U of A, he found a way to make his undergrad experience work at his pace.

Balancing "feather boards" and the Board of Governors, Frank Robinson can attest to the life-changing possibilities of a positive undergraduate experience.

Last summer alone, the student-led non-profit Golden Future sent him to South Africa to assist teachers with promoting health and post-secondary education, just before the U of A Go Abroad program set him up with an internship at The Protection Project, a D.C.-based think-tank on human trafficking. Then, after attending a UN conference on discrimination against women, he returned to Edmonton to finish his self-directed research on how the BRICS (Brazil, Russia, India, China and South Africa) may offer growth opportunities across Africa, a project for which he received a $5,000 grant from the Undergraduate Research Initiative. In March, he received the Lou Hyndman Edmonton Glenora Award—$20,000 over two years—for outstanding leadership, high academic standing and involvement in university or community organizations.

And somewhere in between he climbed Mount Kilimanjaro.

A generation ago, undergraduate students with a modicum of Selner's stamina would be left to search out their own opportunities. To research, travel abroad and intern in your field—before graduation—was almost unheard of. Now, as a result of the Students' Union and University's efforts, undergrads are graduating more confident and more experienced than ever.

Undergrad Revolution

There has been a quiet proliferation of literature on campus and, though far from Marxist, it *is* changing the way students think about the redistribution of educational wealth.

From the anthropology department's *Diversipede* to PoliSci's *The Agora*, these undergrad research journals are written, published and peer-reviewed by students like Selner. There was no institutional effort behind them, says **Crystal Snyder,** '10 MSc, research co-ordinator for the Undergraduate Research Initiative. She's seen them simply crop up over the last few years.

The URI, however, took eight years of championing before its 2011 launch with a $200,000 investment. What started as a Students' Union idea got a little bit of help from the Office of the Dean of Students and CaPS U of A Career Centre, and now offers students grants to do research—not for grades, but in the pure pursuit of new knowledge. Each applicant just needs a quality proposal that is interdisciplinary and will contribute to the student's own knowledge and skills, plus a faculty supervisor. Sometimes, URI simply acts as matchmaker between undergraduates and professors looking for extra help on current research.

Andrea Budac used a $5,000 URI grant to help Dr. Sean Gouglas's team understand the attachment video game players have to their avatars, the user's graphical representation in the game. The URI stipend supported her last 12 months of coding and analyzing how players of the popular video game *Mass Effect* reacted to the introduction of the game's first heroine. Once completed, Budac, a computer science major set to graduate in 2014, hopes to see her name in a cultural studies journal and improve her chances of getting into a master's program. But she's already benefitting: "Getting the URI showed me research could be easier than I thought."

Snyder sees URI as more than a bridge to graduate school. "They're developing skills that are relevant to their discipline. They're meeting people. They're getting outside the classroom and seeing all the possibilities of what they can do with their degree," she says. "We're very focused on having students get the most out of their undergraduate experience."

Though URI is unique in Alberta, the experience-focused revolution in undergrad studies is happening across North America. Some trace the impetus to the 1998 Boyer Commission report by the former U.S. commissioner of education, which suggested undergraduate education was failing its baccalaureate students. Completed shortly after Ernest L. Boyer's death, *Reinventing Undergraduate Education: A Blueprint for America's Research Universities,* accused academia of caring more about credentials than experience, being too pedagogical and turning the freshman year into a "repetition of high school curriculum."

> ***"Students can actually stop just being passive learners—writing notes and memorizing for the exam—and begin generating knowledge."***
>
> *—Frank Robinson, vice-provost and dean of students*

It was especially critical of research institutions, suggesting they had the habit of championing their professors while simultaneously refusing undergraduates access to them. "If those challenges are not met," the report read, "undergraduates can be denied the kind of education they have a right to expect at a research university, an education that, while providing the essential features of general education, also introduces them to inquiry-based learning."

Removing the barriers between baccalaureates and doctorates, Boyer believed, could only strengthen schools. Frank Robinson, vice-provost and dean of students, sees it that way, too.

THE NEW UNDERGRAD GLOSSARY

Gone are the days of long registration lines and sleepy lecture halls. Undergrads these days need a whole new vocabulary to make it through to graduation day.

BEAR TRACKS The online portal that allows you to conduct business with the University of Alberta. Applicants can track their application, and students can sign up for classes.

BLENDED LEARNING Combines the best parts of face-to-face and online learning practices.

DIDACTIC LEARNING Thought of as a traditional classroom approach, this style of teaching is often equated with rote learning. The university is encouraging instructors to move away from using only this style of teaching in the classroom.

E-CLASS The online portal through which students can interact with instructors for the duration of the course. Students can download lecture notes, get supplementary materials, receive and submit assignments, and take quizzes.

EXPERIENTIAL LEARNING Gives students the opportunity to learn through hands-on practice.

FLIPPED CLASSROOM This model allows the students to read the lecture notes online before the class. This enhances student engagement and makes the student a more active participant during the lecture.

PEER-BASED LEARNING Students with common interests work together and learn from each other. In this case, the instructor fulfils the role of moderator and facilitator.

PROBLEM-BASED LEARNING Students are presented with a problem to solve, rather than a lecture or assignment. The idea is that they learn better by actively solving the problem.

"We sometimes apologize that we are a research-intensive university," he says, "and I'm sick and tired of that because there are advantages for students being here. One of them is that students can actually stop just being passive learners—writing notes and memorizing for the exam—and begin generating knowledge."

If it wasn't for undergraduate research, Robinson doesn't think he'd have a degree, let alone a fifth-floor corner office on the campus of one of the world's top schools. As a young man at the University of Saskatchewan, he was ready to drop out by the third year of his studies until an animal science behaviour class changed his mind. "I spent the whole semester looking at chickens in cages, seeing whether they would avoid looking another chicken in the eyeball if they were a dominant or subordinate chicken." Not only did it get him his first A, but it led to his life's work: "I'm a chicken gynecologist by training."

As a professor he's not abandoning pure lecture-style learning, but he does emphasize research and hands-on experience to his first- and second-year students. One student, Josh Perryman, was not counting on the latter. The shy 19-year-old panicked when he learned about "There's a Heifer in Your Tank," the professor's popular course that turns research about agriculture into a theatrical performance before a public audience of 400.

"I spent the first class on my iPad ... trying to find another class I could take instead," says Perryman. "But staying in the class was one of the best decisions I've made. Getting to do that research and making those contacts outside of university really helps get a feel for other paths that I could take in this field." (See sidebar on page 27 for more on the class.)

Indeed, removing the uncertainty that haunts students from the day they enrol to the day they start the job hunt is a huge feat. From the moment they don their robes and shake hands with the university president, they're anxious to know whether the next hand they're shaking will be connected to a suit or a paper hat. And who could blame them? According to global management firm McKinsey & Company, only 45 per cent of employed university graduates felt adequately prepared for their careers. Sadly, even fewer employers thought the graduates came to them adequately prepared. The survey results are even stranger when you note that almost three-quarters of educators believed they were adequately preparing students. Have academics been living in their own bubble?

