

YORKU

SPECIAL RESEARCH EDITION 2005



Lake Doctor

Biologist Norman Yan battles invaders in cottage country

PLUS:

Mars: The Search for Life

The Promise of Stem Cells

Tracking SARS

US Border Blues



..... A geologist sees fossil fuel.
 An engineer sees space stations.
 An historian sees war.

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THE MAGAZINE OF YORK UNIVERSITY



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RESEARCH 2005

STAN SHAPSON

Challenging the Ordinary

Within the pages of this special research edition of *YorkU*, you will find a snapshot of the breadth of research excellence and innovation at York University. We are the third largest university in Canada, with a comprehensive mix of professional schools and faculties spanning the full spectrum of research in the sciences, social sciences, humanities and fine arts. Our traditional strengths in the liberal arts are combined with our growing international reputation in natural and health science as we continue to diversify our signature interdisciplinary approach that distinguishes York as an innovator in research.



In reading the articles, reprinted from the past two years of *YorkU*, you will discover that our research touches almost every facet of life. Our real strength, however, lies in our capacity for unique collaborations and synergies. We facilitate meaningful ways for our researchers to work together and understand that only an integrated, multifaceted approach can advance the human condition. We also bring together a rich and diversified group of external partners who ensure our research has maximum impact.

Innovative and interdisciplinary, committed to challenging the ordinary and exploring the unusual – York is taking the lead in redefining university research. ■

Stan Shapson is York's vice-president research & innovation.

SAMUEL SCHWARTZ

The Passion for Research

When I entered York University in 1967 to pursue my master's degree in political science, I never dreamed I would be where I am today – serving on the University's Board of Governors and helping to promote the research excellence of this great institution. But my time as a student at York truly shaped my future. The innovative nature of the people and the programs had a profound impact on me.



Today, York University remains at the forefront of innovation. As Chair of the board's Academic Resources Committee, I regularly visit the University's research centres and see the groundbreaking work taking place there. The quality of the research is matched only by the passion that the researchers and students in these centres have for the generation and dissemination of new knowledge, ideas, solutions and products.

But research and innovation at York requires not only the finest, most innovative researchers and students in Canada; it requires visionary, dynamic partners and investors. We invite those who believe in making a major contribution to our community, our country and our world to join us. ■

Osgoode alumnus Samuel Schwartz is senior partner at Goodman and Carr LLP, a member of York's Board of Governors and Chair of its Academic Resources Committee.

YORKU

THE MAGAZINE OF YORK UNIVERSITY
SPECIAL RESEARCH EDITION 2005

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This Special Research Edition of *YorkU* showcases key stories about research at York University published from 2003 to 2005. Each feature story shows the issue it is reprinted from, and each Universe item shows the year; stories are printed in their original form although designs may have been altered. *YorkU* is published bi-monthly, five times during the academic year, by the Marketing & Communications Division of York University.

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redefine THE POSSIBLE.

Getting the word out about York's research excellence. BY LORNA R. MARSDEN

In the Real World

When I was appointed president of York in 1997, the good news in Canada was the trajectory for Asteroid 3753 Cruithne, which had been discovered by York researchers Paul Wiegert and Kim Innanen. But the bad news was that while most people had heard about this fascinating discovery – the asteroid accompanies earth in its orbit, making it the planet's only natural companion besides the moon – the public failed to connect it to York University. That is our challenge – to get the world to realize the long and distinguished history of science, research and discovery at our University.

While the presence of research and an associate vice-president responsible is of long standing, it was only in 2000 that York appointed its first VP Research & Innovation, Stan Shapson. The aim of this new position was to bring focus and leadership to York's research effort, to maintain it as a central part of the University's long-term strategy and, above all, to get



neighbouring York Region by contributing their expertise to businesses and public services. Our health policy experts are providing new ways of thinking for governments. As Stan Shapson puts it: "Research at York tears down the ivory tower."

Innovation is key to this

the word out about research at York. Our 22 research centres report to VP Shapson, as does the Office of Research Services, which works with researchers and applicants for grants in all 10 faculties.

The results of this organizational change are beginning to show. VP Shapson has made York's presence felt in granting council circles and has supported the work of dozens of distinguished colleagues. At the same time, he has guided us into a more sophisticated strategy for meeting our three goals of focus, strategic thinking and profile.

Pointing to the key interests of granting councils, the VP R&I has supported groups of interdisciplinary researchers in the important areas of health, sustainability and the environment, culture and entertainment, and international studies. York's interdisciplinary and collaborative focus helps us to approach these issues in a truly unique way.

Innovation is key to this effort. So is working with the community, transferring technology and knowledge. York spin-off companies are contributing to economic development. Our researchers are helping to shape local communities like

Lorna R. Marsden is York's president and vice-chancellor.

effort. So is working with the community, transferring technology and knowledge.

Recently, five new Canada Research Chairs were awarded to our researchers, bringing York's total of CRCs to 31. Caitlin Fisher is investigating the future of narrative through explorations of in-

teractive storytelling and interactive cinema in augmented reality environments and through research into the epistemological status of digital archives. Joshua Fogel is undertaking a historical examination of the dynamic cultural and political interactions between China and Japan in the modern era. Sherry Simon is examining translation in the context of intensified global connectivity, with particular attention to the multilingual nations of Canada and India. Wendy Taylor's research aims to clarify the nature of the smallest constituents of matter and the fundamental forces between them, including the Higgs particle and supersymmetry. Peer Zumbansen is exploring the impact of globalization on national political economies, concentrating on changing forms of production and on the politics of privatization and deregulation.

That's research in the real world. To find out more, just log on to www.research.yorku.ca and see how York is redefining university research in Canada. ■

PHOTOGRAPHY BY BRIAN REISER

PHOTOGRAPHY BY COREY MIHALIUK

JAVA JOY

York's own brand of premium rainforest coffee is on sale at Timothy's

UNIVERSE

Feel like a coffee? Why not head to your neighbourhood Timothy's café and order a cup of smooth Las Nubes. That's York's very own brand of premium coffee. It's brewed from quality coffee beans, certified "sustainable" and nearly all shade grown from farms near York's Las Nubes Rainforest reserve in Costa Rica, and roasted and packaged in Downsview at the Timothy's World Coffee central warehouse. The Canadian coffee chain launched York's Las Nubes brand as its coffee of the month in April at its 140 locations across the country.

This unusual marketing partnership between York and Timothy's was the brainwave of environmental studies Professor Howard Daugherty. In 1998, Daugherty's friend Dr. Woody Fisher donated Las Nubes Rainforest to York. As director of the Fisher Fund for Neotropical Conservation, which funds biodiversity research at Las Nubes, Daugherty was looking for a way to give nearby coffee growers an incentive to increase sustainable production, and to raise money for research. Over the past four years, the coffee growers had already implemented environmentally friendly agricultural methods, benefiting greatly from research conducted by York students and the Tropical Science Centre of Costa Rica. Daugherty decided to buy 10,000 pounds from their cooperative to test the market in Canada.

Then he approached Timothy's World Coffee president and CEO Becky McKinnon about marketing the coffee in Canada. Once she was assured the coffee growers could supply high-quality beans to meet Timothy's standards, she struck a deal. Timothy's has just bought 30,000 pounds directly from the growers' co-op for \$1.30 US per pound – four cents more than the official fair-trade price and about double the world price for coffee. Timothy's, already buying in Costa Rica, also agreed to cover the cost of transportation to port, which gave farmers even higher value. For every pound sold, Timothy's will also donate \$1 Canadian to the Fisher Fund, through the York University Foundation, to support sustainability research and community programs at Las Nubes.

