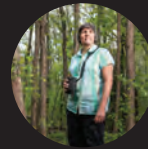




CELEBRATING 50 YEARS

YORK UNIVERSITY FACULTY OF SCIENCE





MESSAGE FROM THE PRESIDENT

AT THE HEART of any research-intensive institution is scientific discovery, and York University is no exception. The Faculty of Science has a longstanding history at York and is one of the established fixtures on our Keele campus. This year marks a major milestone in the life of the Faculty as it celebrates 50 years since its founding.

At the Faculty of Science and across the University, we continue to provide our students with the highest quality educational experience. This is evident in the numerous awards given to our teaching staff and faculty for teaching excellence

throughout the decades. Notable achievements by the Faculty include advances in science education, environmental biology, atmospheric chemistry, anti-matter and, most recently, its leadership in the areas of disease modelling, cosmology and astronomy.

At York, we invest in and support the basic sciences because we understand that critical breakthroughs must first emerge from fundamental research before they can be applied and make a broader impact. As an interdisciplinary University, collaboration at York is a key component of transferring knowledge and advancing our strategic initiatives.

Our new Life Sciences Building, for example, is a facility strategically designed to house open-concept benches and shared equipment to encourage collaboration and make efficient use of space and resources. This state-of-the-art building was constructed with environmentally sustainable building materials and design. Today, it is a hub for our first-year biology and chemistry undergraduate students - encouraging and cultivating opportunities among researchers and students both in and outside of labs and classrooms.

The evidence of a successful postsecondary experience, whether at the undergraduate or graduate level, is embodied in our graduates. Our students' positive and enriching experiences at York are exemplified by our Faculty of Science alumni, who have gone on to become ambassadors for science and York in various capacities, both nationally and internationally.

On behalf of the entire University community, it is my pleasure to congratulate the Faculty of Science on the wonderful occasion of its 50th anniversary. As we celebrate our past, we also look to the future with excitement, eager to see what the next 50 years hold.

Sincerely,

Mamdouh Shoukri
President and Vice-Chancellor



MESSAGE FROM THE DEAN

THESE ARE TRANSFORMATIVE TIMES for science and for its role in society. In my own field of astrophysics, we have gone from the one solar system we knew of two decades ago to the discovery of thousands of extra-solar planets circling other stars - a dramatic step towards understanding our own place in the cosmic context. It is both exciting and awe-inspiring to imagine what the next decades will reveal.

Science is at the heart of many of the biggest issues that we, as a society, grapple with today, from energy and the environment to health and security. Science has the power to transform our lives not only by enabling technology and medicine, but also by teaching critical thinking and enriching our lives culturally. Science underpins a multitude of other disciplines. Frankly, science provides context and perspective for our lives by revealing new ways of looking at the world and at ourselves. And for at least one kid growing up on a tropical island far from here, it even provided inspiration. Thus, it is imperative that science is and will remain a core pursuit and a hub of distinction at York University.

In these times of celebration and renewal for the Faculty of Science, we toast five decades of discovery, learning, innovation, engagement and impact. The Faculty's track record of profound and wide-ranging achievements inspires us to reach for even greater heights in the years ahead.

As we build on excellence toward a truly exciting future, I invite you to join us.

Ray Jayawardhana
Dean



MESSAGE FROM DONALD HASTIE

IT IS HARD FOR ME TO BELIEVE that the Faculty of Science is 50 years old. Looking back on my limited time at York (37 years), I am impressed by how much the Faculty has grown and all that it has accomplished. It would make any organization proud.

Like most units at York, Science started at Glendon before moving to the Keele campus and into the then brand new, state-of-the-science Farquharson building. Over the years, departments have come and gone, the Faculty changed its name three times, and we helped create the Faculty of Health and the Lassonde School of Engineering.

We have grown from five faculty members in the one building with a handful of students, to 140 faculty members with 3,500 students in seven buildings. Our top-quality degree programs have graduated 12,500 BSc and 1,600 Msc and PhD students, and our alumni are increasing and contributing in larger numbers to the activities of the Faculty.

Our faculty members are leaders in their fields of science and education. We have 11 faculty members who held Canada Research Chairs, six York Distinguished Research Professors, two NSERC Steacie Prize awardees, and seven faculty members who have been inducted into the Royal Society of Canada.

Research and teaching are not the same as they were 50 years ago, and we have kept ahead of the trends in both. Science has always been at the core of our activities. The recent renaming of the Faculty to its original moniker, the Faculty of Science, has reinforced the importance of our science base, and we look forward to building on these strengths over the coming decades.

Don Hastie
Interim Dean
July 1, 2012 - June 30, 2014

YORK UNIVERSITY FACULTY OF SCIENCE CELEBRATING 50 YEARS



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LEFT: Amro Zayed

AMRO ZAYED & LAURENCE PACKER

CREATING A BUZZ

WHY YORK IS ONE OF THE BEST PLACES IN THE WORLD TO DO BEE RESEARCH

IMAGINE A WORLD where fruit, vegetables, nuts, coffee and other food crops were not available, or were significantly more expensive. A world where many flowers do not get pollinated, and all the things that feed upon those flowering plants are lost. This hypothetical world, according to York's renowned bee researchers Professors Laurence Packer and Amro Zayed (BSc '01, PhD '06), is one in which bees do not exist. Bees pollinate almost 90 per cent of the world's flowers and so, some say, are responsible for perhaps one-third of our food.

Packer and Zayed endeavour to make major advances in bee research and conservation. "We have one of the biggest and most diverse bee research groups in the world here at York," says Packer. "With my expertise in bee behaviour, taxonomy and conservation, and Amro's expertise in genetics, evolution and genomics of bees, we form a globally unbeatable team."

Zayed praises York as a world leader in bee research. "York is one of the best places in the world to do research on bees," he says. "The diversity of tools, questions and skills that our groups bring to the table are truly amazing." York's bee experts have the capacity to study more than 80 per cent of the world's bee diversity, with bees from over 100 countries. They have the biggest collection of bees in the country and certainly one of the fastest growing in the world.

Packer and Zayed have a long history of fruitful collaborations, starting when Zayed was a PhD student in Packer's lab from 2000 to 2006. "As a PhD student in my lab, Amro made major advances in bee conservation genetics. When he went to the University of Illinois for his postdoctoral research, he very quickly became a leader in honey bee population genomics," says Packer. "Now that he's back at York and has a well-established lab, we'll be able to collaborate in even greater depth."

Zayed's lab aims to understand how and why social behaviour evolves in bees, and examines the genetics behind the behaviour of workers in social insects. His research also seeks to develop tools to improve the declining health of managed honey bee colonies. For example, his group

AMRO ZAYED & LAURENCE PACKER

CREATING A BUZZ



is currently developing methods for the genetically assisted breeding of disease-resistant honey bees.

Packer's lab is concerned with bee conservation, as well as describing new species of bees. They study the role of geography in bee diversity and trace how certain bees got to where they are. Its scientists also look at diseases that have been implicated in the disappearance of bumble bees and, in alliance with other labs, examine how factors such as climate change impact bee diversity.

The importance of bees to the earth is unimaginable; just ask Packer and Zayed. Next time you are enjoying some fresh fruit or delicious coffee, remember it was only made possible through the activities of bees.

ABOVE: Laurence Packer

ONE OF THE MOST SPECTACULAR phenomena in nature is the mass migration of billions of birds from Canada as they head for warmer climates each fall. The Stutchbury Lab, headed by biology Professor Bridget Stutchbury, pioneered the use of miniature devices called geolocators. These devices, attached via a backpack, allow Stutchbury and her team to track the entire marathon journey of songbirds - a feat that ornithologists around the world had long been waiting for.

"For centuries, bird migration has been one of the biggest mysteries of the natural world," says Stutchbury. "It seems unbelievable that such little birds can fly many thousands of kilometres to the tropics, travelling much of the way over what is now urban sprawl, and return to exactly the same place each year."

Stutchbury and her team are most interested in the flexibility of migration timing in order to understand if these long-distance migrants can adapt quickly to climate change.

They tracked the 7,000-kilometre spring migration of the Purple Martin, a large swallow, from its winter home in the Amazon Basin to its summer home in eastern North America. The spring of 2012 set records in Canada and the US as the warmest spring on record, but the lab found that Purple Martins did not leave earlier from the tropics, fly faster or arrive sooner at their breeding sites compared with normal years. A second study, on a forest bird called the Wood Thrush, found that individuals began their spring migration from Central America on almost the same day from year to year.

Stutchbury's research suggests that these amazing flying machines cannot easily change their own flight schedules to match the warmer springs in the north. The new information will assist future conservation efforts.

"My biggest hope," says Stutchbury, "is that our new migration maps will inspire bird watchers, naturalists and the public at large to admire and protect these birds."



BRIDGET
STUTCHBURY

Feathered Friend

WILL CLIMATE CHANGE SILENCE SONGBIRDS?



WITH THEIR INNOVATIVE mass spectrometry technique, Professor Demian Ifa and his group bring analytical chemistry to life.

Their technology is called desorption electrospray mass spectrometry, or DESI-MS. By applying an electrically charged spray, DESI-MS dissolves, desorbs and turns samples into ions without the need of sample preparation shortening the usually long process required by conventional mass spectrometry. These ions are then taken by the mass spectrometer, which measures their mass to charge ratio.

With this information and some manipulation, the samples can be identified.

DESI-MS has innumerable practical uses. In the forensic field, it can detect trace amounts of explosives, drugs or other materials left behind from fingerprints. In 2013, DESI-MS was even employed to analyze chemical components of condoms present in fingerprints as circumstantial evidence of sexual assault.

The technology can also be used as an important tool in disease diagnosis. It can detect lingering cancer cells in tissue sections after the removal of tumours. Finally, DESI-MS has opened possibilities in the botanical field to screen and identify pesticides and microorganism signatures directly from infected vegetal samples.

The DESI-MS technology is so advanced, it has even been featured in episodes of the hit television shows "CSI" and "CSI: Miami."

"DESI can answer, in a simple and fast way, important analytical questions from many different fields of science," Ifa says. "And that's really exciting."

DEMIAN IFA

Cutting Edge

FROM CRIME SCENES TO TUMOUR DETECTION, ANALYTICAL CHEMISTRY IS HERE

GORDON SHEPHERD

Champion for Space Science

AT 82, THERE'S STILL SO MUCH TO DO



AFTER SPENDING 46 YEARS - and counting - at York University, it is safe to say Professor Gordon Shepherd is a York legend. Shepherd spent most of his career at the Faculty of Science and since the split has become a member of the Lassonde School of Engineering, where he is professor emeritus of space science.