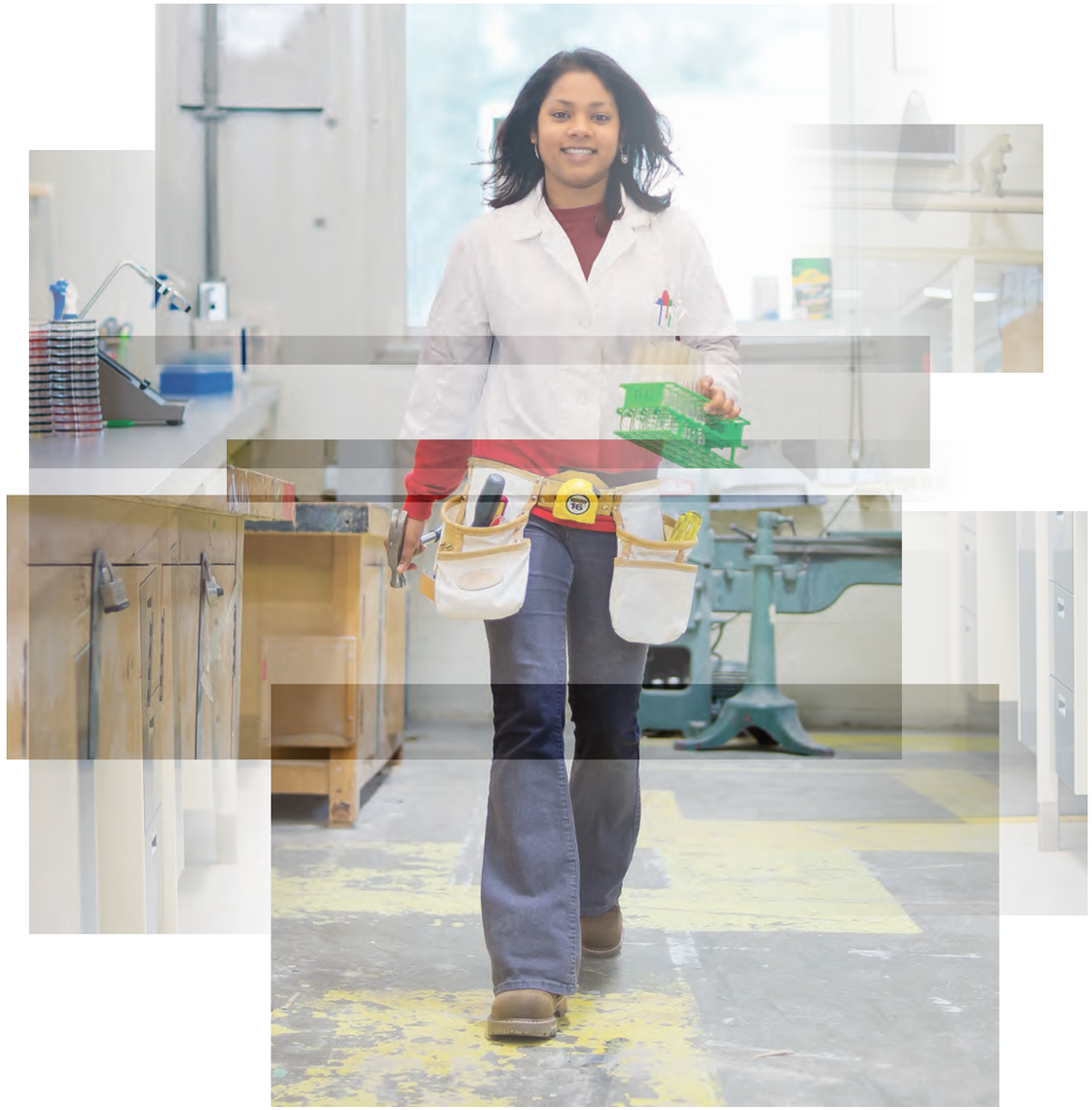
Moving toward exceptional

A linguistics graduate, **Chelsey Nazar**, '03 BA, has one word for her U of A baccalaureate experience: "unexceptional."

"It was nothing more than attending classes and passing exams," she says. "We never experienced anything first-hand." Nazar believes she could have done just as well by studying the textbooks and only showing up for mid-terms. Whether or not she's right, her opinion is echoed by thousands of Canadian graduates each year. But in the past decade, universities have started responding to their grievances.

Though untimely for Nazar, the same year she graduated the U of A launched the Community Service Learning program for students like her, who were seeking more first-hand experiences. The CSL matches students' coursework with volunteer work for credit, so the students, communities and non-profits all stand to benefit.

Pat Conrad is the executive director of SKILLS, a 30-year-old Edmonton-based non-profit that finds meaningful ways for disabled people to participate in their communities. When a colleague told Conrad about CSL in 2004, she jumped at the opportunities it offered. For more than 20 years, U of A students had completed practicums at SKILLS, but the Nonprofit Board Internship Program—offered by CaPs and CSL—was a chance to bring fresh minds to the group's elected body. Not only did they bring new knowledge to the board, but Conrad says they also helped hold it accountable. "We have really good ideas about things we want to do, but critical issues and other stuff get in the way, and we don't fulfil some of what we hoped we would," she says. "But the students' presence pushed us to stay on path with projects that were really meaningful."



Arisha Seeras's experience repairing houses in Mexico helped place her lab work and coursework into context.

New Horizons in Health Care

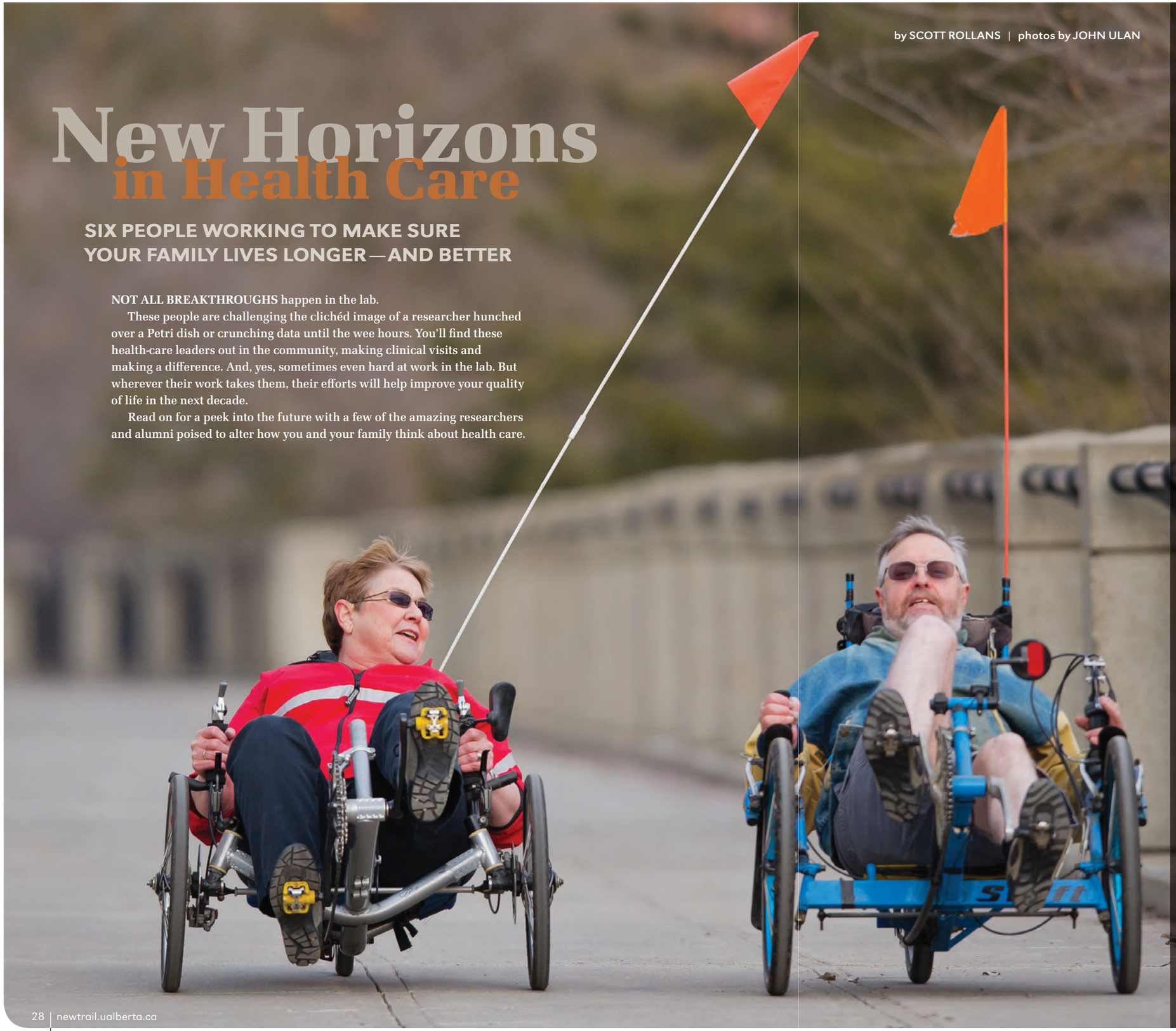
SIX PEOPLE WORKING TO MAKE SURE YOUR FAMILY LIVES LONGER—AND BETTER

by SCOTT ROLLANS | photos by JOHN ULAN

NOT ALL BREAKTHROUGHS happen in the lab.