"We are very excited about this relationship," says McKinnon. "We strive to educate our consumers about the link between good growing practices and great tasting coffee." The more coffee sold, the more money goes into research and quality; the more the quality improves, the more farmers get paid. It's an "upward spiral," says McKinnon. ■

FULL OF BEANS: McKinnon and Daugherty at Timothy's warehouse

PHOTOGRAPHY BY GEOFF GEORGE

2005

Medieval Mystery Tour

Malcolm Thurlby's scholarship guides West Country tourists

With a title like *The Herefordshire School of Romanesque Sculpture*, it may be a stretch to call art historian Malcolm Thurlby's first book a bestseller. But ever since travel writer Christopher Somerville reviewed it last spring in Britain's *The Daily Telegraph*, church-hopping tourists to England's West Country have been scooping it up. With the York professor's paperback in hand, Somerville told readers, he had found the key to the "riot of carvings" that decorates Kilpeck and dozens of other rural 12th-century churches dotting the Welsh Borders. Now in its fourth printing, Thurlby's illustrated guide explains the origins of the eccentric and uninhibited mix of Celtic and Christian imagery – bug-eyed dragons, pointy-headed soldiers, grimacing gargoyles and all manner of fish and fowl – parading around the doors and windows of Kilpeck's tiny stone chapel.

British-born Thurlby, a prolific scholar of medieval ecclesiastical art and architecture, draws upon 40 years of research to detail the sources of inspiration. The masons, hired by Norman rulers of the then disputed borderlands, drew their inspiration from the Bible and *The Bestiary*, a book of beasts, as well as from their patrons' descriptions of Romanesque churches seen on pilgrimages to France and Spain. In everyday language, Thurlby traces such influences with the zeal – undiminished since he was a schoolboy – of a detective. ■



If you're an investor, how you weather the stock market's ups and downs may depend on Mother Nature herself, says Melanie Cao, Schulich School of Business finance professor. Cao and fellow researcher Jason Wei, a University of Toronto business professor, found evidence that ties market performance to outside temperature. When it's cold, investors act aggressively. When it's hot, they act apathetically and the market generally performs below average.

"There have been lots of psychological studies showing temperature affects mood," says Cao. "Mood changes lead to behavioural change. For instance, people tend to rate their life satisfactions much higher on sunny days than on cloudy ones.

So we were interested to see if there was a link between market behaviour and temperature."

Cao and Wei tracked returns worldwide in 20 markets (comparing for the same season). They found a statistically significant correlation between temperature and market performance even when controlling for anomalies (the "Monday" effect, local cloud cover, etc.). Returns were better when the weather was cold, and not so hot when the temperatures soared.

What advice might investors take away from her study? Cao says: "Buy in the summer and hold until the end of winter. In the long term – say 10 years or more – your chance of getting a good return is very high." ■

2005

Now You're Talking

Why bilingualism may be good for the brain

If you're fluent in two languages, it's like going to "the brain gym", says York psychology Professor Ellen Bialystok. She recently discovered that bilingual people consistently outperformed monoglots on a series of cognitive tests. Why? It seems that if you have two or more languages at the tip of your tongue you're continually forced to make choices. The brain has to suppress one language in favour of the other and in so doing exercises itself – rather like brain Pilates. Psychologists call this choice mode "executive function" (the ability to prioritize tasks and focus one's attention).

Executive efficiency declines markedly as we get older. But Bialystok found that in three studies comparing the performance of bilingual vs. monolingual adults, both younger bilingual adults (aged 30 to 59) and older ones (60 to 88) had faster reaction times than comparable monoglots. The studies involved the Simon Task – a computerized test measuring people's reaction times in correctly choosing from competing on-screen stimuli. Although executive function slows down after age 60, Bialystok discovered that those who spoke two languages significantly outperformed single language speakers on the Simon Task at age 60 and beyond. ■

PHOTOGRAPHY BY RSQUARED

ILLUSTRATIONS BY MARIE POULIN; PHOTOGRAPHY BY RSQUARED

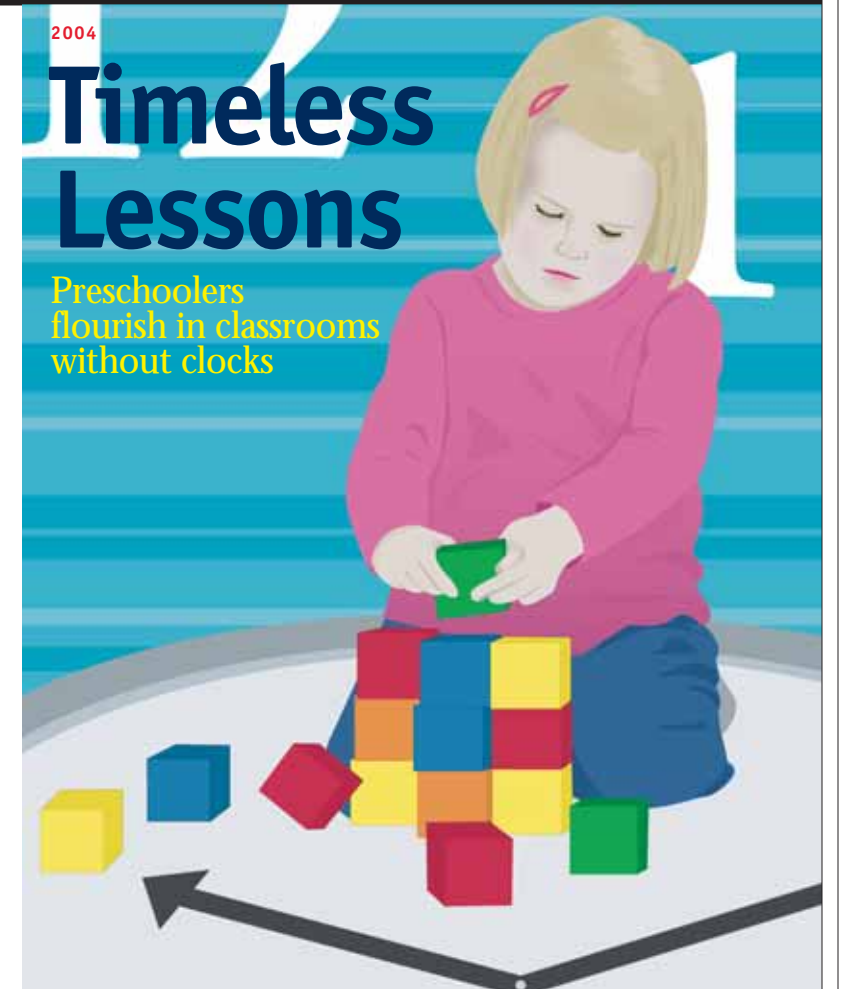
2004

Timeless Lessons

Preschoolers flourish in classrooms without clocks

Here's a recipe for happy preschoolers: throw away the clock, discard rigid rules and let them play when and for as long as they please. Early childhood education expert Carol Anne Wien guarantees the little ones will be calmer, quieter and more cooperative. Since 1995, she's advocated "letting time go" in daycare settings. That doesn't mean a free-for-all, but respecting the complex rhythms of childhood, says Wien. She's recently documented and published the effect of doing just that on children and their caretakers at three non-profit child-care centres in Hamilton, Ont.