"I'm very appreciative of the support I received in my 44 years at the Faculty of Science," says Shepherd, a celebrated author, renowned speaker and champion for space science.

Now 82, Shepherd remains an active researcher in the science community. He is the principal investigator for the Wind Imaging Interferometer (WINDII), a Canadian instrument built in cooperation with France. It was in orbit from 1991 to 2003 on NASA's Upper Atmosphere Research Satellite.

Shepherd and his team of researchers, both within and outside of York, spent years developing WINDII, which acquired over 23 million images of the upper atmosphere during its time in orbit. But according to the veteran professor, the work doesn't stop there. As he explains, "There are still many, many things to do. I will keep doing this work at York until I really retire."



ROSALIND AND LORELEI SILVERMAN

Sister Act

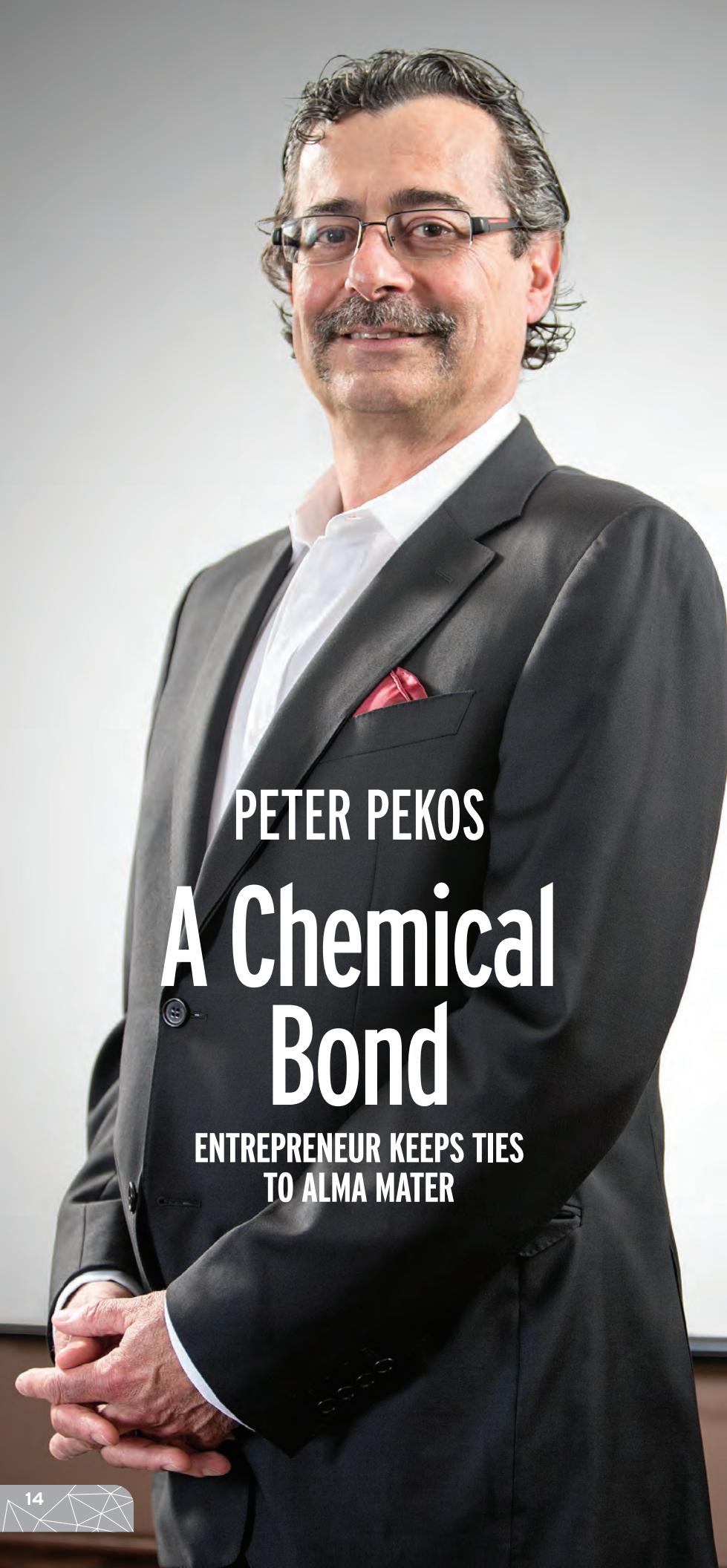
CHOOSING YORK FOR ITS STUDENT-CENTRED APPROACH

LORELEI AND ROSALIND SILVERMAN (MSc '99, PhD '03), Romanian-born twin sisters, moved to Canada to pursue future education opportunities. They chose York for its student-centred approach and its graduate study support. Both earned MScs and PhDs with distinction in biology and went on to hold postdoctoral fellowships. Lorelei is a neurophysiologist, and Rosalind a specialist of cell division in cancer and atherosclerosis. They are currently the deans of the flagship Pre-Medical and International Medical Graduates residency matching programs at Toronto's Royal Crown College of Business and Technology.

Inspired by their own experience, the Silvermans founded Models of Human Diseases, a non-profit organization aimed at providing support and mentorship to Canadian students and foreign-trained biomedical professionals. More than 250 participants, many of them from underrepresented communities in the biomedical field or international medical graduates, benefit annually from the program's guidance. The organization even spawned an International Conference on Models of Human Diseases, the first of which was supported by funding from the Canadian Institutes of Health Research. The program model has been shared globally with other organizations.

Recipients of the Royal Bank of Canada's prestigious Top 25 Canadian Immigrants Award in 2009, the Silvermans continue to dedicate themselves to the advancement of science and community volunteering, always with an emphasis on new immigrants.

LEFT: Rosalind Silverman and Lorelei Silverman



PETER PEKOS
A Chemical Bond
ENTREPRENEUR KEEPS TIES TO ALMA MATER

PETER PEKOS' (MSc '86) successful career in the pharmaceutical industry began right after he completed his MSc in chemistry at York. Pecos is the co-founder, president and chief executive officer of Dalton Pharma Services, a privately owned Canadian pharmaceutical services provider.

Dalton Pharma has had a long and fruitful relationship with York University. Founded together with the late York Professor Douglas Butler - Pecos' supervisor - the company operated out of a lab in the Farquharson Building in its early days, eventually moving to a larger lab and office space nearby. With an initial \$1,000 investment from each founder - for the basic equipment - the company flourished to become an established leader in the Canadian pharmaceutical services industry.

"York is a very innovative place. It always has been, perhaps because it's a younger institution," says Pecos. "People don't realize how entrepreneurial York is. Particularly as an entrepreneur and business owner, my education and experiences at York proved to be essential to my future success."

Pecos continues to support the University and its Faculty of Science in various ways. This includes establishing the Dalton Pharma Services / Dr. Douglas Butler Award in Organic Chemistry - created with an initial gift of \$50,000 from Dalton Pharma. This collaborative relationship between York and the pharmaceutical company endures. Dalton is a regular commercial user of the University's mass spectrometry equipment; has sponsored the Healthcare and Biotechnology Venture Challenge at its Schulich School of Business; and has contributed over \$120,000 in equipment and compounds for York's mass spectrometry laboratories.

Pecos has served in various advisory roles in the Faculty of Science, and recently participated as an expert industry panelist in a career-networking event for graduate students in science and engineering.



SCOTT MENARY
Because Antimatter Matters

TACKLING ONE OF THE GREATEST MYSTERIES IN PHYSICS

ANTIMATTER PRESENTS one of the greatest unsolved mysteries in physics. Scientists have determined that at the Big Bang, matter and its counterpart antimatter were created in equal amounts, yet now there is precious little antimatter around. What happened?

"It's a profound mystery," says physics Professor Scott Menary, who has been pursuing the answer to that very question for over 25 years. Menary is a member of the ALPHA experiment collaboration at CERN in Switzerland. The group studies the properties of antihydrogen against those of hydrogen in order to detect differences between matter and antimatter - information that has the potential to unlock a fundamental new understanding of our universe.

In 2010, the ALPHA team became the first to trap antihydrogen; in 2011, to hold it for 1,000 seconds (5,000 times longer than ever before); and in 2013, to determine whether it falls or rises under gravity. Each of these developments brings the scientific world closer to being able to study antihydrogen with unparalleled precision - and the world is taking notice. For its contributions to the enormous undertaking, the ALPHA-Canada team was awarded the prestigious John Charles Polanyi Prize in 2013.

"It has been my experience that people are fascinated by antimatter," says Menary of the elusive substance. "I guess because it's so exotic." Indeed, antimatter is a fixture in popular culture, featuring prominently in the "Star Trek" television series and, more recently, in author Dan Brown's novel *Angels & Demons* and its film adaptation. (According to Menary, Brown even got most of the science right.)

Above all, the solution to the antimatter conundrum can, and most likely will, change the way we view our world. "Whatever we find," says Menary, "it will certainly be something new and interesting and, as usual in science, will breed new questions."

RON CANNATA

York: The Early Years

ONE OF THE UNIVERSITY'S FIRST SCIENCE UNDERGRADS SHARES HIS FOND MEMORIES OF YORK

DECIDED TO ATTEND YORK UNIVERSITY after taking a tour of the Glendon College campus in February 1965, and that fall I enrolled in the Faculty of Science. I liked the idea that the University was small and classes would be more intimate.

There were about 17 graduates from my high school, Agincourt Collegiate Institute, who opted to go to York. Four of us would travel from our homes in Scarborough to the Keele campus in my friend's Volkswagen Beetle. We took various routes until Highway 401 was expanded from four to 12 lanes across Toronto. We could not imagine there would ever be traffic jams again!

The Keele Street campus was brand new and offered mainly first-year courses. There were only about 500 students in the first year - 350 in the arts program and 150 in science. The campus had the feel of an advanced high school.

I remember a dance scheduled at Glendon College in October 1965 as part of frosh week. The headliner was a guy nobody had heard of: Neil Diamond. Apparently only eight people showed up that night. Within a year, Neil was at the top of the music charts and it was clear that someone on the dance committee had known something we did not.

CAMPUS LIFE

I WAS AN ENTHUSIASTIC SUPPORTER of the University and took every opportunity to talk to high-school students coming to the Keele campus for a tour. Initially, there were only four buildings - Founders College, Steacie Library, Farquharson Life Sciences Building and Burton Auditorium - and they were quite far apart. One particularly interesting stop was the glassblower located in the basement of the Farquharson building. He made specialized glassware for the various science departments and it was quite a sight if he had work in progress during a tour.