These people are challenging the clichéd image of a researcher hunched over a Petri dish or crunching data until the wee hours. You'll find these health-care leaders out in the community, making clinical visits and making a difference. And, yes, sometimes even hard at work in the lab. But wherever their work takes them, their efforts will help improve your quality of life in the next decade.

Read on for a peek into the future with a few of the amazing researchers and alumni poised to alter how you and your family think about health care.



AGING POPULATION

Sharon Anderson
'10 MSc Health Promotion

CURRENT POSITION: PHD STUDENT WITH RESEARCH ON AGING, POLICIES AND PRACTICE IN THE FACULTY OF AGRICULTURAL, LIFE & ENVIRONMENTAL SCIENCES **FIELD:** COMMUNITY LIVING AFTER STROKE **WHY SHE'S ONE TO WATCH:** SHE EXPANDS OUR UNDERSTANDING OF PERSONAL RELATIONSHIPS IN REHABILITATION AND QUALITY OF LIFE. SHE RECENTLY RECEIVED A QUEEN ELIZABETH II GRADUATE SCHOLARSHIP.

IN 1997, SHARON ANDERSON AND HER HUSBAND, JOHN, HAD A STROKE.

The event itself occurred in John's brain, but it transformed them both as a couple. It also drastically rerouted Sharon's career path. She left her job as a dental hygienist and headed back to school, eager to expand on her own experience in a marriage affected by stroke. She earned two master's degrees—one at the University of Calgary and one at the U of A. Now she's working on a PhD, studying the experiences of other couples who have survived strokes, and how their relationships affected their recoveries.

When John suffered his stroke, at age 46, the prognosis was grim, recalls Sharon. "The neurologist told me to put him in a nursing home. I said that wasn't an option."

Instead, Sharon brought her husband home and hired private therapists. Within a month, John had improved enough to be accepted into a rehabilitation program. Today, he maintains his own website, *stroke-survivors.org*.

The couple's effort not only improved their quality of life, it spared the health-care system an estimated $73,000 per year for care in a nursing home, says Sharon.

"My husband is now 15 years out of stroke. If you look at the cost of keeping him in a nursing home for 15 years, that's a lot of money."

Anderson is delving into the experiences of couples in a similar situation. "What happens in that couple's relationship to help the stroke survivor get better, or to keep the couple together?" she wonders. Existing data already show stroke survivors in stable relationships recover better and require significantly less long-term care. Anderson's findings could maximize the benefits enjoyed by stroke patients in relationships, while finding ways to provide better community support for all.

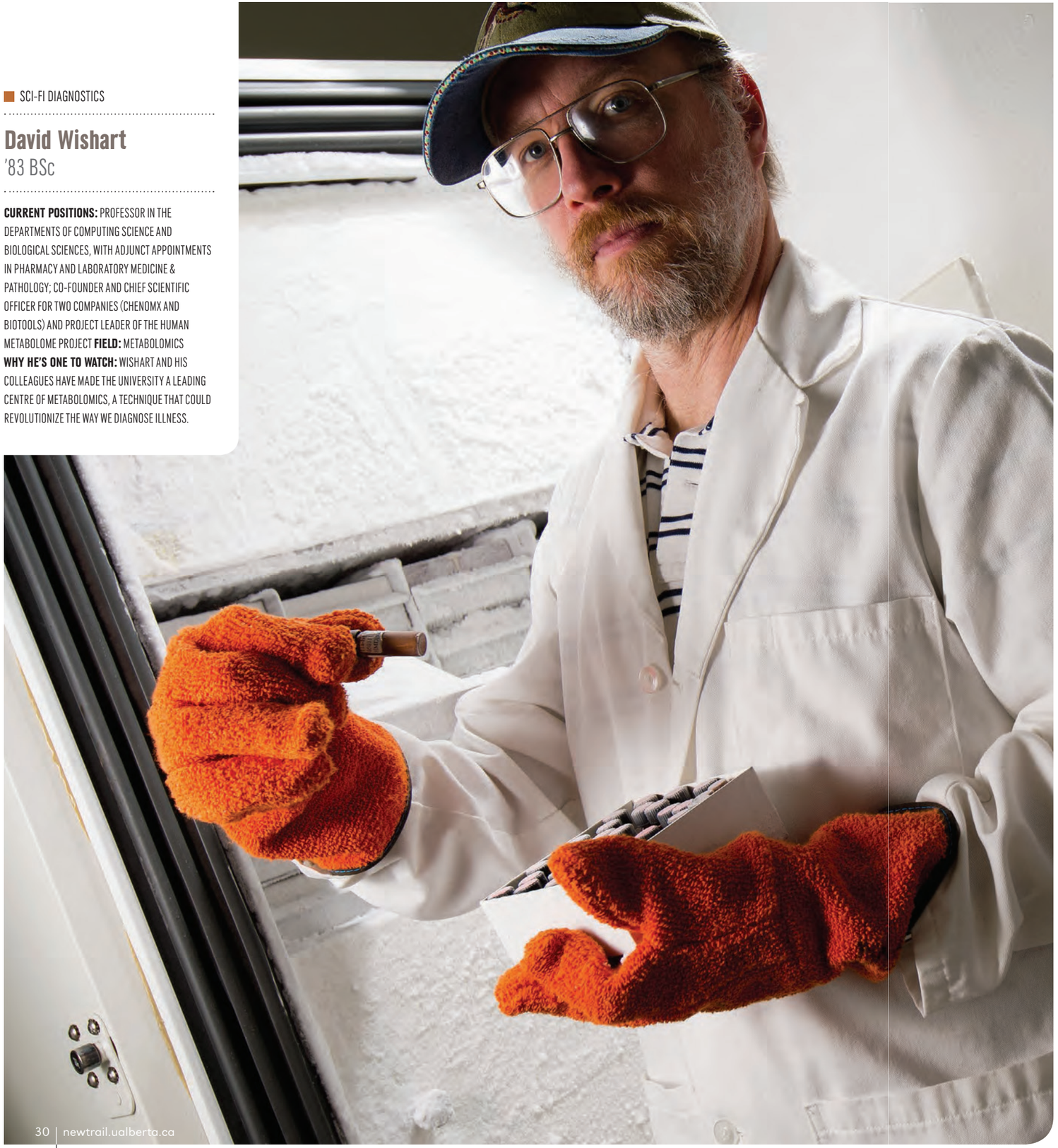
Anderson is particularly excited to be working with Norah Keating, U of A professor of human ecology, who is helping her explore medical questions from a holistic perspective.

She also continues to look forward to her shared future with John. "When people refer to me as a caregiver, I say, no—I'm my husband's wife." —*Scott Rollans*

SCI-FI DIAGNOSTICS

David Wishart
'83 BSc

CURRENT POSITIONS: PROFESSOR IN THE DEPARTMENTS OF COMPUTING SCIENCE AND BIOLOGICAL SCIENCES, WITH ADJUNCT APPOINTMENTS IN PHARMACY AND LABORATORY MEDICINE & PATHOLOGY; CO-FOUNDER AND CHIEF SCIENTIFIC OFFICER FOR TWO COMPANIES (CHENOMX AND BIOTOOLS) AND PROJECT LEADER OF THE HUMAN METABOLOME PROJECT **FIELD:** METABOLOMICS **WHY HE'S ONE TO WATCH:** WISHART AND HIS COLLEAGUES HAVE MADE THE UNIVERSITY A LEADING CENTRE OF METABOLOMICS, A TECHNIQUE THAT COULD REVOLUTIONIZE THE WAY WE DIAGNOSE ILLNESS.



"Remember Star Trek and the 'Tricorder?' Well, metabolomics is going to allow everyone to have their own tricorder in the next 10 years."

CHANCES ARE YOU'VE NEVER HEARD THE WORD METABOLOMICS (pronounced metabo-LOH-mics) but it just might revolutionize medical diagnostics around the world—and the U of A stands at the global epicentre of this emerging field.