Taking their cue from Italy's Reggio Emilia approach, where children set their own creative agendas, staff at the centres scrapped an excess of silly rules – no door licking, no blowing on food. They abandoned timetables, except for basics like lunch, and let children choose where they wanted to play. After a few months, children concentrated longer and were generating their own games and rules. Their confidence grew because they realized adults thought they were capable. And teachers, no longer exhausted by enforcing the rules, enjoyed more positive relationships with the children. It all goes to show, concludes Wien, that rigidly structured activities are "so contradictory to how children want to learn." ■



Breaking Up Is Hard to Do



For most teen girls, boyfriends come and go. But sometimes the going gets tough. Teen romances last an average of four months and give girls a chance to learn about what makes a good relationship. Usually the partings are amicable.

"Some will weather a breakup fine," says York psychology Professor Jennifer Connolly. "But for a small number – whether they or their boyfriends initiate the end of the relationship – the breakup leads to serious depression and even suicide attempts."

Determining why these adolescents suffer so much is what interests Connolly, director of York's LaMarsh Centre for Research on Violence & Conflict Resolution. Along with York Professor Debra Pepler and Queen's University Professor Wendy Craig, Connolly is studying girls and boys from Grades 7 to 12 over an 18-month period to find out how young people deal with dating relationships and cope after breakups.

Connolly hopes her findings on dating and its problems may one day help promote positive relationships and understanding between the sexes. "Girls' perceptions are heavily influenced by the media," she says. "They think all their peers have boyfriends and they have unrealistic expectations for those relationships. In reality, less than 20 per cent of 13- to 15-year-olds have a current romantic partner, and most relationships are based on companionship, not emotional closeness. Kids need a perspective on what's normal and what's reasonable for relationships at this age." ■

ILLUSTRATION BY RYAN PRICE

Farm Out

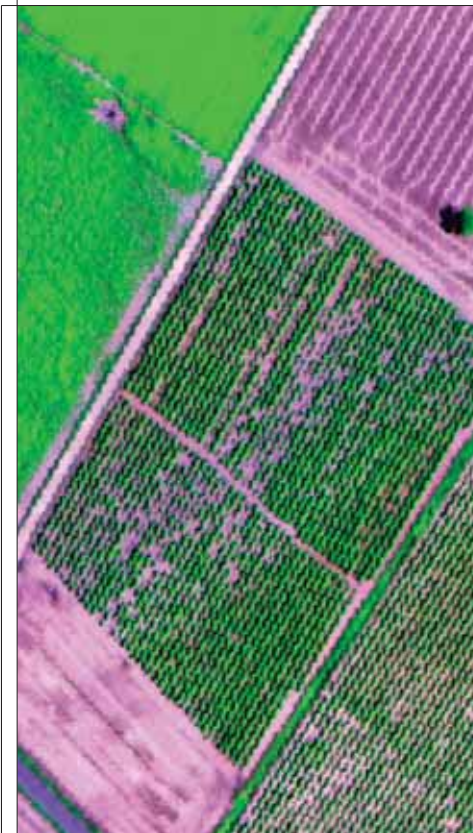
A York scientist advances techniques for remote sensing

Imagine you're a farmer with hundreds of acres of crops. Now you can know exactly what parts of your field need more (or less) water or fertilizer – right down to a single acre. Sound impossible? Not with the new emerging field of "precision farming".

Enter York physics Professor John Miller, who works in the area of geomatics. Not too long ago Miller was in Spain with York PhD grad Pablo Zarco-Tejada mapping Spanish vineyards and olive groves from an airplane using the technique of remote sensing.

Miller is perhaps better known for his work around remote sensing of chlorophyll pigments in deciduous forests (precise inference of colour from leaves can give an indication of tree vigour and detect problems, he says). But the same techniques used to sustainably manage woodlots are also valuable to farmers.

The Spanish project came up as an offshoot of Miller's work to improve the technology involved in precision farming. Says Miller: "We collect the data as accurately as possible, but we ultimately leave it up to other experts like ecologists or plant scientists on how to use it." ■



2005

A Steacie for York

Scientist Doug Crawford wins the prestigious prize

York scientist Doug Crawford is this year's winner of the prestigious Steacie Prize, awarded to a promising young Canadian scientist or engineer who is 40 or under. Although the award began in 1964, this is York's first Steacie. Other illustrious recipients have included Nobel Prize-winning chemist John Polanyi (1965). The award is named in memory of E.W.R. Steacie, a physical chemist and former president of the National Research Council of Canada, who was instrumental in the development of science in Canada (and for whom York's Steacie Science Library is named). Crawford is Canada Research Chair in Visual-Motor Neuroscience, associate director of York's Centre for Vision Research and a professor in the departments of Psychology, Biology and Kinesiology & Health Science. His lab is engaged in three areas of vision research: eye-hand coordination; 3-D gaze control; and trans-saccadic integration (piecing together perceptions across different gaze fixations). ■

ILLUSTRATION BY ROB MACDONALD; FARMING IMAGES COURTESY OF JOHN MILLER

2005

Are We Alone?

If not, how do you talk to an extraterrestrial?



York anthropologist Kathryn Denning isn't sure whether we are alone in the universe but she is certain about one thing: we'll have a tough time talking to alien "others" if we ever hear from them. Denning first became interested in the hypothetical challenge of communicating with extraterrestrials at a meeting of the World Archaeological Congress. Her interest was piqued when she heard researchers debating the merits of basic math or simple pictures to construct interstellar messages. She argues that we shouldn't assume these methods could work when there are peoples here on our own planet who can't count or understand two-dimensional representations such as maps. "Language is all cultural, all arbitrary," Denning says. "With archaeological cases here on Earth, deciphering an unknown script usually requires a familiar language, proper names of historical figures and bilingual or multilingual inscriptions." As well as being a member of the World Archaeological Congress's Space Heritage Task Force, Denning has presented papers at meetings of the non-profit SETI Institute (search for extraterrestrial intelligence). ■

What They're Reading

York people reveal what's on the bedside table

Ellen Bialystok,
psychology professor:

Bel Canto

By Ann Patchett
HarperCollins

Due Preparations for the Plague

By Janette Turner Hospital
W. W. Norton & Company

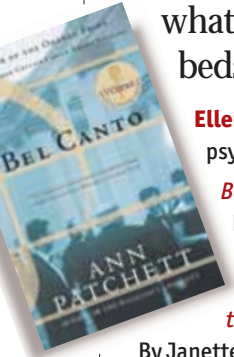
"I've been reading *Bel Canto* (rich and engaging but too predictable in that Agatha Christie closed-world kind of way) and *Due Preparations for the Plague* (absolutely the best – riveting and provocative). I like well-written fiction that reveals something about the human condition through situations that challenge our comfortable lives."

Marcus Boon,
English professor:

The Spell of the Sensuous: Perception and Language in a More Than Human World

By David Abram
Vintage

"I am fascinated by the power involved in naming things. In this book a professional magician and anthropologist uses his travels in Nepal and Indonesia to advance a theory of language production as a practice by which we magically negotiate the relationship between ourselves and our environment. It brings together Aboriginal song-lines, shamanism, Beat poetry and phenomenology! A highly original, mind-boggling read."



Biotech's Risks

'There are huge social issues at stake'

While science makes innovative, almost daily discoveries, the credibility gap – between what the experts say the benefits of their discoveries are, and what the risks might actually be – continues to grow. An area of particular concern is biotechnology. Whether it's possible to regulate biotech and demand accountability in the global production of knowledge is a question Professor Roxanne Mykitiuk of York's Osgoode Hall Law School and doctoral candidate Dayna Scott are investigating.

"Government proclaims the benefits of biotechnology, but simultaneously they're privatizing health care. The question is, are the benefits of genetic technologies real and who is going to benefit from them or be able to afford them?" asks Mykitiuk, whose work is funded by the Social Sciences & Humanities Research Council of Canada and the Law Commission of Canada.