There was no physical education facility or ice rink on campus until 1966 when the Tait McKenzie gym and arena were built. Prior to that, we travelled to the Glendon campus to swim, work out, play squash or play intramural hockey on

an outdoor rink. By 1968, Vanier College and Winters College had opened, and intramural sports were a welcome relief from the daily grind of courses. As well, Osgoode Hall moved to York and we were joined by a more refined, better-dressed group of students.

Initially, there were no pubs on campus. The closest beer room was in the Beverly Hills Hotel on Wilson Avenue where draught beer was 15¢ a glass. Then it was raised to 20¢, a 33 per cent hike, which did not go over well. The police knew the hotel was popular among York students so we had to be extra cautious driving back to the campus. It wasn't until the fall of 1968 that the "Cock and Bull" pub opened in the basement of Founders College.

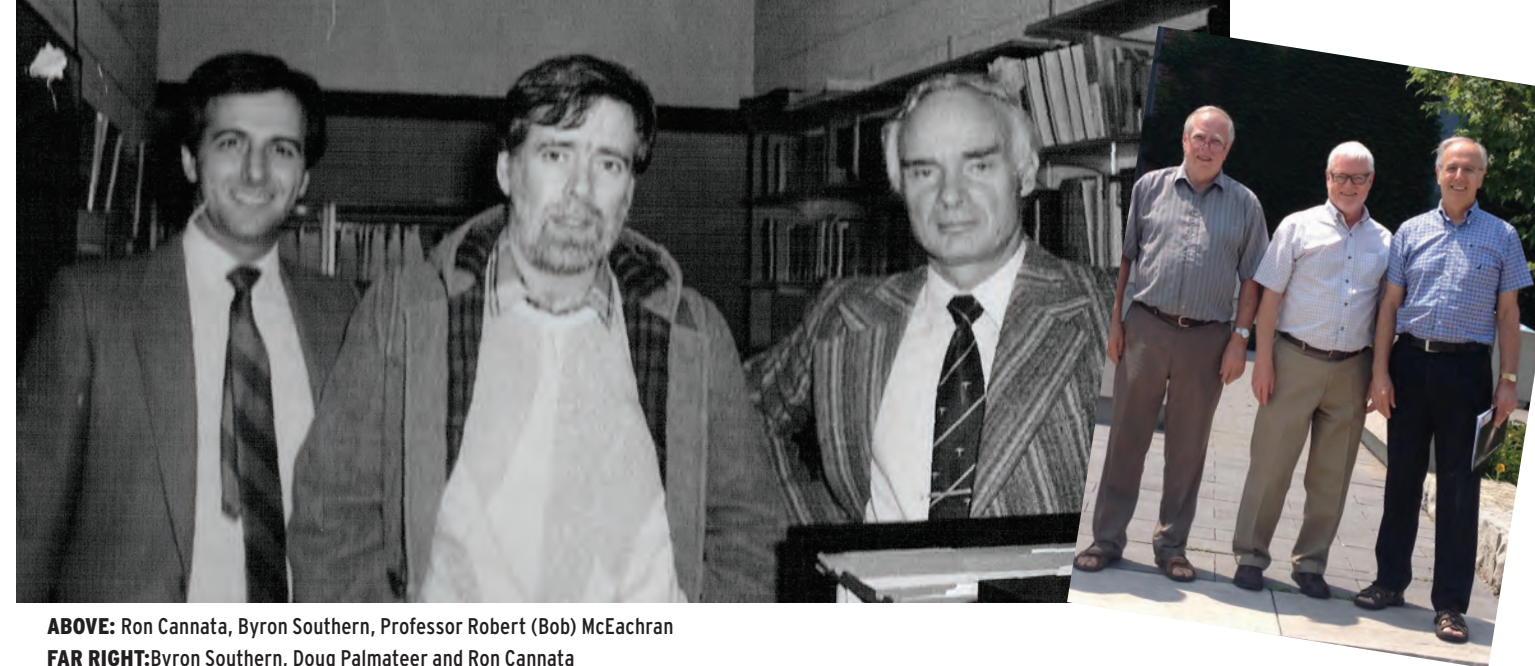
Founders Residence was composed of four floors, with women on one side and men on the other, separated by a fire door. To visit the female residence, men had to sign in with the great defender of female virtue, Mr. Bull. They were not allowed to stay past 8pm and Mr. Bull chased down any man trying to breach the rules. There are plenty of stories about the escapades of students trying to hide from Mr. Bull.

I entered Founders Residence in February 1968, and by then some clever students had figured out how to disarm the fire alarm between the women's and men's residences. It became a cat-and-mouse game with the administrators to prevent free passage between the two. When the Vanier residence was built in 1968, it was designed to have alternating floors of women's and men's rooms. This was a sure sign that the moral righteousness of the administrators was in decline. The sexual revolution of the 1960s had reached York!

CLASSROOM MEMORIES

THERE WERE NO CALCULATORS or personal computers in the 1960s. Science students learned to use a slide rule to do most calculations - multiplication, division, logarithms etc. - which was sufficiently accurate for much of the course work.

I remember doing the Millikan Oil Drop experiment in a first



ABOVE: Ron Cannata, Byron Southern, Professor Robert (Bob) McEachran
FAR RIGHT: Byron Southern, Doug Palmateer and Ron Cannata

year physics lab. The experiment measures the charge on an electron. Most of us had trouble seeing the drop of oil, never mind controlling its motion. Before time expired, the graduate student stepped in to help us complete the assignment. Some experimental physicists we were!

In second year, Professor Bob McEachran walked us through the mathematical solution for the hydrogen atom, using Schrödinger's equation. This is relatively simple because the hydrogen atom consists of a single proton orbited by a single electron. The problem has an infinite number of solutions, each representing an energy level that an electron can take as it orbits the proton. I was mesmerized. This demonstrated the power of quantum mechanics.

In third year, Professor Helen Freedhoff walked us through the solution to Maxwell's equations, which concerns the relationship between electricity and magnetism. There were two possible solutions, with time either moving forward or back. She quickly dismissed the solution suggesting that time could move backward. It was a revelation in the sense that science fiction writers are not bound by the same constraints as physicists.

A friend, Don Kellett, landed a summer job in the computer department at York. This was during the days of mainframe computers and punched cards. Don was quite excited about a fabulous new system that permitted universities and researchers around the world to communicate with one another (the ARPANET). This sounded like a great idea but was very expensive and only available to a select group. It was unimaginable that it would be available to everyone 25 years later in the form of the Internet.

LIFE AFTER YORK

AT THE END OF OUR THIRD YEAR, in 1968, about 26 students became the first graduates of the full science program at York, receiving a BSc degree. At the end of our fourth year, 10 students became the first recipients of the BSc (Honours), including me.

Doug Palmateer, a very good friend whom I met when we started in the science program together, is a testament to the value of York's interdisciplinary approach. Doug graduated with a BSc in mathematics in 1968 and then embarked on two years of English, receiving a BA (Honours) in 1970. He then joined the staff at York as the Faculty of Science's academic administration officer from 1972 to 1975. Doug then went on to Osgoode Hall Law School and obtained his LLB in 1978. He has been practising law in Toronto every since.

Another honours physics graduate that year was my closest friend Byron Southern. The two of us then went to McMaster University to do a master's degree. I must admit to some trepidation at the time because the McMaster program admitted physics students from around the world. Would the York science program, for which we had been "guinea pigs" in all courses, hold up? I can honestly say it did. We had received a comprehensive education comparable to our colleagues in McMaster's graduate program. Byron and I both completed an MSc in physics in 1971. Byron went on to obtain a PhD and is now a member of the Physics Department at the University of Manitoba.

Reluctantly, I left physics in 1973 to pursue a new career. After the moon landing in 1969, the US had scaled back funding of their science and engineering programs, resulting in a scarcity of job opportunities worldwide. The first person I contacted in connection with my job search was my former professor, Helen Freedhoff, in York's Physics Department. Her husband was a partner in a firm of chartered accountants, and she asked if I had ever considered that profession. Shortly thereafter, I landed a job with Deloitte and, after four years of retraining and practical work experience, graduated with my CA designation in 1977.

I retired in 2008, after 35 years in the financial field. My career path was probably not what the people in the York science program envisioned in 1965. Freedhoff used the term "the lost generation" of physicists because of fewer opportunities available to us. Nonetheless, the training I received in science at York proved to be an excellent platform for my future career.

ALLAN CARSWELL

Laser Vision

A LOVE AFFAIR WITH SCIENCE THAT BEGAN EARLY

ALLAN CARSWELL'S PHILOSOPHY is "Keep doing what you enjoy." The founder of Optech Incorporated and former physics professor encourages students to find something they love, and turn it into their life's work. After all, this is the path that Carswell himself took.

Carswell's love affair with science began at an early age. In his youth, he was enthralled by the swashbuckling heroes found on the pages of his comic books. There were exciting space travellers like Buck Rogers and Flash Gordon - who could flit about the universe at will - as well as characters like Alley Oop, a time-travelling caveman. These fictional personas inspired and stretched the young Carswell's ideas of the possible.

This passion for science led Carswell to join York University in 1968 as a physics professor in the Faculty of Science. "At that time, the world was focused on colour televisions, long-distance telephones and larger jet aircraft," he says. "The campus was growing - it was expanding physically with the opening of the Petrie Science Building and, academically, in the areas of molecular spectroscopy, nuclear physics and space measurements. It was a great time to do research."

Although his focus at RCA Victor Research Laboratories in Quebec was ionized gas plasmas, Carswell became heavily involved with lasers shortly after they were invented in the early 1960s. He continued his research with lasers at York. Specifically, he focused on the properties and applications of high power lasers and lidar (laser radar).