"It's clinical chemistry on steroids," explains David Wishart, project leader for the U of A's Human Metabolome Project. Metabolomics seeks to identify and catalogue every chemical we produce in our bodies, and to look for the patterns that correspond to various illnesses and conditions. Instead of looking for one or two compounds—for example, blood glucose—metabolomics measures hundreds or even thousands of compounds all at once.

By doing so, metabolomics vastly expands the amount of information that we can derive from a single tissue or fluid sample, says Wishart. "In the past, it was like looking at the world through a keyhole. But now, we can look at the world through a picture window."

In other words, metabolomics allows diagnosticians to see the big picture. "Blood glucose tells you if you have diabetes or not," explains Wishart. "But there's a whole bunch of other compounds that can tell you how bad the diabetes is, whether it's going to progress, or even if you're going to get diabetes."

That kind of detail opens the door to personalized health care. "You can actually have a metabolic profile that could be used to diagnose, or predict, or prognosticate, or assess the risk for a whole bunch of different conditions." Eventually, Wishart hopes, a urine sample could be as useful a diagnostic tool as a Star Trek tricorder (if not quite as sexy).

The Human Metabolome Project, launched by Wishart's lab in 2005, has catalogued about 40,000 different chemicals found in the human body. Although the project hasn't yet made its way into everyday medical practice, that day is definitely coming. Several companies, including three in Edmonton, have already started developing specific tests based on the data, including one for pre-colon cancer and another for HIV.

Meanwhile, the U of A's Human Metabolome Project database is accessed by millions around the globe every year. It just might be time for a new sign on Gateway Boulevard: "Welcome to Edmonton—City of Metabolomics." —*SR*

100 YEARS OF INNOVATION

University of Alberta researchers and alumni have been contributing to the field of health care for the past 100 years. As the Faculty of Medicine & Dentistry celebrates its 100th anniversary, we share a few highlights from the 20th century. For a complete faculty history and to learn about 100 years of medicine celebrations, visit *med100uofa.ca*.

100 YEARS OF MEDICINE

During the First World War, U of A faculty member **ALLAN C. RANKIN** helped identify and develop treatments for trench fever, meningitis, typhoid and malaria. He later went on to become the first appointed dean of the medical school.

In 1922, **J.B. COLLIP,** '24 PhD, '26 MD, '46 LLD(Hon), joined a University of Toronto research team looking to find a way to treat diabetes. Collip was tasked with extracting and refining a pure form of insulin from a pancreas. The team was successful and won the Nobel Prize for their work in 1923.

In the 1950s, **THEODORE (TEDDY) AARON,** '39 BSc, '42 MD, was the first person in Alberta to administer penicillin, and the first person in Western Canada to do Rh blood typing to ensure compatibility for blood transfusions. Aaron conducted clinical studies on the use of antihistamines that led to these becoming universal cold remedies. In 2012, he received a Distinguished Alumni Award.

JOHN CALLAGHAN performed the first successful open-heart surgery in Canada in 1956 at the University of Alberta Hospital. His team saved the life of a 10-year-old girl, Suzanne Beattie.

In 1982, **PATRICK DOYLE,** '47 BSc, '49 MD, performed the first cochlear implant surgery in Canada, enabling a young woman who had been totally deaf to hear environmental sounds, understand speech and talk on the telephone. He is a 1995 Distinguished Alumni Award winner.

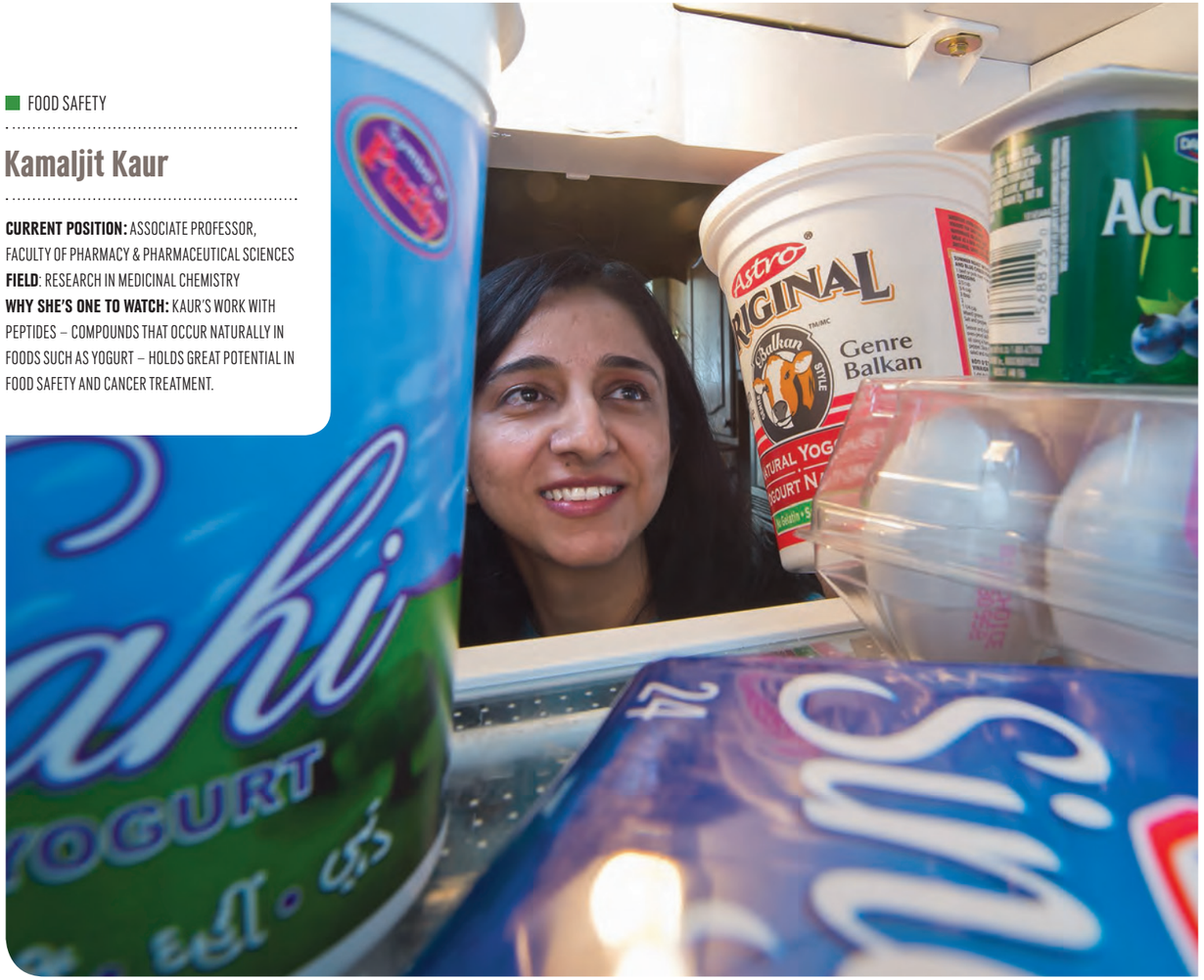
D. LORNE J. TYRRELL, '64 BSc, '68 MD, led the team that developed the world's first oral antiviral drug for the treatment of hepatitis B in 1986. Tyrrell and his team discovered the anti-viral properties of the compound lamivudine, which was licensed as Heptovir in 1998 as the first drug treatment for chronic hepatitis B carriers.

At the end of the 20th century, **JAMES SHAPIRO,** '01 PhD, led the team that developed a landmark treatment for Type 1 diabetes that became known around the world as the Edmonton Protocol.

FOOD SAFETY

Kamaljit Kaur

CURRENT POSITION: ASSOCIATE PROFESSOR, FACULTY OF PHARMACY & PHARMACEUTICAL SCIENCES
FIELD: RESEARCH IN MEDICINAL CHEMISTRY
WHY SHE'S ONE TO WATCH: KAUR'S WORK WITH PEPTIDES – COMPOUNDS THAT OCCUR NATURALLY IN FOODS SUCH AS YOGURT – HOLDS GREAT POTENTIAL IN FOOD SAFETY AND CANCER TREATMENT.