"None of these technologies are without implications. There are huge social issues at stake, particularly when it comes to reproductive technologies and genetically modified organisms. A central aim of our work is to highlight the changing relationship between experts, decision-makers, legal systems and citizens in the production of knowledge and power around biotechnological risk." ■

2005

Bad Words

A mother's insults can hit kids hard

Who hasn't heard the expression "sticks and stones may break my bones but names will never hurt me"? Sadly, insulting words do hurt, especially from parents. They can even do serious psychological damage – perhaps more than some kinds of physical violence, says Glendon psychology Professor Tim Moore, who has published results of his research on insults in the *Journal of Family Violence*.

Words are especially potent when they are in the form of insults delivered by mothers and directed at their children ages 6 to 12, Moore says. "The data are somewhat counterintuitive. On the one hand, should it surprise us that children are negatively affected by their mother's insults? Maybe not, but the magnitude of the effect is alarming," Moore says.

Moore found that children from stable, relatively affluent homes in which mothers report the frequent use of insults show psychological adjustment problems similar to those of kids from chronically violent homes where the mothers (who Moore surveyed in battered women's shelters) did not use insults. For families combining physical violence and a mother's insults, the effect is devastating. "It's a kind of double whammy," says Moore. "The kids have severe adjustment problems."

Why should a mother's words matter more than a father's? Because whether we like it or not, moms are arguably the single most important person in a child's life. "It's not that mothers insult their kids more frequently than fathers," says Moore, "it's that their verbal abuse is more influential." ■



PHOTOGRAPHY BY RSQUARED

This collection of orchid bees might look healthy, but in reality the number capable of breeding is minuscule. Most will die without creating a replacement.

York biology Professor Laurence Packer, who specializes in bee research, and doctoral biology candidate Amro Zayed are using genetic methods to track how apparently healthy bee populations may, in fact, be on the brink of collapse. Genetic problems – likely due to environmental stress – are rendering many male bees sterile. Packer calls it "mutational meltdown".

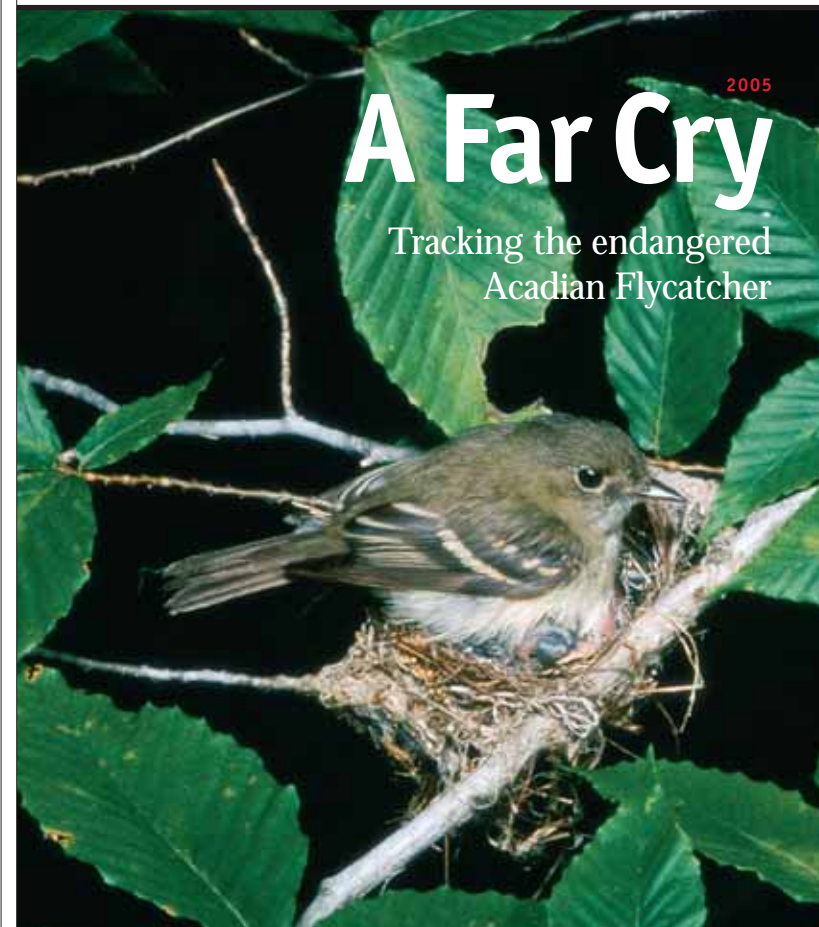
"Just because there appear to be a lot of bees in one spot on one given day doesn't mean much," says Packer. "Numbers are no indication of healthy, sustainable populations. Bees move around, populations fluctuate. One year you could have thousands and the next, none."

The genetic methods Packer and Zayed used demonstrated that the number of effectively reproducing bees in the picture at right is approximately 15. They believe their methods can reveal information about the reproductive health of all bee populations and predict their future success or demise, says Zayed.

Zayed and Packer's research on orchid bees – funded by NSERC and the American Orchid Society, and published in the prestigious Proceedings of the Royal Society – may one day help conservationists find ways to protect nature's premier insect workers (worth an estimated \$782 million to Canadian agriculture in 2001).

"Without bees there would be no apples, no plums, no showy wildflowers. The world as we know it would look totally different," says Packer. "There'd be no coffee," adds Zayed. That's enough to keep anyone awake. ■

FLYCATCHER IMAGES COURTESY OF BONNIE WOOLFENDEN; BEE PHOTOGRAPHY COURTESY OF LAURENCE PACKER



A Far Cry

Tracking the endangered Acadian Flycatcher



2004

The Latest Buzz

It's not good news. York researchers have worries about the health of our most important pollinators – bees.

The Acadian Flycatcher's unique two-note song, "tee-chup", may soon be no longer heard – in Canada anyway. On the endangered species list, only an estimated 40-50 pairs now exist in southwestern Ontario, one of its breeding grounds. But research by York ornithologists Bridget Stutchbury and Bonnie Woolfenden could help reverse that decline.

Stutchbury, a Canada Research Chair in Ecology and Conservation Biology, and Woolfenden, a Postdoctoral Fellow, are monitoring habitat disruption and other factors threatening the birds. (Acadian Flycatchers remain widespread and common in the eastern US.)

An important aspect of Stutchbury and Woolfenden's research is the use of genetic fingerprinting to determine the distinctiveness of "Ontario" vs. "US" populations. "We can now trace gene flows, so we can see if Ontario birds mix with American ones, or how groups move around the Great Lakes area," Woolfenden says. "The more we know the better. Any behavioural data is valuable for making decisions about protecting the Acadian Flycatcher's habitat." ■



2004

Clean-Up Time

A corporate ethics report shows what Canada needs to do

If Canada wants to rescue its sagging reputation for “clean” dealings at home and abroad, its leaders should listen to business ethicist Wesley Cragg. Last year, the professor at York’s Schulich School of Business brought together experts from business, government, non-governmental organizations and academia to discuss a code of ethics for corporate behaviour at home and abroad. In three days, they drafted standards for corporate social responsibility everyone could agree upon – and government should promote. They called for ethical accounting and auditing procedures, improved corporate disclosure and environmentally sensitive procurement policies, among other things.

Such guidelines could do wonders for Canada’s recently tarnished image of incorruptibility, argues Cragg. Companies that promise human rights, fair wages, safety standards, environmental protection and no bribes, can boost – and won’t bust – their profits and Canada’s global competitiveness. Investors, he says, get better value and predictability for their money.