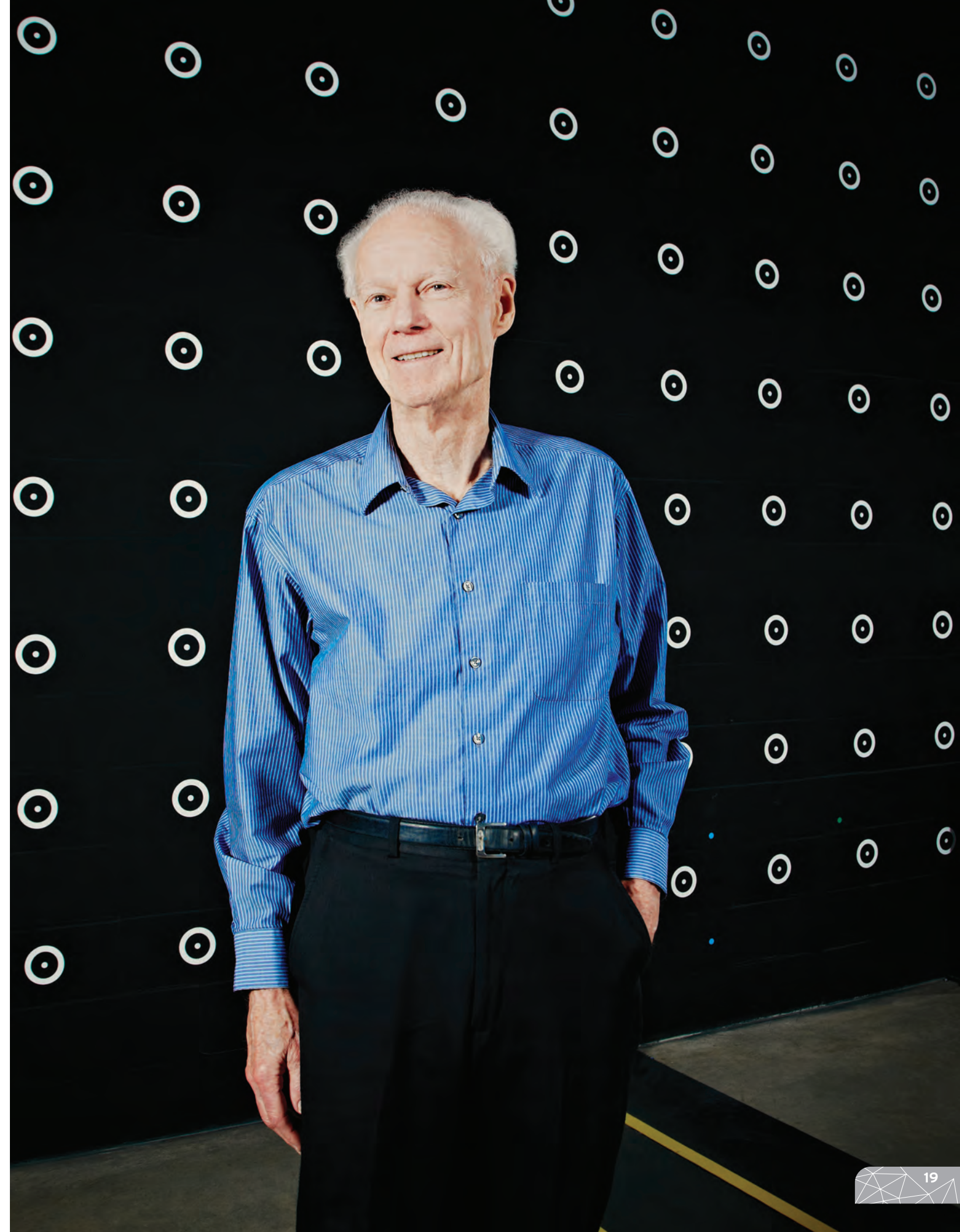
"Lidar for airborne surveying, 3-D imaging, atmospheric measurements, process control applications and space systems - as we know it today - would not have advanced to the level it has without Allan's significant contribution to physics and in pioneering the lidar industry," says Gordon Shepherd, distinguished research professor emeritus of space science.

Today, Carswell's research in laser radar technology is used in a multitude of ways - for flood plain mapping, tree species classification in the rainforest (including determining age), surveillance systems, urban planning, discovering snow on Mars, monitoring the Arctic ozone layer and determining the height of clouds.

At the peak of his academic career, and in just six short years at York, Carswell founded a spin-off company, Optech Incorporated. Optech develops and manufactures advanced lidar and camera survey instruments for airborne, mobile and terrestrial mapping. Forty years later, the company's products are used on all seven continents, in orbit around Earth, and on Mars. "The Faculty of Science certainly provided fertile grounds for advancing science, technology and innovation," says Carswell. "Entrepreneurship was encouraged in my early days at York, long before it achieved the very high profile status of today."

Carswell is the author and contributing editor of over 200 scientific publications and has been widely recognized for his pioneering and entrepreneurial work in his field. He has been the recipient of numerous prestigious awards and honours, including the Order of Canada, the Queen Elizabeth II Diamond Jubilee Medal and the C.D. Howe Award at the Canadian Aeronautics and Space Institute. He is also a Fellow of the Royal Society of Canada and the Canadian Academy of Engineering.

"Allan is a great role model for all budding scientists and entrepreneurs," says Jim Whiteway, professor in the University's Department of Earth and Space Science and Engineering, and leader of the Canadian team that supplied the lidar instrument for the NASA Phoenix Mars mission. "Not only as a contributor to Canadian science and technology, but in his philanthropic work, as a generous supporter of York, and the various outreach programs he volunteers with."



A portrait of Dan Riskin, a man with glasses, wearing a purple shirt and a grey blazer, smiling. He is standing in front of a blurred background of colorful lights.

DAN RISKIN

Zoology for the Masses

TV'S AWARD-WINNING
EVOLUTIONARY BIOLOGIST

DAN RISKIN (MSc '00) is an award-winning evolutionary biologist and a zoology rock star. However, a scientific career was not in his plans until he encountered *Just Bats*, a book by noted bat authority and York Professor M. Brock Fenton.

Fenton's passion and knowledge impressed Riskin, inspiring him to join his "bat lab" after he completed his degree in zoology at the University of Alberta. Riskin then earned his MSc in biology at York while under Fenton's supervision.

Riskin's research on vampire bats eventually attracted the attention of various news agencies and scientific television programs, such as "Daily Planet," The New York Times and programming on the CBC. He has also been featured on "The Tonight Show with Jay Leno," "The Dr. Oz Show," as well as a number of other programs. Riskin later became an assistant professor at the City College of the City University of New York, but soon left to pursue his passion for sharing science with a television audience.

Riskin hosted "Human Nature" on Discovery Science and Animal Planet's "Monsters Inside Me" before becoming the new face of "Daily Planet" with co-host Ziya Tong in 2011. Since his arrival, he has generated record ratings for these shows.


Though the world of television is a far jump from academia, Riskin says it is the same passion for knowledge that links the two. "I'm still driven by curiosity and learning," he explains, "only now I'm sharing all this with a great big audience. My goal is to show people how much fun science is."

It's safe to say that this goal has been achieved.

SERGEY KRYLOV

Eye on Personalized Cancer Medicine

CREATING INNOVATIVE ENABLING TECHNOLOGIES

A portrait of Sergey Krylov, a man with dark hair, wearing a dark patterned button-down shirt, looking directly at the camera.

IT IS NO SECRET that chemistry Professor Sergey Krylov has earned a variety of awards and grants throughout his career. Most recently, in 2014, he was awarded the Canadian Society for Chemistry Maxxam Award.

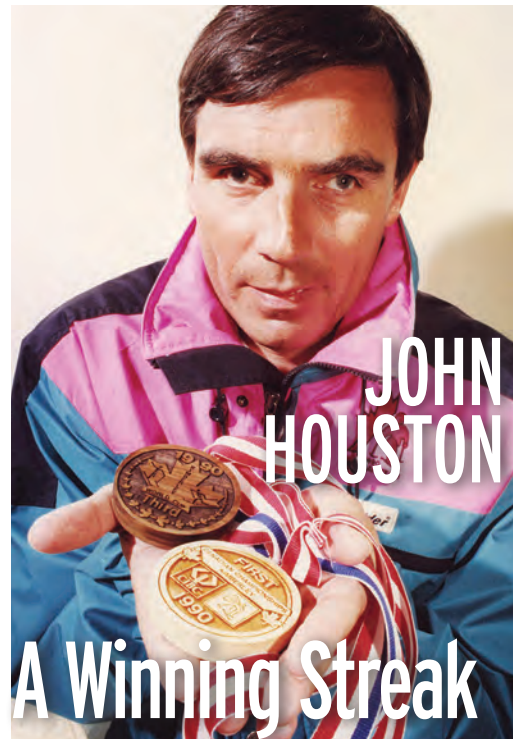
But what are the goals and objectives of one of York's leading, award-winning researchers? Krylov, former Canada Research Chair in Bioanalytical Chemistry, has broad research interests spanning from applied mathematics and physical chemistry to analytical chemistry, molecular biology and cell biology. As he explains, "All of my diverse research activities have an overarching goal of creating innovative enabling technologies for better understanding, diagnosing and treating complex diseases such as cancer."

The Krylov Lab pioneered a highly efficient way of developing aptamers, which are molecules that can serve

as diagnostic probes, drugs and drug-delivery vehicles. His team developed a technology for the selection of drug leads that is now being evaluated by a major pharmaceutical company. They also invented an approach for highly accurate and sensitive quantitation of multiple microRNAs, which is pivotal to researchers' ability to discover and validate cancer subtypes.

"This new approach promises to be an important technological step towards personalized medicine," stresses Krylov. "The technology will be used by oncologists for the early detection of cancer and choosing optimum therapies in treating the disease."

Further contributions towards personalized cancer medicine are expected from Krylov's ongoing efforts aimed at advancing his invention of a single-cell method of measuring multi-drug resistance.



DURING MY YEARS AT YORK I learned many interesting things and ‘neat stuff’ in the areas of probability, statistics and numerical methods,” says John Houston (BA ’74, MA ’75). “I owe much to the various professors for their great support and enthusiasm, in particular Professors Anthony Wallis, Peter Peskun and Gene Denzel.”

In the spring of 1973 Houston, despite a visual impairment, was hired by Professor Jack McConnell for the summer to write FORTRAN programs to assist with the solution of equations arising from McConnell’s atmospheric research. “This was a great experience for me, and a valuable part of my academic learning,” says Houston. “To this day, I still tell everyone that the summer of 1973 was the best I’ve ever had.”

Although Houston has a disability, he has never let it get the best of him. “Skiing is my sport!” he says. Incredibly, Houston was a member of the Canadian Para-Alpine Ski Team and travelled in Canada, the US, Europe and Japan attending races and training camps. In 1988 he won a bronze medal in giant slalom at the Paralympic Games held in Innsbruck, Austria.

Houston spent his working years following a data processing path, first with Bell Canada for 18 years and then 12 years at IBM, primarily in mainframe system software with an emphasis on database management. Now retired, and completely blind, Houston has many fond memories of his time at York. “I am very grateful for the total university experience,” he says.