WHEN KAMALJIT KAUR CONTEMPLATES A CONTAINER OF YOGURT, SHE SEES MUCH MORE THAN A TOPPING FOR HER MORNING GRANOLA. The lactic acid bacteria in yogurt produce peptides, compounds that lie at the very centre of her research. "These peptides are very friendly to humans," she says.

In fact, they're more than just friendly. Those peptides, it turns out, are very effective in killing pathogenic bacteria, like listeria, a foodborne illness that can cause serious infections. By harnessing the power of peptides, Kaur and her colleagues could potentially banish listeria from our food industry, along with other deadly microbes such as *E. coli* and salmonella.

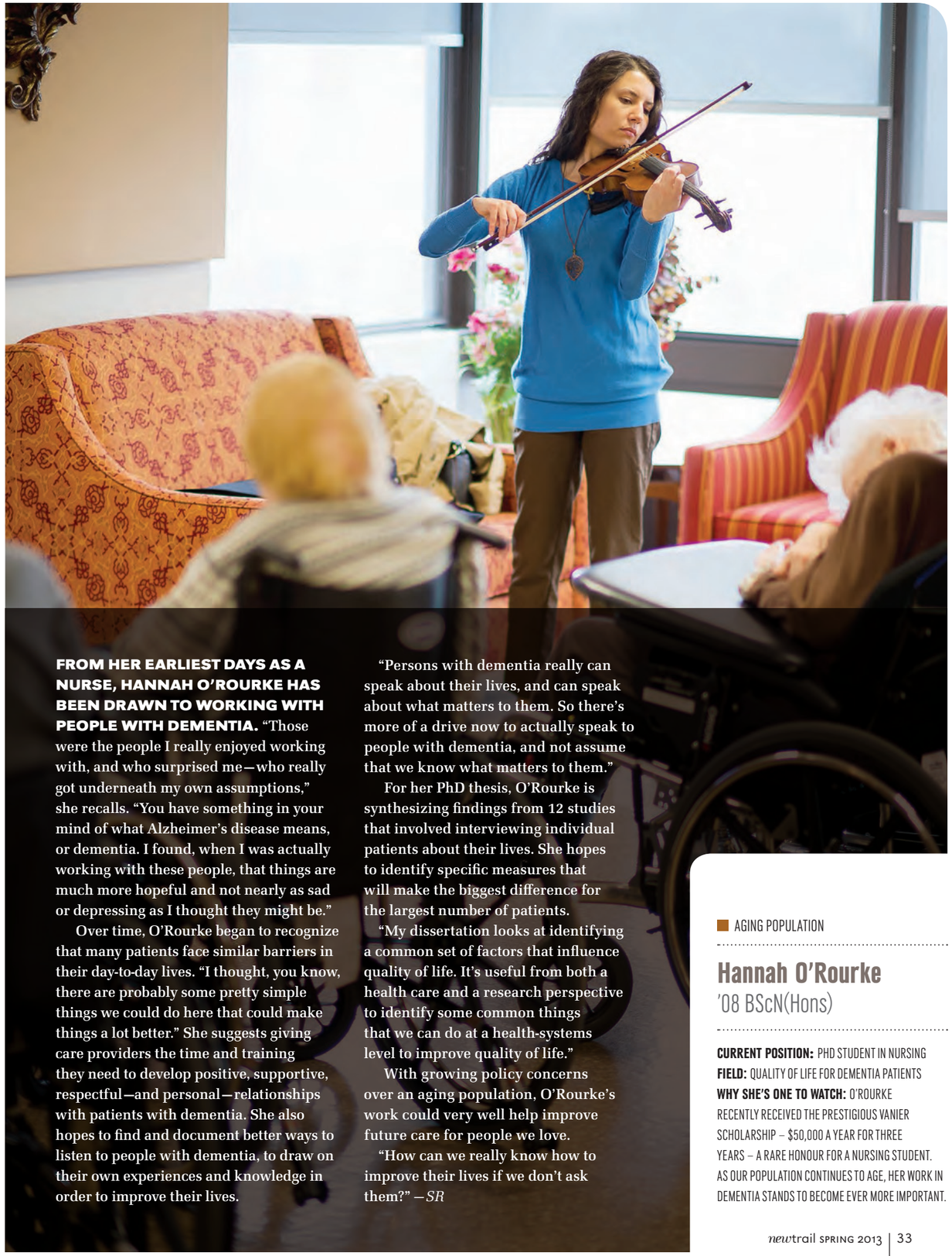
Because they are derived from food sources, these antimicrobial peptides, also known as bacteriocins, could provide industry with a much healthier way to fight pathogens. "Current practices use a lot of chemical preservatives and conventional antibiotics," Kaur explains.

Kaur's work earned her $495,000 in funding from the Food Safety Research and Innovation Program, with the support of Alberta Innovates Bio Solutions and the Alberta Livestock and Meat Agency. During a three-year research project, Kaur and her colleagues hope to develop new methods for mass-producing these bacteriocins.

The project teams Kaur with longtime colleagues David Wishart, Computing and Biological Sciences; Lynn McMullen, Agricultural, Food and Nutritional Science; and industrial partner CanBiocin Inc. (See page 30 for more on Wishart's research.)

Kaur has another major research area also focusing on peptides—using them to target cancer cells, including breast cancer. "That's equally exciting," she says modestly, "but this grant is mainly for our antimicrobial work."

Above all, Kaur is grateful for the atmosphere of support and collaboration at the U of A. "The funding makes it possible for our team to pursue our ideas," she says. "These peptides are very promising, and they haven't been explored to the extent they should have been." —*SR*



AGING POPULATION

Hannah O'Rourke
'08 BScN(Hons)

CURRENT POSITION: PHD STUDENT IN NURSING
FIELD: QUALITY OF LIFE FOR DEMENTIA PATIENTS
WHY SHE'S ONE TO WATCH: O'ROURKE RECENTLY RECEIVED THE PRESTIGIOUS VANIER SCHOLARSHIP – $50,000 A YEAR FOR THREE YEARS – A RARE HONOUR FOR A NURSING STUDENT. AS OUR POPULATION CONTINUES TO AGE, HER WORK IN DEMENTIA STANDS TO BECOME EVER MORE IMPORTANT.

FROM HER EARLIEST DAYS AS A NURSE, HANNAH O'ROURKE HAS BEEN DRAWN TO WORKING WITH PEOPLE WITH DEMENTIA. "Those were the people I really enjoyed working with, and who surprised me—who really got underneath my own assumptions," she recalls. "You have something in your mind of what Alzheimer's disease means, or dementia. I found, when I was actually working with these people, that things are much more hopeful and not nearly as sad or depressing as I thought they might be."

Over time, O'Rourke began to recognize that many patients face similar barriers in their day-to-day lives. "I thought, you know, there are probably some pretty simple things we could do here that could make things a lot better." She suggests giving care providers the time and training they need to develop positive, supportive, respectful—and personal—relationships with patients with dementia. She also hopes to find and document better ways to listen to people with dementia, to draw on their own experiences and knowledge in order to improve their lives.

"Persons with dementia really can speak about their lives, and can speak about what matters to them. So there's more of a drive now to actually speak to people with dementia, and not assume that we know what matters to them."

For her PhD thesis, O'Rourke is synthesizing findings from 12 studies that involved interviewing individual patients about their lives. She hopes to identify specific measures that will make the biggest difference for the largest number of patients.

"My dissertation looks at identifying a common set of factors that influence quality of life. It's useful from both a health care and a research perspective to identify some common things that we can do at a health-systems level to improve quality of life."