Cragg’s message couldn’t have come at a better time. The code of ethics was released just as news broke of the federal sponsorship scandal, the biggest in a string of scandals – such as Bre-X, Yorkton Securities and Hollinger Inc. – that had shaken international confidence in Canada. Canadians seemed in a mood to listen. “Businesses in Canada,” says Cragg, “need to understand that ethical standards are a bottom-line issue.” ■

2004

The Roots of Pain

Reducing suffering from cancer

There’s no surefire cure for cancer pain, but there may be more helpful physical and psychological strategies to deal with it. Lucia Gagliese, a York kinesiology & health science professor, is studying how young and old patients alike cope with gastrointestinal cancer, to see whether there’s a link between physical pain and psychological distress.

“From preliminary findings, it looks as though the differences in pain lie in its impact and in how people cope – not in their age,” says Gagliese. She says that those who have not learned adaptive pain-coping mechanisms in their life are the ones who suffer most from cancer pain.

“We’re also looking at other causes of why people experience pain differently. We know that elderly people are

less likely to be given painkillers, for instance, and we want to know why. That may be because some health-care workers believe elderly patients are more likely to become addicted to painkillers.”

Gagliese hopes her work will lead to new programs for helping cancer patients cope. Given Canada’s aging population, the study couldn’t be more timely. ■



PHOTOGRAPHY BY RICK REID; ILLUSTRATION BY ROB MACDONALD



PHOTOGRAPHY BY NANCY MERCADO; BANKNOTES USED AND ALTERED WITH PERMISSION FROM THE BANK OF CANADA

2004

Working Knowledge

Inside the real ‘new economy’

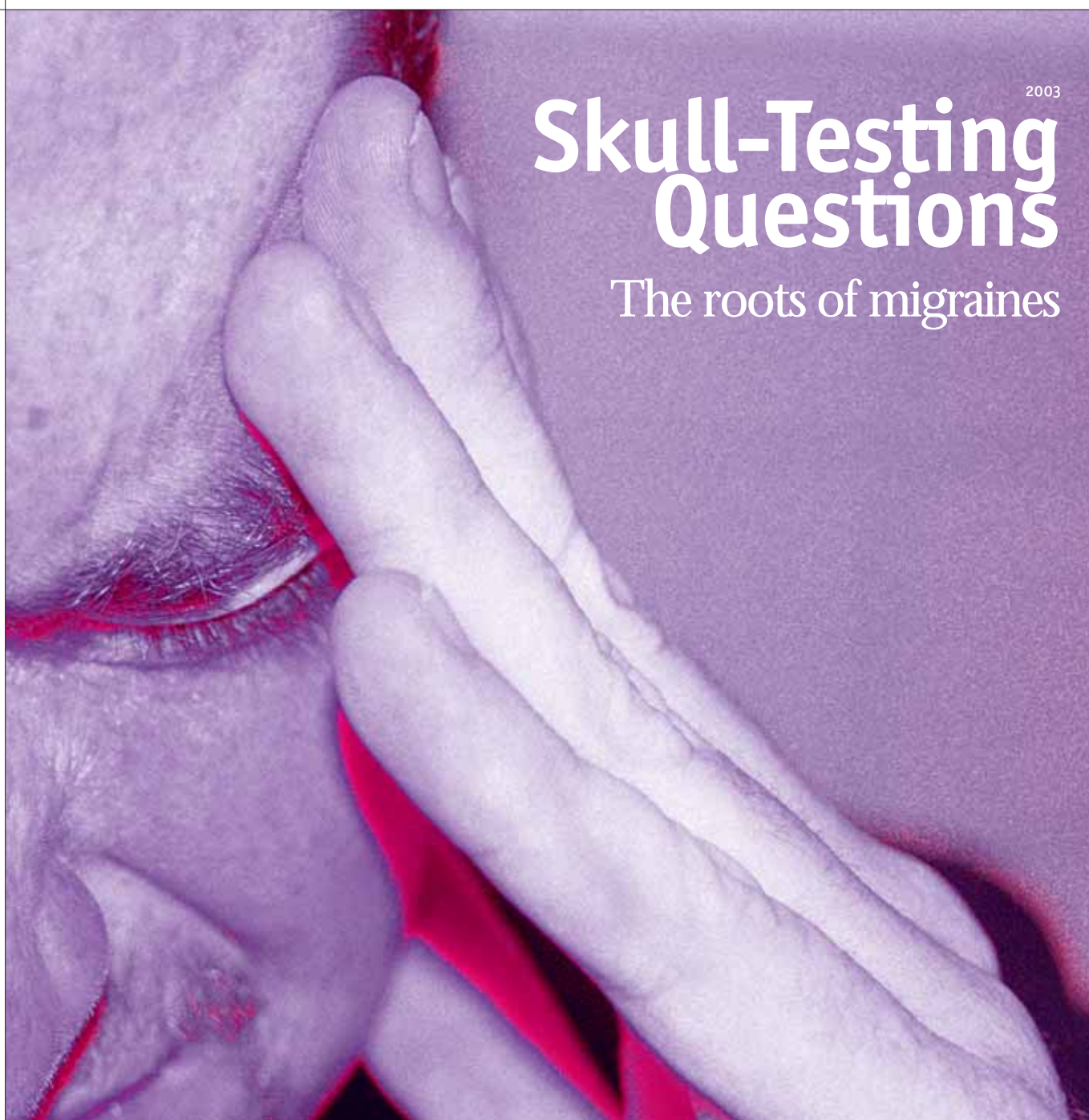
The “new economy” is more than simply a shift to new technology in the workplace. It has restructured the way Canadians work and live, says Norene Pupo, director of York’s Centre for Research on Work & Society. Combined with the forces of globalization, it has transformed communities and created new challenges for labour unions accustomed to the stability of the “old economy”. That’s why 11 of them – including the Canadian Auto Workers and the Canadian Union of Public Employees – are collaborating with scholars from across the country in a three-year study Pupo is leading.

With \$900,000 from the Social Sciences & Humanities Research Council of Canada, she has commissioned studies on the growth of part-time and temporary work and its impact on family life; burgeoning telemarketing services and cultural production (musical festivals, museums, crafts) in regions abandoned by industry; how unions have changed their organizing strategies and developed training programs to adapt to workers’ changing needs; and how privatization has affected work and workers’ health within the public sector. By 2005, Pupo and her team will have an in-depth profile of the real “new economy”, one that will help policymakers respond to the changing needs of working Canadians. ■

Skull-Testing Questions

2003

The roots of migraines



On Fran Wilkinson's office wall is an eye-catching drawing of two heads. Each is filled with tiny squiggles and patterns. They're an artist's approximation of what you might see if you were having a migraine attack. "People do see things like that," says Wilkinson, a York psychology professor and visual neuroscientist affiliated with the Centre for Vision Research. "It's called the migraine aura."

Wilkinson hopes that if she and her research partners can find the link between migraines and suspected visual triggers – flickering lights from computers, for instance, or maybe overhead fluorescent tubes or light patterns from Venetian blinds – they might be able to suggest non-drug therapies or develop diagnostic protocols.

"Visual sensitivity is a very prominent aspect of migraines," she says. "But we don't know why some people are more sensitive to light than others. Maybe light hypersensitivity makes you prone to migraines, or perhaps migraines make you hypersensitive to light. Health psychology research in this area has a lot to offer science and human well-being." ■

PHOTOGRAPHY BY NANCY MERCADO

The oddly-named "pokeweed", *Phytolacca americana*, is native to shaded environments in the southern regions of Canada and the United States. It may one day prove to be an effective weapon against HIV. Kathi Hudak, a York biology professor, is one of a handful of scientists in the world currently studying the possible benefits of pokeweed, which contains a protein called pokeweed antiviral protein (PAP).