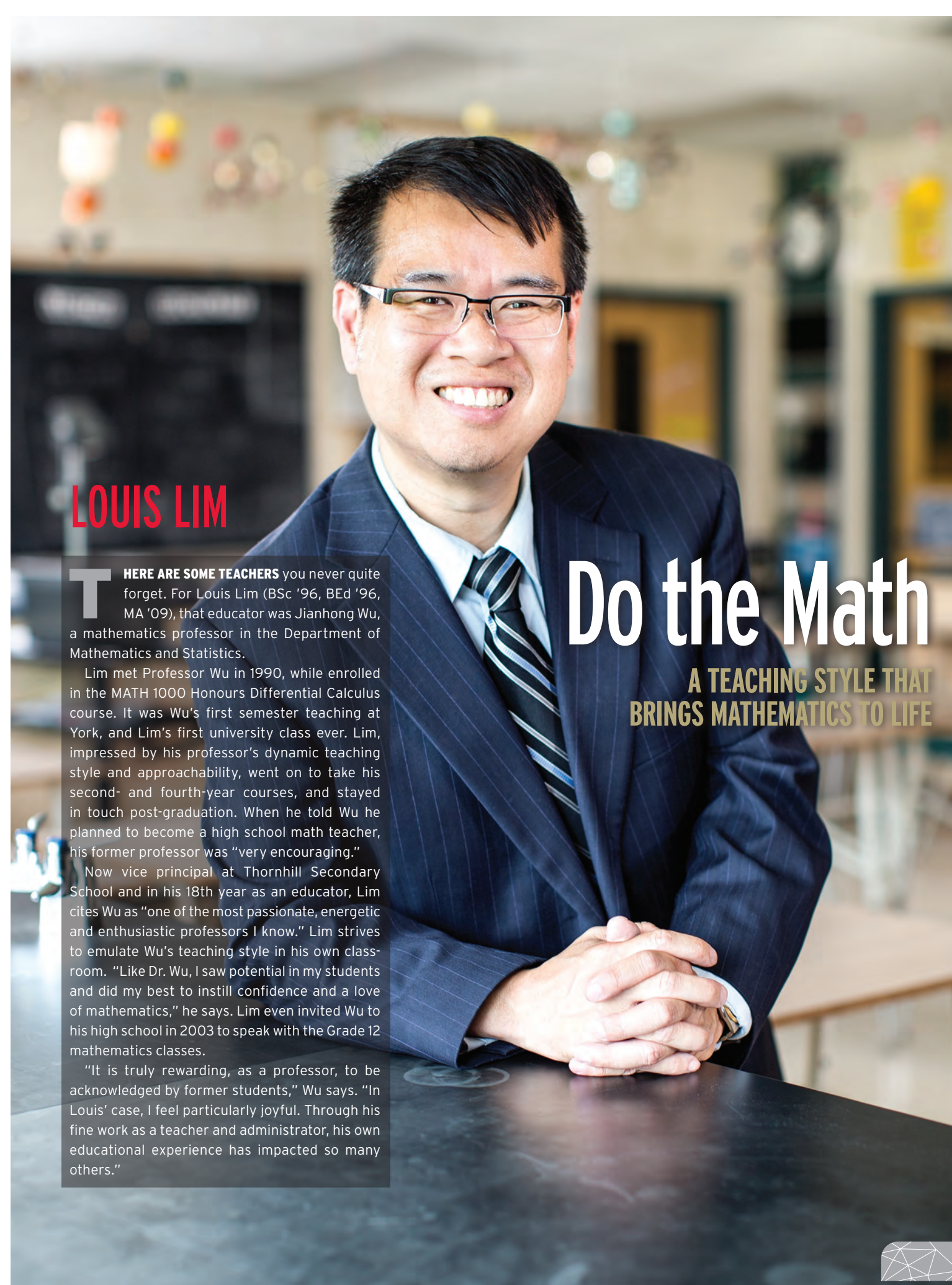
A **WARD-WINNING RESEARCHER** and York alumna Cecilia Moens (BSc ’87) asserts that the time she spent at York helped lay the groundwork for a successful career. One could even say her time here was highly personal. Her father, the late Professor Peter Moens, was an early faculty member of the Faculty of Science, and as a child, she grew up running around the sculptures and greenhouse outside the Farquharson Building.

Moens decided to pursue her university education at York. Her undergraduate degree in biology, which included opportunities to conduct primary research outside the classroom, thoroughly prepared her for a career in scientific research. “By the time I finished my degree at York, it became crystal clear to me that this was the direction I wanted to go,” says Moens. “Here I am 25 years later, feeling just so lucky to still be doing it!”

Moens operates a lab in the Division of Basic Science at the renowned Fred Hutchinson Cancer Research Center in Seattle, Washington. The Moens Lab studies the early development of the vertebrate brain using the transparent zebrafish embryo as an *in vivo* model system. Moens has been published over 35 times in the last seven years alone.

“Science is a brilliant, creative endeavour but it absolutely isn’t for everybody. Undergraduate research is essential for young people to determine whether this is going to be their career path or not,” says Moens. “The research I conducted at York proved to be essential to my current career. It was at York that I discovered the field of developmental biology.”

Pushing Boundaries in Developmental Biology



LOUIS LIM

Do the Math

A TEACHING STYLE THAT BRINGS MATHEMATICS TO LIFE

T **HERE ARE SOME TEACHERS** you never quite forget. For Louis Lim (BSc ’96, BEd ’96, MA ’09), that educator was Jianhong Wu, a mathematics professor in the Department of Mathematics and Statistics.

Lim met Professor Wu in 1990, while enrolled in the MATH 1000 Honours Differential Calculus course. It was Wu’s first semester teaching at York, and Lim’s first university class ever. Lim, impressed by his professor’s dynamic teaching style and approachability, went on to take his second- and fourth-year courses, and stayed in touch post-graduation. When he told Wu he planned to become a high school math teacher, his former professor was “very encouraging.”

Now vice principal at Thornhill Secondary School and in his 18th year as an educator, Lim cites Wu as “one of the most passionate, energetic and enthusiastic professors I know.” Lim strives to emulate Wu’s teaching style in his own classroom. “Like Dr. Wu, I saw potential in my students and did my best to instill confidence and a love of mathematics,” he says. Lim even invited Wu to his high school in 2003 to speak with the Grade 12 mathematics classes.

“It is truly rewarding, as a professor, to be acknowledged by former students,” Wu says. “In Louis’ case, I feel particularly joyful. Through his fine work as a teacher and administrator, his own educational experience has impacted so many others.”

JAYASHREE THATTE BHAT

Promoting Breast Cancer Awareness

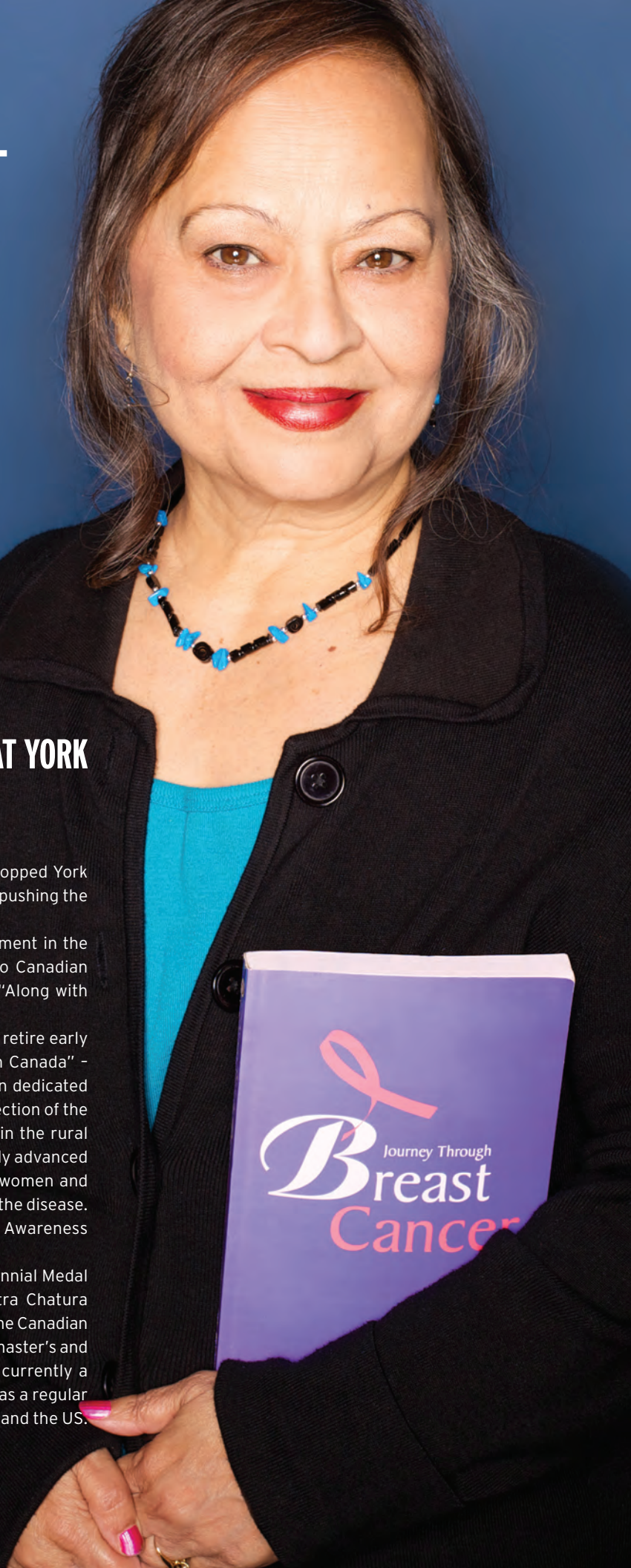
DEVELOPED HER MENTAL FRAMEWORK AT YORK

IN INDIA, breast cancer is a social taboo, but that never stopped York University alumna Jayashree Thatte Bhat (MSc '75) from pushing the disease into the spotlight.

Arriving as a recent immigrant to York's chemistry department in the 1970s, Bhat credits the university with helping her adjust to Canadian life. "My new mental framework developed here," she says. "Along with sciences, I also learned what Canada was about."

After a successful medical research career, Bhat decided to retire early and spread that scientific knowledge - "so easily available in Canada" - overseas. Today, she is a founding member of an organization dedicated to promoting breast cancer awareness in rural India. Early detection of the disease is crucial to successful treatment, but often women in the rural regions of India do not seek help until the cancer is at an already advanced stage. For more than a decade, Bhat has been working with women and their families to help cope with and spark conversations about the disease. Thanks to her efforts, there are now seven Breast Cancer Awareness centres across the state of Maharashtra.

Bhat's cross-cultural work has earned her an Alberta Centennial Medal from the government of Alberta, the prestigious Chaturasthra Chatura award from the government of Maharashtra, and a position on the Canadian Race Relations Foundation Board of Directors. She earned her master's and doctorate in classical music from Indian universities, and is currently a visiting professor of musicology at several universities as well as a regular speaker for the International Women's Forum in Canada, India and the US.