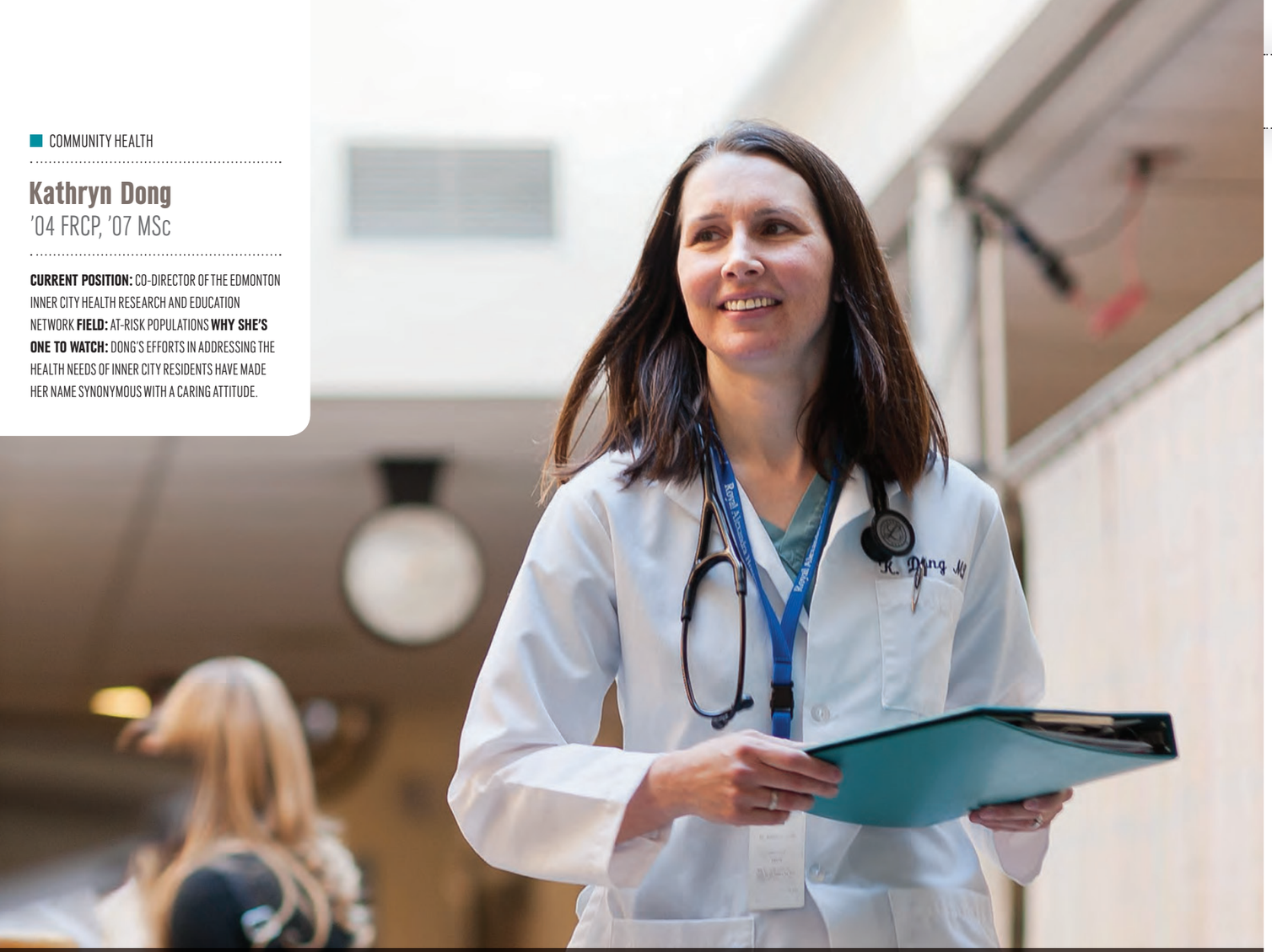
With growing policy concerns over an aging population, O'Rourke's work could very well help improve future care for people we love.

"How can we really know how to improve their lives if we don't ask them?" —*SR*

COMMUNITY HEALTH

Kathryn Dong
'04 FRCP, '07 MSc

CURRENT POSITION: CO-DIRECTOR OF THE EDMONTON INNER CITY HEALTH RESEARCH AND EDUCATION NETWORK **FIELD:** AT-RISK POPULATIONS **WHY SHE'S ONE TO WATCH:** DONG'S EFFORTS IN ADDRESSING THE HEALTH NEEDS OF INNER CITY RESIDENTS HAVE MADE HER NAME SYNONYMOUS WITH A CARING ATTITUDE.



"THIS IS MY CALLING," SAYS KATHRYN DONG. Based at the Royal Alexandra Hospital in Edmonton, she champions the needs of those people who live on nothing, with nothing, and who often turn to drugs and alcohol for escape and release.

For these people, a visit to the hospital is often an overwhelming and intimidating last resort, says Dong, who has worked at the Royal Alexandra Hospital since 2004. She came to the U of A specifically for its first-rate residency program. She followed that with a master's in population health.

"I think, regardless of what I might have done in medicine, I would have ended up working in this field," she says, cradling her third son in her lap.

"Addiction is a disease. Just as I may treat a person with diabetes who comes into emergency, I see addiction and alcoholism in the same way."

In 2009, she and her colleagues launched a survey to find out how satisfied at-risk inner city residents were with the care they were getting from their local hospital.

"We did not really know if we were meeting their needs, nor did we understand fully the underlying causes contributing to their health issues."

The results of this survey are still being analyzed. "We still need to figure out where the gaps are, exactly, and the community will tell us how best to address them." says Dong.

Her dream is to make the hospital a welcoming place for inner city residents and ensure it provides compassionate and more holistic care that not only deals with patients' acute issues, but also helps to improve the social determinants of their health, such as housing and social supports.

"I feel very connected and feel like this is exactly what I should be doing," she says. —*Wanda Vivequin*

SOLVING THE WORLD'S HEALTH CHALLENGES

UNIVERSITY OF ALBERTA RESEARCH HAS IMPLICATIONS FAR BEYOND PROVINCIAL BORDERS. SEVEN U OF A RESEARCHERS HAVE RECEIVED RISING STARS IN GLOBAL HEALTH AWARDS FROM GRAND CHALLENGES CANADA.

The $100,000 Phase I award supports innovators who offer solutions to global health conditions—especially ideas that will have a large impact in developing nations. Award recipients must take an integrated, innovative approach, which means the health solution incorporates scientific or technological, social and business innovations. Meet the U of A's Rising Stars.

AMAN ULLAH

Assistant professor, Department of Agricultural, Food and Nutritional Science

Project: Filters from feathers

The aim of this project is to create cost-effective, reusable and biodegradable filters from poultry feathers and use them to remove arsenic from contaminated drinking water. Arsenic poisoning affects 140 million people worldwide, particularly in developing countries where poultry feathers can serve as a cheap raw material.

KARIM DAMJI

Professor of Ophthalmology

Project: Preventing Blindness in Sub-Saharan Africa

Glaucoma is the leading cause of irreversible blindness worldwide, and sub-Saharan Africa is the hardest hit. Both adults and children are affected. Damji was awarded a grant for his plan to care for the disease in order to prevent blindness. His four-point plan includes awareness programs, early detection and treatment–especially in rural areas through the use of "telemedicine"–training subspecialists who can work in teaching hospitals, and creating centres of excellence for subspecialty practice.

RATMIR DERDA

Assistant professor of chemistry, Faculty of Science

Project: Paper-based diagnostic tool

Derda's team is working on a paper-based diagnostics device that doesn't use power, so it can be stored at room temperature–important in countries where resources are limited. The cells grow in paper just as they do in a culture dish, so tests can be conducted on-site to diagnose diseases like malaria, HIV or TB.

ABDULLAH SALEH, '10 MD

ICChange

Project: Kibera Medical Records Initiative

Saleh proposes to develop and implement a standardized patient medical record system in Kibera, one of Africa's largest slums. This improves patient care and resource use, but will also allow clinics and health institutions to track illness geographically, ultimately allowing for better prevention and treatment of outbreaks and targeted interventions.

JULIANNE GIBBS-DAVIS

Assistant professor of chemistry, Faculty of Science

Project: Affordable TB detection

Gibbs-Davis's team developed a system to amplify and detect unique DNA sequences associated with a host of infectious bacteria like TB and malaria. They are working on implementing this system in a DNA test that can be conducted cheaply and easily to accurately diagnose active TB, including drug-resistant forms of the disease.

MICHAEL SERPE

Assistant professor of analytical chemistry, Faculty of Science

Project: Prevention of disease overtreatment in developing countries

In developing countries, lives are sometimes lost unnecessarily because people receive treatment for a disease they don't actually have. Serpe proposes designing an easy-to-use diagnostic tool that requires no infrastructure and identifies multiple biomarkers for one disease. This makes the test results more reliable, and helps prevent costly and potentially deadly overtreatment.