Although researchers have been aware of PAP's antiviral potential since 1928, scientists such as Hudak are only now discovering how PAP targets and kills viruses.

Traditionally, scientists believed that the antiviral property of PAP was due to its toxicity, and that the protein would limit virus proliferation by destroying the host cell. Since the early 1990s, however, studies suggest that antiviral activity of PAP is separate from its toxicity, given that it is capable of limiting the spread of HIV without killing its host cell. In fact, PAP is already being used as a therapeutic drug against HIV in South Africa.

Hudak's study of how PAP targets viruses is currently the only real one of its kind in Canada. In future, her findings may help in the manufacture more anti-viral medicines.

Pokeweed, which grows in rich pastures, waste places, gardens, open places in woodlands, and along fence rows also makes a good salad. Collect shoots when they are young and 5-6 inches in length. Cut them in the same way as asparagus, being careful not to take any part of the poisonous root or older stem. ■

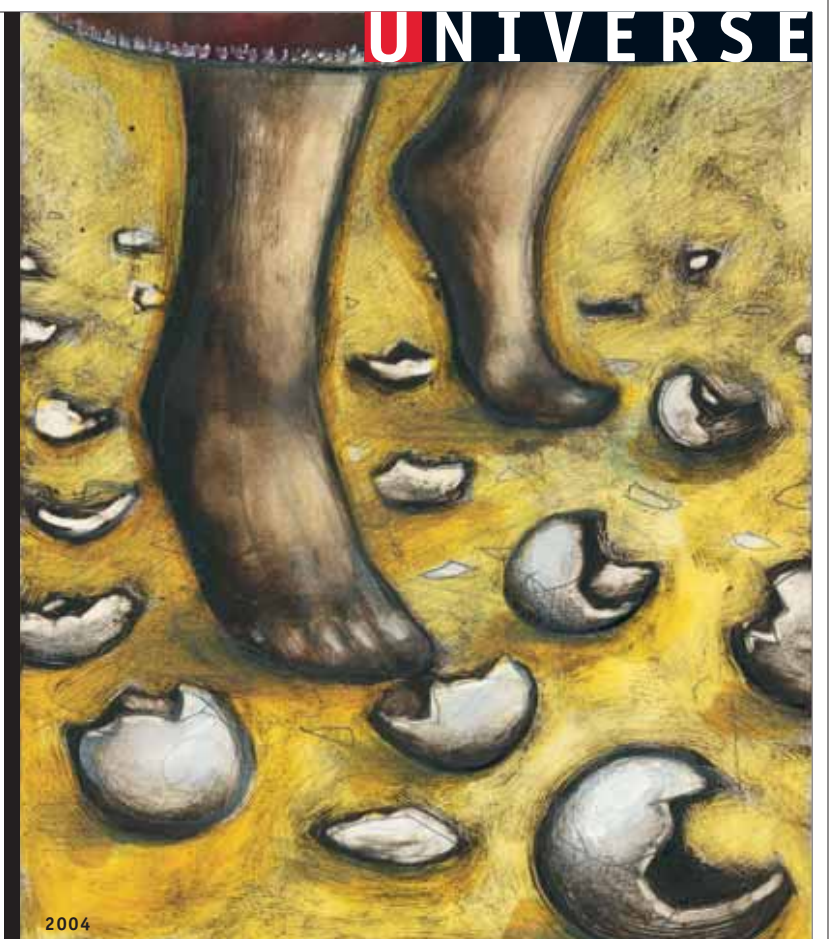
2003

Natural Acts

How an edible plant could help battle HIV



ILLUSTRATION BY CAMERON BROWNING; ILLUSTRATION BY RYAN PRICE



2004

Fast Results

A law prof's report aids abused women

The timing was "fortuitous" to say the least, remembers Janet Mosher. A day after the York law professor released a report calling for welfare-system changes to better protect abused women, the Ontario government announced more money for transitional housing and counselling for women fleeing domestic violence, better officer training and public education. Was there a connection? Even before the report came out April 5, she says, Premier Dalton McGuinty's office was planning policy changes around domestic violence and had met twice with Mosher and her research collaborators. "They had a pretty clear sense of what the key findings were," she says.

The media trumpeted the report's finding that many abused women return to abusive relationships because they can't afford to live on welfare. Of the 34 recommendations made in "Walking on Eggshells: Abused Women's Experiences of Ontario's Welfare System," raising welfare rates and revamping welfare fraud policies are the two most critical, says Mosher. Abusive partners often exploit get-tough policies on welfare fraud to trap women.

Weeks after releasing the report, Mosher was still being deluged with requests for copies at her Osgoode Hall Law School office. "We're really delighted that it got the kind of media play it did," she said. "We hope it will be used to keep up the pressure at all levels of government to change the welfare system." ■



2004

Tragic Waste

Behind the Walkerton disaster

In May 2000, seven people died and 2,300 fell ill in Walkerton, Ont., after deadly E. coli bacteria contaminated the local water system. It was one of Canada's worst public health disasters. How did it happen? An inquiry blamed an unsafe well, a heavy rainfall, the town's water manager, political neglect. But Harris Ali, a sociologist in York's Faculty of Environmental Studies who analyzes the impact of environmental calamities on human health, suspected the Walkerton outbreak had been "incubating" for some time. He began a sociological and ecological autopsy.

Factory farms – and there are more in the Walkerton region

than anywhere else in Ontario – process as many as 25,000 head of cattle a year. Livestock processors treat cattle as industrial "food production units" and take measures to compress their birth-to-slaughter throughput – dose them with disease-preventing antibiotics, fatten them on grain and bone meal, keep them inactive indoors. The byproduct is tons of waste, spread wide on unsuspecting fields. These are the conditions – resisting antibiotics, thriving on waste – that have inadvertently stimulated the evolution of a once harmless bacterium into something deadly. We disrupt nature's cycles at our peril, argues Ali, who published his study on Walkerton in September. ■

2003

Chilling Out

Why the science of atoms is cool

You're lost in the wilderness and all you have is your cell phone and your pocket global positioning system (GPS). How do you tell rescuers *precisely* where you are? "Cold" atoms might help.

Physics Professor A. Kumarakrishnan (Kumar), of the Department of Physics and Astronomy, is studying the interaction of laser light with atoms. In fact, he captures and cools them. What's this got to do with GPS? For one thing, cold atoms are the basis of atomic clocks, which are used to set national primary time standards

around the world. They help give GPS satellites their accuracy.

It used to be that these systems could pinpoint your location to within only several hundred metres. Now, thanks to research like his, they can tell your location to within 15 metres. Kumar explains that GPS receivers work by "talking" to three satellites at once and all satellites keep the same beat as defined by an atomic clock. The more precise the clock, the more accurate the GPS readings. ■



PHOTOGRAPHY BY NANCY MERCADO; ILLUSTRATION BY ROB MACDONALD

UNIVERSE



2003

Onward to Mars

York scientists are set for a red planet mission

The red planet is a hot location to send space missions these days, but its colour contrasts with its climate. Daytime highs only reach -65 C, and nights dip to -120 C. But chilly temperatures never deterred York scientists from developing technology that will fly aboard NASA's \$450-million Phoenix Scout Mission in 2007.