NIGEL LOCKYER

Aim Big Think Small

PARTICLE PHYSICIST CREDITS YORK FOR RIGHT CAREER MOVE

NIGEL LOCKYER (BSc Spec Hons '75) is a leader in the high-energy particle physics field. He has been named director of two prestigious scientific research facilities in North America, and his successful scientific career was launched right here, in York's Department of Physics and Astronomy.

After graduating from York with a BSc in physics, Lockyer completed a PhD in physics from Ohio State University. He then took up a prestigious postdoctoral fellowship at the SLAC National Accelerator Laboratory. The lab is operated by California's Stanford University and engages in experimental and theoretical research in elementary particle physics. Lockyer returned to the classroom in 1984 as a physics faculty member at the University of Pennsylvania, a position he held for over two decades.

From 2007 to 2013, Lockyer was director of TRIUMF, Canada's national laboratory for particle and nuclear physics, and professor of physics and astronomy at the University of British Columbia.

Lockyer's most recent prestigious appointment was as the new director of the U.S. Department of Energy's Fermi National Accelerator Laboratory (Fermilab). Fermilab is the premier national laboratory for particle physics research in the US and one of the most important scientific research facilities in the world.

The award-winning physicist credits York with jumpstarting his scientific journey. "I had such a great time at York. The University's science program introduced me to the world of research in physics, and that initial exposure was incredibly influential in my career," he says. "York's faculty served as a central driver for my passion for science. Professor Bill Frisken, for example, was my spiritual leader and mentor - he was the one who encouraged me to go into physics in the first place."



INVERTEBRATE ANIMAL PHYSIOLOGY

The Ties that Bond

BIWEEKLY 'FAMILY MEETINGS' THAT SPAN OVER 40 YEARS



LEFT TO RIGHT: Julie Clark, Angela Lange, Jean-Paul Paluzzi, Andrew Donini, Rod Webb, Ian Orchard, Ken Davey, Sima Jonusaite

IN THE EARLY 1970S, the field of invertebrate endocrinology was in its infancy at York. When Ken Davey arrived at the University in 1974 as the new Chair of the Department of Biology, the University supported his application to the National Research Council Canada (NRC) for major funding to develop this field of research. Under his leadership and with NRC funding, two newcomers, Professors Rod Webb and Colin Steel, joined those already active in the field: Professors Barry Loughton and Saber Saleuddin. "There was no specific program," says Davey, "but our labs were all more or less contiguous in the basement of Farquharson. We worked in one another's labs, ran a weekly journal club, and partied together. Our research involved approaches from biochemistry to structural biology on snails, insects, parasitic worms and crustaceans."

Students, notes Davey, were regarded as colleagues. "We saw ourselves not as users of student efforts in pursuing our research, but as developers of talent."

That approach paid off. Today, graduates of the program can be found at universities across Canada, the US, Africa and Australia. In particular, Angela Lange, who completed her PhD in Loughton's lab, is a faculty member at the University of Toronto Mississauga; Ian Orchard, a research associate in the group, is the vice president academic and provost at the University of Waterloo; and Mike O'Donnell, another research associate, is on the faculty at McMaster University.

The labs also served as a driving force in nurturing the careers of three individuals recently appointed to the faculty at York: Professors Jean-Paul Paluzzi, Andrew Donini and Julie Clark. They currently study the endocrine processes that regulate feeding behaviour, salt and ammonia homeostasis, and egg-laying behaviour in various insects, such as mosquitoes, ticks and locusts.

Says Paluzzi: "Although my educational work was done elsewhere, it has come full circle as my mentors were both at York. I am now a York professor, which wouldn't have been possible without the efforts of Ken and Barry."

These newcomers and other professors in animal physiology at York operate a new journal club that keeps students abreast of the astonishing range of activities in their labs. Both Davey and Loughton attend. "I have had a very privileged career," says Davey, "but to sit in this group and listen to your scientific great grandchildren, who were not born when I arrived at York, stir the pot, present with such fearless assurance - WOW!"

ILIJAS FARAH

Logical Approach

JOINING MATHEMATICIANS' HALLOWED RANKS



IF THE INTERNATIONAL CONGRESS OF MATHEMATICIANS (ICM) is to mathematicians what the Academy Awards are to filmmakers, then an invitation to give a lecture at the ICM is the equivalent of winning an Oscar. This year, Ilijas Farah became the first York faculty member to ever join those hallowed mathematical ranks.

Farah, a mathematics professor, was one of just a handful of Canadian mathematicians invited to speak at the August 2014 event held in Seoul, South Korea. The quadrennial meeting, the largest and most important mathematical congress in the world, is hosted by the International Mathematical Union, and its lecturer list reads like a "who's who" in the world of mathematics.

Speaking in the sessions on logic and foundations, Farah represents a branch of research that has attracted scholarly attention only in recent years: applications of logic to operator algebras

"Ten or 15 years ago there was virtually no interaction between these two subjects," says Farah, "but then several longstanding problems in operator algebras were solved using methods devised by logicians with completely different applications in mind." Farah became a driving force behind this development through perseverance and an insatiable curiosity that led him to learn a difficult subject seemingly unrelated to his everyday work.

"Designing bridges, MP3 players, computers and search engines - each of these endeavours fundamentally depends on a different sophisticated area of pure mathematics," says Farah. "Although my research is on the interface of all of these areas, my main motivation has always been the intrinsic beauty of the mathematics itself."

ILANA DASHEVSKY The Best Job in the Universe

**WORKING ON THE HUBBLE TELESCOPE.
CAN IT GET ANY BETTER?**

LATVIAN-BORN ILANA DASHEVSKY (BSc '97) never imagined that her love of astronomy would lead to a career writing software commands for the iconic Hubble Space Telescope. And a York science degree helped get her there.

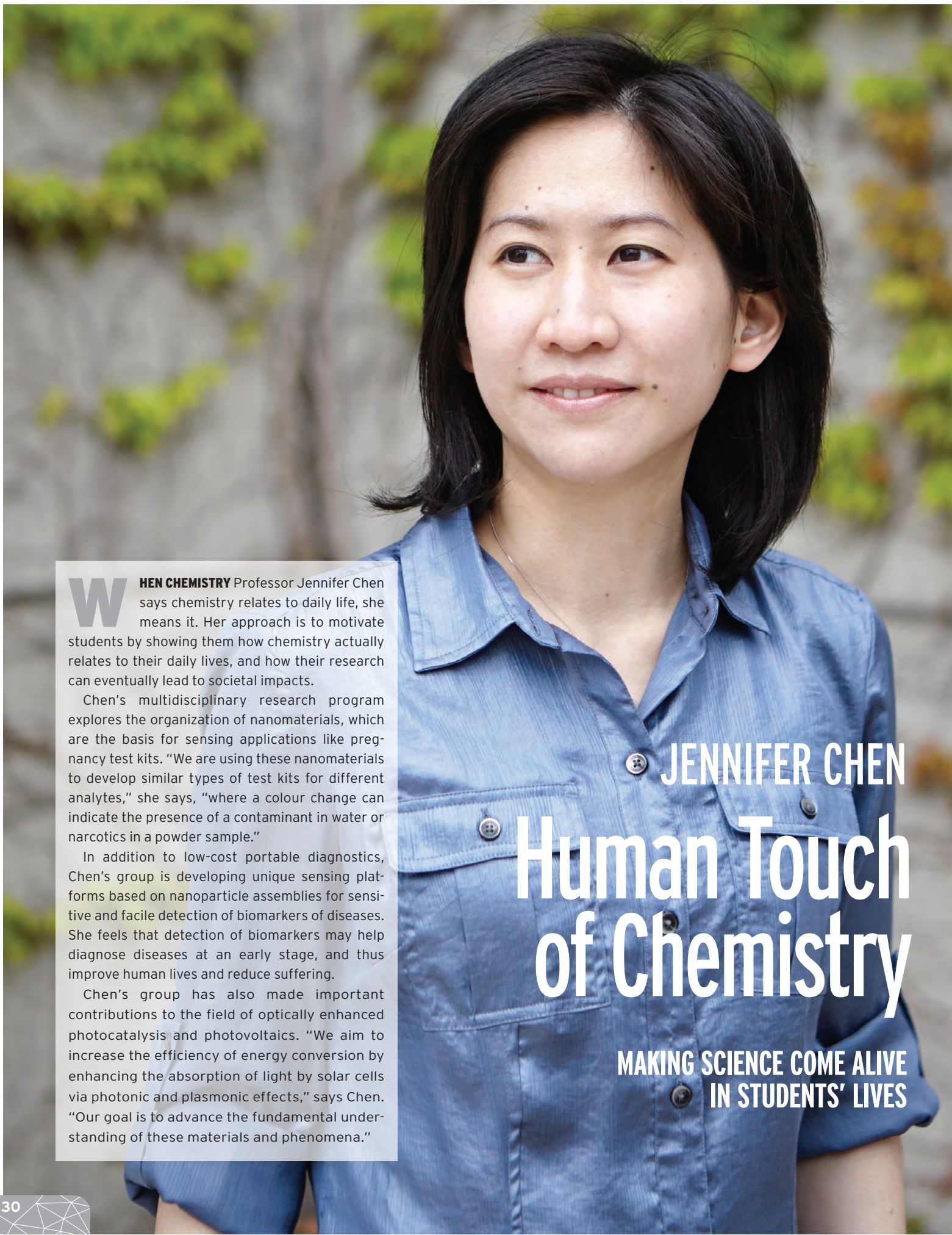
Dashevsky's family immigrated to Calgary when she was just six, and soon after they made their way to Toronto. In 1992, when it came time to start university, Dashevsky chose York's astronomy program.

Dashevsky became heavily involved in the York community - she served as president of the Astronomy Club and was a member of the York University Observatory team. She formed relationships with physics and astronomy Professors Paul Delaney and John Caldwell, subsequently completing a research assistantship with Caldwell. It was at York that Dashevsky worked with her first Hubble images, an experience that proved beneficial in future job interviews.

It was this passion that led Dashevsky to a position at the Space Telescope Science Institute (STScI) in Baltimore, Maryland, the scientific base for NASA's Hubble Space Telescope. As a software systems engineer, Dashevsky was part of a team that wrote commands for Hubble's telescope and cameras. After many years at STScI, Dashevsky and her team now develop mission systems for the James Webb Space Telescope, a project that will yield infrared pictures of younger, distant galactic regions to complement those compiled by Hubble.

"I see Hubble images everywhere I go," Dashevsky says, "in bookstores and in movies. It's a really good feeling to know that I helped a tiny bit to make that happen. The images are out there to inspire other people."