STEPHANIE YANOW

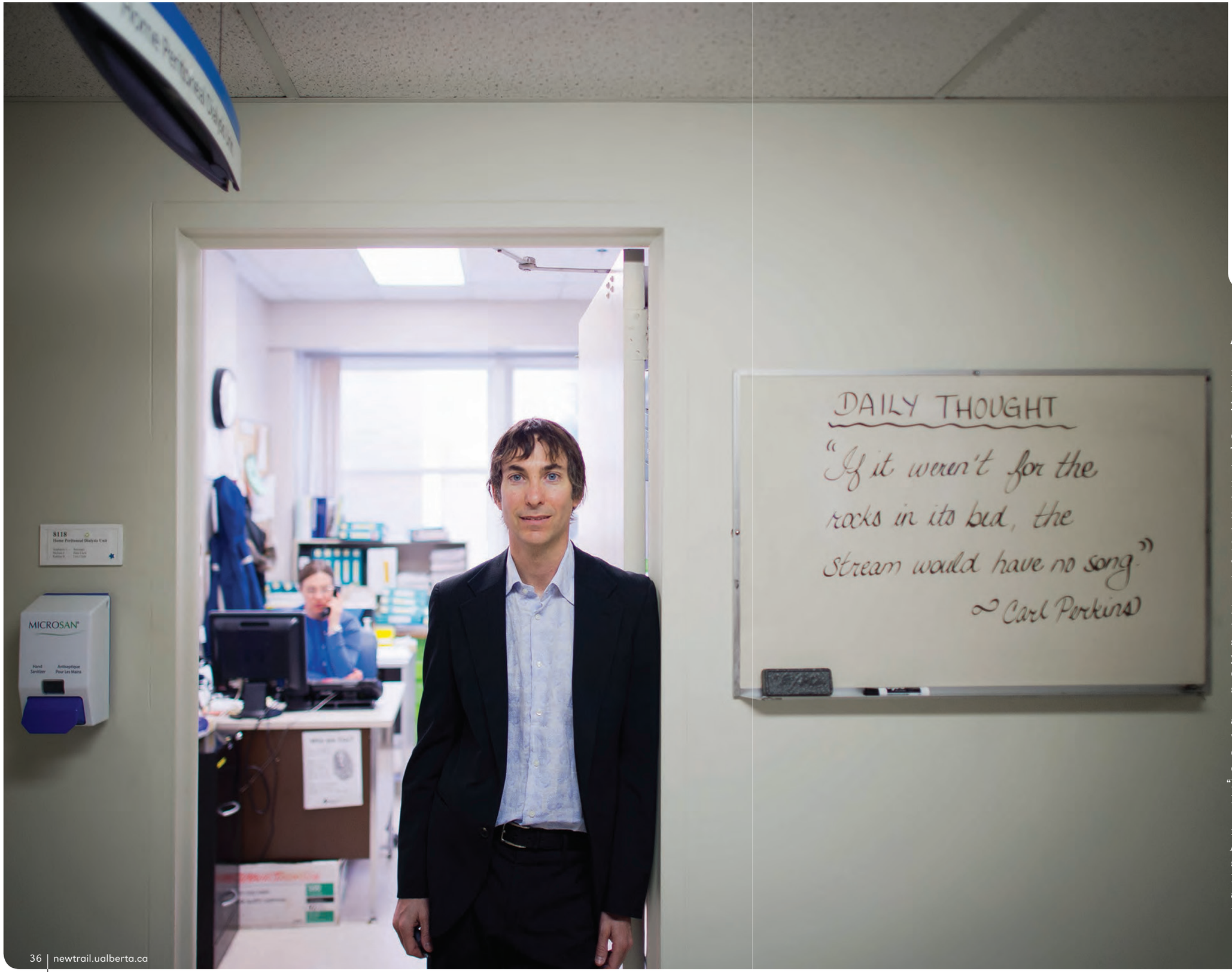
Assistant professor, School of Public Health, and program leader, Provincial Laboratory for Public Health

Project: Bringing the lab to the village

Yanow's team is working to bring disease detection to rural villages in Africa. A health-care worker collects a blood sample and tests it on a chip that contains special gels – each designed to test for a different disease: malaria, dengue fever, the flu, etc. When a patient's blood is added to the chip, it is absorbed into the gel. The chip is run in a mobile instrument that tests for the DNA of each organism. If that organism is present in the blood, the gel will light up and a health-care worker on-site can have a result without needing a lab.

Editor's note: At press time, two more U of A researchers received Grand Challenge grants: John Davis, working on rapid and non-invasive breath sensors for diagnosing diseases; and Darryl Adamko, who hopes to improve the diagnosis of respiratory disorders through urine tests.

For more information, visit *grandchallenges.ca.*



KIDNEY DISEASE

Marcello Tonelli

CURRENT POSITION: CANADA RESEARCH CHAIR IN OPTIMAL CARE OF PEOPLE WITH CHRONIC KIDNEY DISEASE **FIELD:** CARE DELIVERY AND QUALITY OF HEALTH CARE **WHY HE'S ONE TO WATCH:** KIDNEY DISEASE AFFECTS MORE THAN TWO MILLION CANADIANS. TONELLI IS ONE OF CANADA'S TOP EXPERTS IN IDENTIFYING KIDNEY PATIENTS AT GREATEST RISK, AND IN PARTNERING WITH HEALTH POLICY-MAKERS TO GET PATIENTS THE MOST EFFECTIVE CARE POSSIBLE.

MOST PEOPLE NEEDN'T LIE AWAKE AT NIGHT WORRYING ABOUT KIDNEY DISEASE, SAYS MARCELLO TONELLI. But if you have high blood pressure, diabetes or a family history of kidney disease, Tonelli wants you and your doctor to be aware of the stakes.

"People with kidney failure have very poor quality of life and they are very likely to die," Tonelli says. "But, fortunately, there are effective treatments available that prevent the kidneys from failing. The major focus of my work is to try to figure out which patients are at highest risk, and what treatments we can use to reduce that risk and improve their outcomes. I'm also looking at how we can make the health system work better, to deliver those treatments in a way that's easy for them to take."

Currently, Tonelli is focusing on a relatively low-tech strategy. "We're returning to an older test, for detecting protein in the urine," he says. "With a very simple and cheap urine test, you can discriminate between someone who is only at slightly greater-than-average risk, and someone who's at a very high risk."

With research partners throughout Alberta and around the world, Tonelli has his hand in a wide range of initiatives. "We meet every week or more by teleconference, and we're talking on the phone several times a day," he says. "Honestly, it's one of the best things about my job. I get to work with such a great group of people."

Tonelli also works to see that same approach reflected in patient care. "Policy-makers in Alberta are quite interested and engaged," he says. "Whether that's Alberta Health or Alberta Health Services or other organizations—people are willing to share their priorities. That helps us to do research that matters." —*SR*

by SARAH LIGON | photos by JOHN ULAN

The Keys to Life

WHY RANDY MARSDEN IS THE MOST IMPORTANT INVENTOR YOU'VE NEVER HEARD OF

On February 5, 2012, **Gil Allan,** '82 BEd, visited his father in the recovery ward of an Edmonton hospital. Allan was relieved to see his dad, Bud Dahlseide, looking in such good colour and spirits after a month-long hospital stay to remove the defibrillator in his chest and replace it with a pacemaker. They went down to the food court for ice cream, where Dahlseide joked with the staff. "Everyone's expectation was that he was fine and real soon would be going home," remembers Allan. "But when I was putting him to bed, he said, 'You know, I feel funny. I feel like I have the flu coming on.' "

Somewhere in the hospital's corridors, Dahlseide had come into contact with *Clostridium difficile*, or *C. difficile,* one of the strains of antibiotic-resistant bacteria known as "superbugs." Once the bacteria entered Dahlseide's body, they found their way to his colon, multiplying and releasing toxins that caused severe diarrhea and bloating. Within four days, his kidneys had shut down. "On Feb. 5, he was my dad, he was completely himself," remembers Allan. "Four days later he was dead."