The Phoenix team, a US-led international group chosen by NASA from among four finalists, will employ laser radar (lidar) developed by Allan Carswell, York professor emeritus and president of Optech Inc. Lidar, or "light detecting and ranging," is used to measure atmospheric pollution. "We'll be focusing on measuring the Martian atmosphere," says Carswell, leader of the Canadian component. "The total package is really trying to identify the potential for allowing life on Mars, by looking for where there's

water, where there was water, or where there could be water."

Canadian and York participation in the team also includes the computer modeling (for mission planning and data analysis) of Professors Peter Taylor and Diane Michelangeli of York's Department of Earth and Atmospheric Science.

In a Mars double-whammy, York was also involved in rescue efforts for the Japanese Nozomi Mars Mission. "We have been responding to a Japanese request for assistance," said Professor Wayne Cannon, Department of Physics & Astronomy. Cannon's research group offered expertise on VLBI (Very Long Baseline Interferometry) as Nozomi did a final swingby of Earth in June to gain energy for its onward flight. "The intention was for the swingby to send Nozomi off on a correct trajectory to Mars and not have it go off somewhere else and get lost," said Cannon. Mission accomplished. ■

ILLUSTRATION BY CAMERON BROWNING



2003

A New Script

A York prof deconstructs gender in athletics

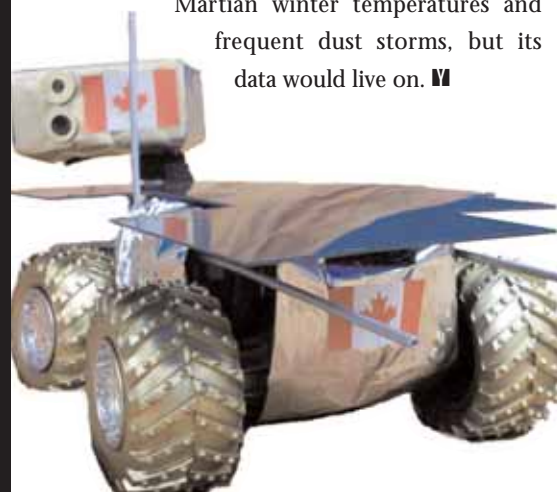
From his upbringing, Greg Malszecki seems an unlikely feminist. The sports historian went to an all-boys Catholic school, learned to box and competed in track. He learned that sissies cry, real men take control. Then he ran into the women's movement in California in the late 1960s and began questioning the script.

That questioning has infused his teaching and research ever since. In 1991, he introduced a course at York on women and sport. It challenged the notions that women are weaker athletes and sport is an expression of male virility. It was a first at York, one of only three in Canada and the first ever taught by a man.

In Malszecki's view, organized sport is based on a false under-

standing of physiology. "There is no physical difference between boys and girls before the age of 14. They can compete equally in the same sports." Yet, from the day they are born, boys and girls hear different scripts. "The language of sport is infused with male values, male virtues and virility, and connections with the world of war," he says. He explores those connections in his forthcoming book, *Homo Furens: Violence and Virility in Sport and War*.

Will sport ever be gender equal? Maybe, if we change the language, says Malszecki. "We have to quit heroizing boys and stop inferiorizing girls who do sport. We must look on sport as a human activity, not a male activity." ■



2004

Leave It to Beaver

A Canadian-made robot may explore Mars

No doubt about it, says York scientist Brendan Quine: Beaver, the Martian robot rover being designed and tested by York scientists, is "eager" to get sniffing the extra-terrestrial environment in 2010. That's when Quine hopes yet another Mars mission, the Northern Light project, could get off the ground.

Beaver is the product of 50 scientists at 12 Canadian universities, led by York, as well as a consortium of companies. Quine, a physics & astronomy professor, is principal investigator of the project developing Beaver, which is no bigger than a sheet of typing paper (plus wheels) and weighs six kg. Nine other York scientists are members of the team. After a nine-month cruise through space, Beaver would explore Mars daily and send data back to Earth.

Equipped with ground-penetrating radar and digging and rock-grinding tools, Beaver can look for signs of water and hematite, a semi-precious mineral. Its other task would be checking Martian radiation levels for future development of manned-mission spacesuits. "For a bargain-basement cost of only \$200 million, we can do this," says Quine, who is seeking financing. Sadly, Beaver can't survive beyond its 90-day mission because of cold Martian winter temperatures and frequent dust storms, but its data would live on. ■

ILLUSTRATION BY RYAN PRICE; IMAGE PROVIDED BY BEN QUINE

PHOTOGRAPHY COURTESY OF NATIONAL ARCHIVES OF CANADA; PHOTOGRAPHY BY NANCY MERCADO

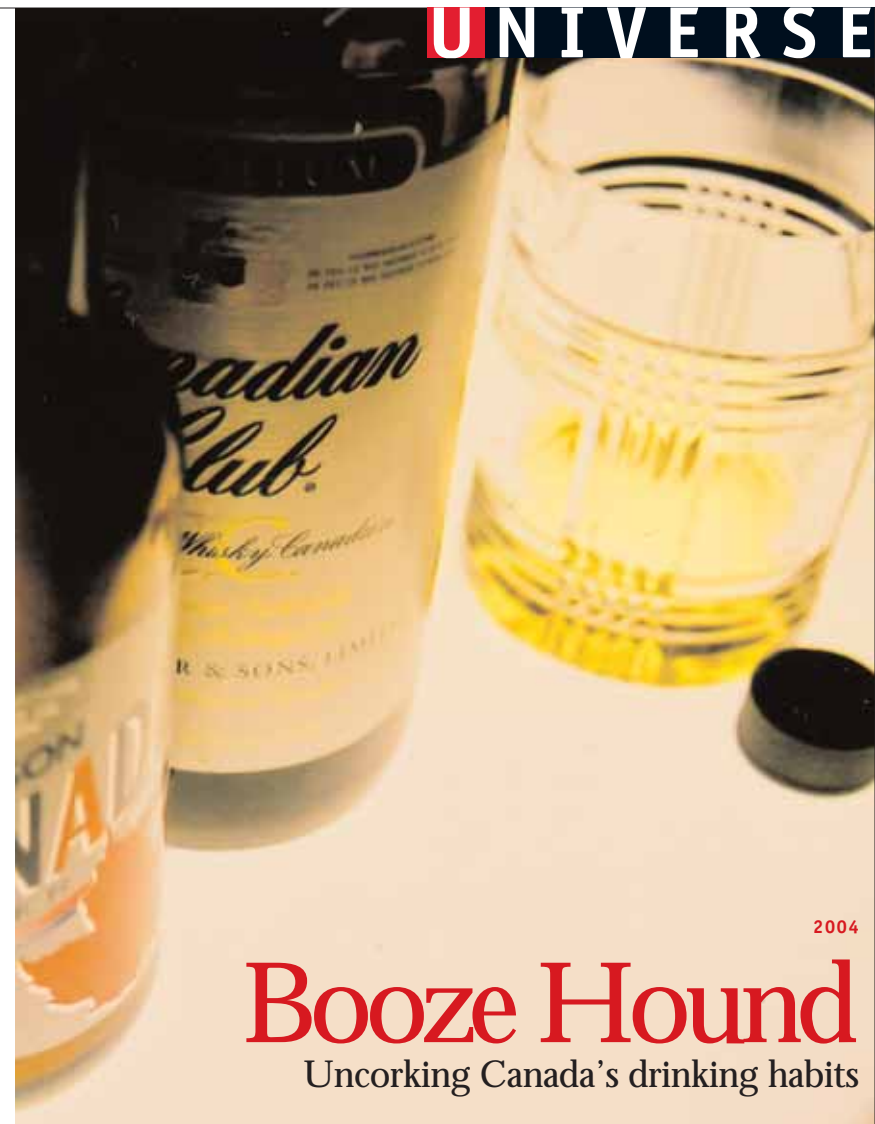
UNIVERSE

Although Canadians have imbibed for a good 400 years, we've kept our ambivalent attitudes toward the country's booze-fueled history all bottled up. Now York social scientist and historian Craig Heron has popped the cap on the murky world of "first contact" (Native North Americans meet European firewater), booze cans, rum runners, the temperance movement and Prohibition. His new book, which documents our love-hate affair with demon alcohol, is called, appropriately, *Booze: A Distilled History*.