WHEN CHEMISTRY Professor Jennifer Chen says chemistry relates to daily life, she means it. Her approach is to motivate students by showing them how chemistry actually relates to their daily lives, and how their research can eventually lead to societal impacts.

Chen's multidisciplinary research program explores the organization of nanomaterials, which are the basis for sensing applications like pregnancy test kits. "We are using these nanomaterials to develop similar types of test kits for different analytes," she says, "where a colour change can indicate the presence of a contaminant in water or narcotics in a powder sample."

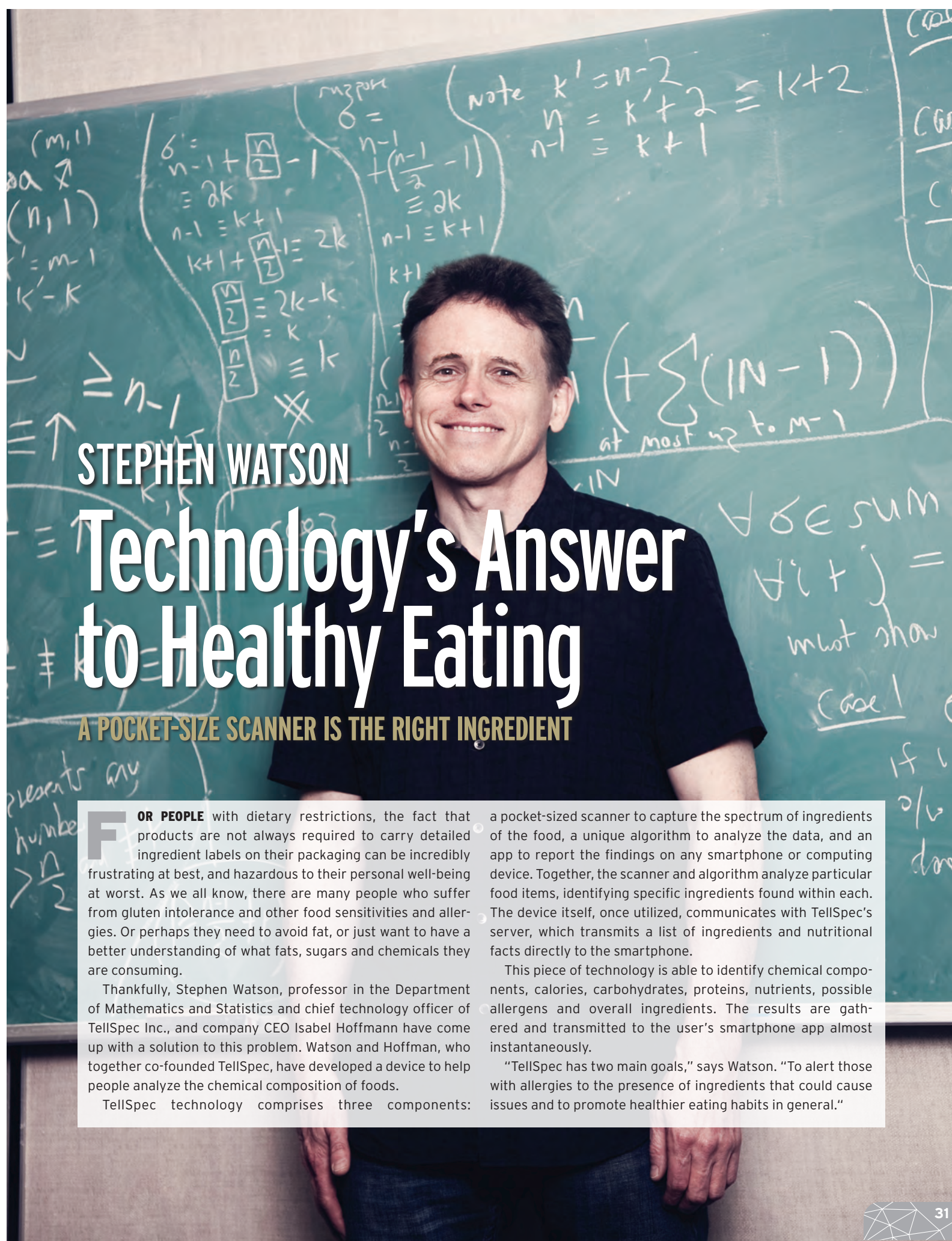
In addition to low-cost portable diagnostics, Chen's group is developing unique sensing platforms based on nanoparticle assemblies for sensitive and facile detection of biomarkers of diseases. She feels that detection of biomarkers may help diagnose diseases at an early stage, and thus improve human lives and reduce suffering.

Chen's group has also made important contributions to the field of optically enhanced photocatalysis and photovoltaics. "We aim to increase the efficiency of energy conversion by enhancing the absorption of light by solar cells via photonic and plasmonic effects," says Chen. "Our goal is to advance the fundamental understanding of these materials and phenomena."

JENNIFER CHEN

Human Touch of Chemistry

MAKING SCIENCE COME ALIVE IN STUDENTS' LIVES



STEPHEN WATSON

Technology's Answer to Healthy Eating

A POCKET-SIZE SCANNER IS THE RIGHT INGREDIENT

FOR PEOPLE with dietary restrictions, the fact that products are not always required to carry detailed ingredient labels on their packaging can be incredibly frustrating at best, and hazardous to their personal well-being at worst. As we all know, there are many people who suffer from gluten intolerance and other food sensitivities and allergies. Or perhaps they need to avoid fat, or just want to have a better understanding of what fats, sugars and chemicals they are consuming.

Thankfully, Stephen Watson, professor in the Department of Mathematics and Statistics and chief technology officer of TellSpec Inc., and company CEO Isabel Hoffmann have come up with a solution to this problem. Watson and Hoffman, who together co-founded TellSpec, have developed a device to help people analyze the chemical composition of foods.

TellSpec technology comprises three components:

a pocket-sized scanner to capture the spectrum of ingredients of the food, a unique algorithm to analyze the data, and an app to report the findings on any smartphone or computing device. Together, the scanner and algorithm analyze particular food items, identifying specific ingredients found within each. The device itself, once utilized, communicates with TellSpec's server, which transmits a list of ingredients and nutritional facts directly to the smartphone.

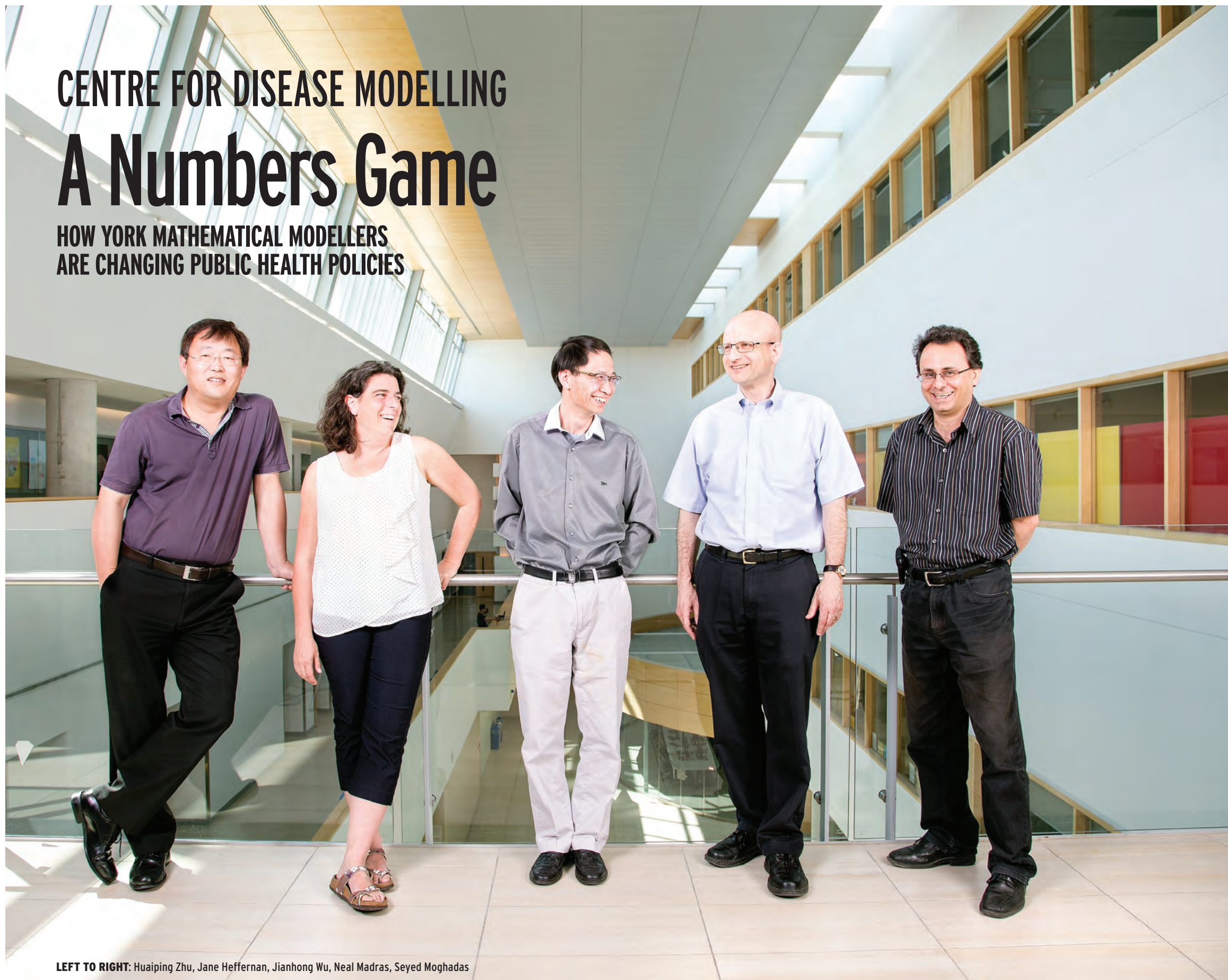
This piece of technology is able to identify chemical components, calories, carbohydrates, proteins, nutrients, possible allergens and overall ingredients. The results are gathered and transmitted to the user's smartphone app almost instantaneously.

"TellSpec has two main goals," says Watson. "To alert those with allergies to the presence of ingredients that could cause issues and to promote healthier eating habits in general."

CENTRE FOR DISEASE MODELLING

A Numbers Game

HOW YORK MATHEMATICAL MODELLERS
ARE CHANGING PUBLIC HEALTH POLICIES



LEFT TO RIGHT: Huaiping Zhu, Jane Heffernan, Jianhong Wu, Neal Madras, Seyed Moghadas

MANY WHO WERE IN ONTARIO in 2003 can remember where they were or what they were doing when the SARS outbreak occurred - whether they were directly affected, learned about it through the media, or attended the benefit concert held in downtown Toronto.