What happened to Bud Dahlseide is tragic but increasingly common. Hospital-acquired infections, including *C. difficile,* are the No. 4 cause of death in North America, behind cancer, heart disease and stroke. Every year, more than 220,000 Canadians will acquire an infection while in hospital, and at least 8,000 of them will die. The numbers are even more staggering in the United States, where 1.7 million people will become infected and nearly 99,000 will die.

"The problem with bacteria is you can't see it," says Randy Marsden, who has invented a technology that makes it harder for deadly bacteria to lurk in hospital rooms. He hopes to make a dent in hospital-acquired infections, a leading cause of death in North America.

question period

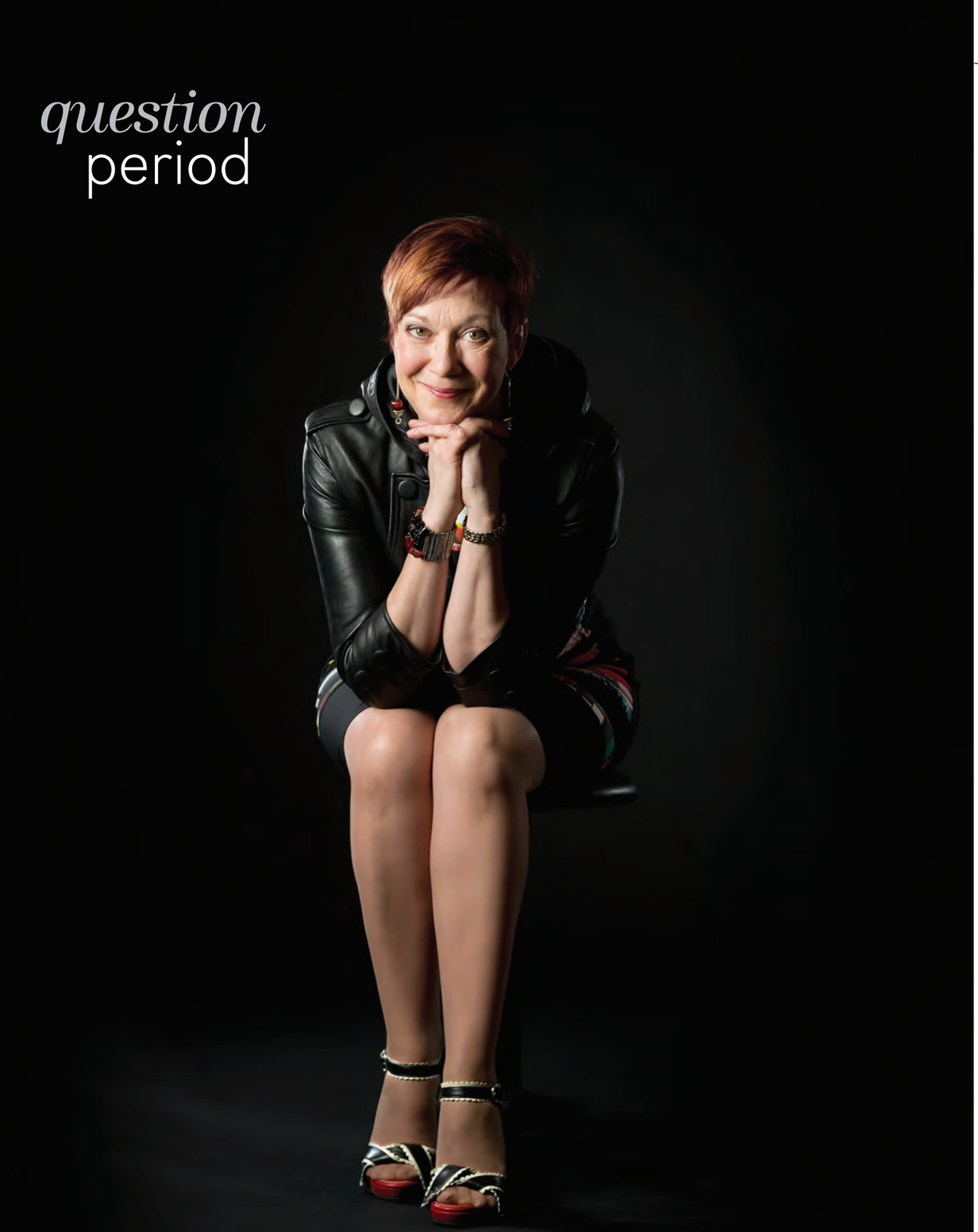


PHOTO BY JOHN ULAN

by TINA FAIZ

Ruth Kelly, '78 BA

The magazine publisher of two of Alberta's most-read titles talks about business decisions, the future of print and a new venture into radio

Ruth Kelly, president and CEO of Venture Publishing, has had an award-winning year. She received the Queen Elizabeth II Diamond Jubilee Medal, the Alberta Women Entrepreneurs' Celebration of Achievement Award and the Achievement in Publishing Award from the Alberta Magazine Publishers Association. She talks about her accomplishments past and future.

In 1997, you purchased *Alberta Venture* magazine from the Alberta government for $100. How has your business grown since then? I now own *Alberta Venture* and *Alberta Oil*, and we reach over half a million people a month. We also have a custom publishing division, where we do another 17 magazines for a range of clients, from private corporations to educational publications for the Alberta Cancer Society or the United Way.

Why do your clients still want to communicate through magazines? Long-form media remains an incredibly powerful way to capture someone's attention. When you are reading, you're completely engaged in that—unlike any other medium where you can do two or three things at once. So what companies and associations know is that if they want to have a more complex communication tool, a magazine is a visually, intellectually engaging tool to position and shape their messaging the way they want.

You're launching a new digital business radio network in September called Venture Radio. Why radio? Why now? Our capacity to deliver content is quite broad. On top of *Alberta Venture* and *Alberta Oil*, if you look at my custom division, we do content on every industry segment relevant to Western Canada: from forestry and construction to health care and education—everything. So this will be a new channel for us.

Why now? Technology has become incredibly accessible and affordable.... The penetration of mobile devices means you can listen at your desktop in your office or over your phone in your vehicle.

What will a radio day include? It's an eight-hour, live-streaming day, Monday to Friday. There will be breaking business news and breaking market news, and we'll have interviews and features. You can listen live, or you can subscribe to a particular podcast, and it will be delivered to whatever device you want.

Since your first issue of *Alberta Venture*, you have reported on some of the country's most successful people. Have you seen a pattern that has led to their success? Persistence can never be underestimated. Success takes effort. It also takes a certain curiosity. Some of the most successful business people I know—the serial entrepreneurs—they mostly started a business because they were really curious. And you have to be risk-oriented. If you wish to be successful in business, you have to embrace risk and understand that along with embracing it, there's potential for failure.

You've also had a front-row seat observing the evolution of Alberta and its business community. What stands out? The province's population has grown by 39.7 per cent since I started Venture, which means more than one in three people in this province have only arrived here in the past 15 or so years. Our GDP has tripled. The province has taken a whole different role, and we've been fortunate just to report on that.

[But] we are not just talking about Alberta to Alberta, we are talking about Alberta to the rest of the world. Almost 50 per cent of my visitors to *Alberta Oil*'s website come from outside of Canada. People in financial districts in Toronto and New York and Washington and Houston and London read my magazines. They know what we are here because Venture has told them, and that's an important responsibility for us.

Do you consider yourself a business success? I don't define myself as a success, yet. To me, success suggests there's an end point, and I'm not at that end point. I'm still on a journey. If you become satisfied, why would you continue to do something?

There are two kinds of magazine publishers: those that publish something about a topic they are deeply passionate about, and those that seek to make money. I am the latter. I have a nasty shoe habit, and I need to keep it satiated.

Has there been a low point in your career? Mistakes you've made? Many! Too many to enumerate: people mistakes, business decisions, timing. I bought *Alberta Oil* in June 2008, right at the peak, just as oil was $149 a barrel. I always say I signed the deal the day the recession started, and it just went downhill from there.... There have been many dark nights of the soul. I don't know many entrepreneurs who haven't faced that. If they don't tell you that, they're just lying. ■