Yet for a small group of mathematical modellers, reaction to this health crisis quickly evolved from a small-scale modelling and simulations project into an interdisciplinary program with more than 20 researchers from universities, hospitals, research laboratories and government agencies. Thus the Centre for Disease Modelling (CDM) was born.

CDM's core members are from York's Department of Mathematics and Statistics and include Professors Jianhong Wu, Jane Heffernan, Neal Madras, Seyed Moghadas and Huaiping Zhu. This group has collective expertise in dynamical systems, stochastic analysis and simulations, viral dynamics, agent-based simulations, data analysis and parallel computing.

The mission of CDM is to develop and sustain a national capacity of disease modelling to inform public health decision makers on potential risks to Canadians. In just 10 years, CDM has firmly established itself as a Canadian network with collaborating institutions and research activities across Canada. CDM's network also spans globally to include collaborations in China, India, Brazil and throughout the US and Europe. CDM members work on a diverse range of diseases, including the HIV/AIDS epidemic, avian influenza and vector-borne diseases such as Lyme disease, West Nile virus and Dengue fever. They also look at the impact of climate change on human health and the spread of diseases. As well, CDM plays a significant role in multiple national projects on antimicrobial drug resistance in Canadian hospitals; disease prevention and control in aboriginal communities; and economic impact of vaccine and immunization programs.

During the 2009 H1N1 influenza pandemic, CDM developed templates of models and simulations to facilitate optimal rapid response and mitigation measures. This work led to changes in the national pandemic influenza management policy to include strategic and adaptive use of antivirals. "When Mitacs funded this initiative we never anticipated just how much CDM would exceed our expectations," says Arvind Gupta, former Mitacs scientific director and current president of the University of British Columbia. "They have become a powerhouse in linking mathematical modelling to public health policy and practice."

While protecting the general population through research efforts is the main objective, CDM finds it equally important to educate and train the next generation of mathematical modellers. Its members host the annual Incubation Day, aimed at showcasing research activities and fostering networking opportunities. They also organize a summer school series that provides effective training to hundreds of students with diversified backgrounds for collaborative research in mathematical modelling, analysis and simulations of infectious disease dynamics.

"Although CDM is over 10 years old, this is just the beginning for us," says CDM Founding Director Jianhong Wu. "In the next few years you'll be seeing many more high-level scientific outputs from us with significant impacts on public health policies and programs. Stay tuned."



TAMARA KELLY

Wanted: Independent Thinkers

AWARD WINNER FOR
TEACHING EXCELLENCE

"SCIENCE TEACHING is in the middle of a transition," Professor Tamara Kelly says. A recipient of the President's University-Wide Teaching Award and two-time winner of the Faculty of Science Excellence in Teaching Award, Kelly is one to know. As an associate lecturer and chair of the Faculty of Science Committee on Teaching and Learning, Kelly is working to introduce and sustain initiatives to promote the pedagogical shift at York.

Like many in her field, Kelly emphasizes evidence-based teaching approaches. In the classroom, it means moving away from traditional lecture-based courses to more student-focused ones that encourage independent thinking and scientific inquiry. Some strategies in place include the use of case studies, group activities, clickers, and peer instruction in large lecture settings, as well as two-stage exams to help students develop skills to communicate science and discuss ideas.

There is more emphasis on high-quality teaching and learning at York, Kelly says, but there are also challenges such as increasing class sizes and improving the shortfall in professional development among educators.

"Teaching is often viewed as a private, highly personal activity, and people can be self-conscious about sharing their teaching approaches or seeking feedback," explains Kelly. "This is something we're working to change."

Kelly's initiatives with the Committee on Teaching and Learning include a newly revived Science Education Seminar series and a monthly Science Education Journal Club to foster discussion. Just as research relies on the support of a community, she notes, so does teaching.

"Teaching is not an innate ability - it's a skill that can be developed, honed and refreshed."



WENDY TAYLOR

Following the Big Bang

WHAT CAME NEXT?

IF YOU HAVE EVER WATCHED the hit television sitcom "The Big Bang Theory," then you might feel as though you know a little bit about physics and the origins of the universe. However, like all entertainment programs that attempt to mimic science and real life, it can be teeming with inaccuracies.

Fortunately, researchers like Wendy Taylor are seeking to replicate and observe the conditions that would have existed immediately after the events of the Big Bang. Taylor is a physics professor and a member of ATLAS at the Large Hadron Collider at CERN in Switzerland. The ATLAS consortium is famous for the discovery of the Higgs boson, a particle hypothesized that explains why some particles have mass but others, such as photons, do not.

Taylor is also searching for the famed and fabled magnetic monopole. There are many questions surrounding its existence and the potential for its discovery, and it is considered to be one of the great modern mysteries of particle physics.

"All magnetic objects that have ever been observed have a north pole at one end and a south pole at the other end," explains Taylor. "A magnetic monopole is a particle postulated to carry only a south or a north pole. If a magnetic monopole exists, theory shows that this would explain why there appears to be a fundamental unit of electric charge."



PAUL DELANEY

The View is Out of this World

TAKING A PEEK THROUGH YORK'S CELEBRATED TELESCOPE

THE YORK UNIVERSITY ASTRONOMICAL OBSERVATORY was built in 1968 as an integral part of the Petrie Science and Engineering Building. Under the guidance of Professor Ralph Nicholls, and then Professors Kim Innanen and Stan Jeffers, two Cassegrain reflecting telescopes with 30 cm and 60 cm diameters respectively were permanently installed.

From the outset, the 60 cm telescope was used primarily for research. Spectroscopic and photometric studies with this telescope have resulted in many research papers and graduate theses. Since 1995, research projects under Professor Paul Delaney's supervision on variable star behaviour have continued. Engaging undergraduate students in asteroid photometry and spectroscopic studies of Titan - a moon of Saturn - will begin in 2014.

In the 1970s, the Observatory's smaller 30 cm telescope was used to support a number of undergraduate astronomy courses, summer public viewing (PV) sessions and regular tours. Winter public viewing was not introduced until 1987, and three years later year-round Wednesday PV was initiated. In 1999, the 30 cm telescope was replaced by a Meade Corporation LX 200 40 cm diameter Schmidt Cassegrain telescope. This allowed for improved image quality, more light gathering power and an extensive array of computer reachable objects, enhancing the capabilities for students and visitors alike.

There have been many special observing events that have taken place at the Observatory over the years. Without question, however, the (near) annular eclipse of the Sun, as seen from Toronto in 1994, was particularly noteworthy. While most media and educational organizations were actively telling people not to be outside for this phenomenon, York, along with other science organizations, trumpeted the opportunity to observe one of nature's truly spectacular events.

Not only was the Observatory kept open, but some 15 portable telescopes were set up in the Steacie parking lot. Hundreds of members of the campus community, along with

some 500 school students, came out to observe as the Sun all but disappeared. The Observatory showed that such a once-in-a-lifetime event should not be missed, and that it was perfectly safe to view with the right precautions.

Another special moment arrived when, on August 27, 2003, Mars was but a scant 55.76 million kilometres from Earth, its closest approach for another 60,000 years. While the Red Planet Mars passes relatively close to Earth every 26 months or so, rarely does it pass so close. Played up by the media, visitors to the Observatory appeared in the thousands, all hoping to catch a glimpse of Mars, and often waiting hours to do so. In total, some 3,500 visitors passed through the Observatory, which stayed open till 3am for five straight nights to allow all of them to see the planet at its finest.

There have also been many other notable observing events at the York Observatory. These have included the Comet Shoemaker-Levy 9 impact on Jupiter (July 1994), the Comet Hyakutake (March 1996), the Comet Hale Bopp (April 1997), and the Transit of Venus (June 2012).

During York's 50th birthday celebrations in 2009, the telescopes went online and began broadcasting images live every Monday evening for an online public viewing (OPV) experience. Coupled with an online chat window, people around the world could observe objects live through the York telescopes and ask questions of the student observers. Shortly thereafter the OPV program started running in conjunction with York Universe, a one-hour live online radio show on astronomy.fm. In excess of 30,000 listeners worldwide tune in to the show each week.

The OPV, PV, onsite tours and York Universe are all part of the Observatory's extensive public outreach program, which reaches more than 5,000 campus visitors and one million online listeners annually. It is maintained by a dedicated team of students, faculty and alumni who enjoy sharing the world of astronomy and space science with the broader public, and who act as important science and York ambassadors.

EDWARD
JONES-IMHOTEP

A New Addition

YORK'S FACULTY OF SCIENCE
INCORPORATES A NEW
DEPARTMENT TO BROADEN THE
SCOPE OF SCIENCE STUDIES

In 2014, York University's longstanding Science and Technology Studies program became the newest department in the Faculty of Science. Edward Jones-Imhotep, professor of history of science and technology, outlines the importance of the new addition.

Q: How would you describe the science and technology studies (STS) program for someone unfamiliar with it?

A: Scientific disciplines like physics or biology or chemistry teach you how to do science - how to use the equations of motion, for instance, or identify cell components under a microscope. STS draws on this knowledge, but it is most interested in how to think about science and technology. What defines them? How do they produce their knowledge and their artifacts? How does their work relate to politics, economics, culture and society?

Q: Who should study STS and why?

A: Given the importance of science and technology in our society, practically anyone would benefit from courses in STS. In addition to PhD and MA programs, we offer both BSc and BA degrees, which means undergraduate students can explore certain topics here in a depth that's not possible elsewhere at York. Our courses deal with the philosophy of quantum mechanics, the history of artificial intelligence, and the social and cultural relations of evolutionary theory, to take some

examples. STS provides a space for those important topics, and many others. As a result, it is both demanding and immensely rewarding. Students who excel at it have a deep interest in science and technology, but also strong abilities in writing and critical thinking, and a curiosity that's not restricted by traditional disciplinary boundaries between the sciences and the arts and humanities.

Q: What kinds of jobs are available to the STS graduate?

A: STS develops communication and critical thinking skills that are broadly applicable in areas like consulting or project management, and in professional programs like law, business and medicine. But it also provides students with the ability to discuss specific scientific or technological issues of broad public interest. I recently did a series of interviews across the country on CBC Radio, for example, discussing the effects of digital technology on kids. That kind of role within the media is very well suited to the skills we develop.

Q: It sounds like the new department will bring something special to the Faculty of Science and York.

A: I think it will. It gives us the rare ability to explore the sciences in all their richness and depth - grappling with pressing technical questions, while also stepping back to ask crucial questions about the sciences and technology as a whole. It's a very exciting time.

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