"Surprisingly, there has been very little written on the history of drinking in Canada," says Heron. "There have been some books on temperance, Prohibition, smuggling and what-not, but nothing that looked at drinking and its effects across the whole span of Canadian history since 1600."

Heron's book is what publishers like to call crossover product. "It should appeal to the general reader who likes to be well-informed, as well as academics," he says.

"Canadians have always had contradictory attitudes about drink. Those attitudes are reflected at local liquor stores. In Ontario, it was only the threat of privatization that scared the LCBO into competing in the marketplace. Buying alcohol wasn't supposed to be pleasant." ■



2004

Booze Hound

Uncorking Canada's drinking habits

2004

Buried Treasure

Canada's hidden history unearthed

Starting this year, York scholars will be unearthing a trove of Canada's hidden history: previously unprocessed census records for the 40-year period from 1911 to 1951. Based at York and six other Canadian universities, the five-year Canadian Century Research Infrastructure (CCRI) project will develop databases derived from census records and other sources, such as newspaper reports and legislative debates.

Mining 40 years' worth of information should yield valuable insights into the country's social, economic and cultural shifts, says Gordon Darroch, sociology professor and York's CCRI centre director. "It will give us new insights into things like the changing character of labour, housing, immigration, families, education and urbanization," Darroch says.

Among other topics, the data should also paint a clearer picture of children's lives in those years, says Evelyn Ruppert, centre coordinator. "Children and youth are mostly absent from even well-documented historical archives. CCRI databases will enable research about their changing lives in the 20th century." The national project's databases will be available to students and researchers via the Web, and will link with existing census databases covering the years from 1871 to 2001. ■



2005

What They're Reading

York people reveal what's on the bedside table

Laurence Packer,
bee expert, York biology prof:

The Hedgehog, the Fox and the Magister's Pox

By Stephen Jay Gould

"In truth, I tend to read a lot of magazines. I find *The New Yorker* to be good bedside reading these days because the articles are short and I can drop off at almost any time. For lengthier bouts, I've been reading Stephen Jay Gould's *The Hedgehog, the Fox and the Magister's Pox: Mending the Gap Between Science and the Humanities*. A worthy enterprise and something lots of us should read."

Jennifer Jenson,

e-game creator, professor of pedagogy and technology:

Anna Karenina

By Leo Tolstoy

An Accidental Man

By Iris Murdoch

"I'm often reading five or six texts at once. At the moment, I am listening to *Anna Karenina* (unabridged) on tape as I drive to and from York. On my bedside table is an Iris Murdoch novel, *An Accidental Man*, a painful, but comic, novel of middle-class betrayals. In my kitchen I'm drooling over the recipes and pictures in an Italian cookbook entitled *Florence* which I experience in the abstract – look, read, but don't attempt to make!"



2004

Low Tech

Why small business and e-business aren't talking

Why aren't more small and medium-size businesses (SMEs) on the e-commerce uptake? A recent survey done by Ron McClean, Schulich School of Business professor, and the Canadian e-Business Initiative suggests one reason may be many SMEs simply can't find enough technology workers with business skills they can trust or understand.

"Most IT workers can't walk into an office and explain how technology will improve business," says McClean, an information systems professor. The survey found only 30 per cent of Canadian SMEs had plans to implement e-biz strategies, yet firms of 50-500 employees generate 85 per cent of all new jobs in Canada. "SMEs are the ones that need to be targeted if you want to help the economy," he says.

"Our focus groups found almost no SMEs had really moved much beyond a Web site. They didn't know what they wanted to do; didn't trust the talent; and didn't know how to access the right talent." McClean says of students: "We've got to give people more critical and hands-on skills." ■

UNIVERSE

2003

Dept. of Self-Interest

Drug companies' tests give their own products glowing reviews

It's rather like marking your own exam. Drug tests sponsored by drug companies on their own products were found to be "more likely to produce results favouring the sponsor's product," says Joel Lexchin, an emergency room physician and Atkinson professor with York's School of Health Policy and Management.

Lexchin recently published a study in the *British Medical Journal* confirming that drug testing sponsored by the pharmaceutical industry is more likely to produce results favouring the sponsor's product than testing funded by other sources. He did an analysis of 30 research articles spanning 20 years and covering a wide range of diseases, drugs and drug classes. "These findings indicate a systemic bias in drug testing," says Lexchin.

Most pharmacological or economic feasibility studies of new drugs are performed either in-house by drug companies or farmed out to external consultants who are paid by the companies. Some drug companies have been known to write their own research papers extolling the virtues of their drugs and pay medical doctors to put their names to the study, Lexchin asserts. Research funded by pharmaceutical companies that runs contrary to the drugs they manufacture is often squelched and never published, he says.

Now several major medical journals have decided to establish more rigorous criteria for accepting industry-sponsored research before they put it in print. (Drug companies currently fund almost half of all medical research.) "It's a step in the right direction," says Lexchin. "Pharmaceutical-sponsored clinical research has a big impact on how medicine gets practised." ■

PHOTOGRAPHY BY RICK REID

York's Norman Yan turns his fresh-water expertise on a tiny but potentially devastating cottage-country invader.

BY CATHY CARLYLE

Reprinted from Summer 2004

FAMILIAR GROUND: Norman Yan

IT USED TO BE THAT a quiet day at the lake was marred only by mosquitoes biting or by fish not biting. Now there's the spectre of the spiny water flea. It may not cause an itch, but researchers are scratching their heads about just how devastating it could be. The little flea has already gummed up the recreational fishing industry in the Great Lakes, and now there are fears that it will affect sport fishing in Ontario's inland lakes. Luckily, York biology Professor Norman Yan is on the case.

Yan is a pre-eminent limnologist, as lake scientists are known, well qualified for this investigation. He was one of the first lake experts in North America to investigate the problem of acid rain, and he is now assessing how areas such as Sudbury have made successful recoveries from it. Through a laboratory established in partnership with the Ontario Ministry of the Environment and built with Canadian Foundation for Innovation funding, he is also studying other problems affecting lakes, such as UV radiation, climate change and invading species. And top of his invaders list right now is the pesky spiny water flea, officially known as *Bythotrephes*.

Yan focuses on the tiny critters in and around the Dorset Environmental Research Centre, only a half-hour drive from his Bracebridge home in Muskoka. Appropriately, his house is across the road from the north branch of the Muskoka River. It's an ideal base for a limnologist who spends half the year checking on the animal life in lakes.

Yan admits he has a grudging respect for the little barbed-tailed animals that are "incredibly good at what they do and incredibly versatile. They're really adept at avoiding predators and catching prey." Spiny water fleas were first spotted in Canada after they hitched a ride on a cargo ship from Russia in the 1980s. They spread from the Great Lakes, where they began tangling the gear of recreational salmon fishers, to the smaller lakes in Ontario. They're now found in more than 50 lakes in this province – working their way to the other half a million – and in the Ohio and Mississippi watershed.

Yan has been establishing whether the water fleas are a threat

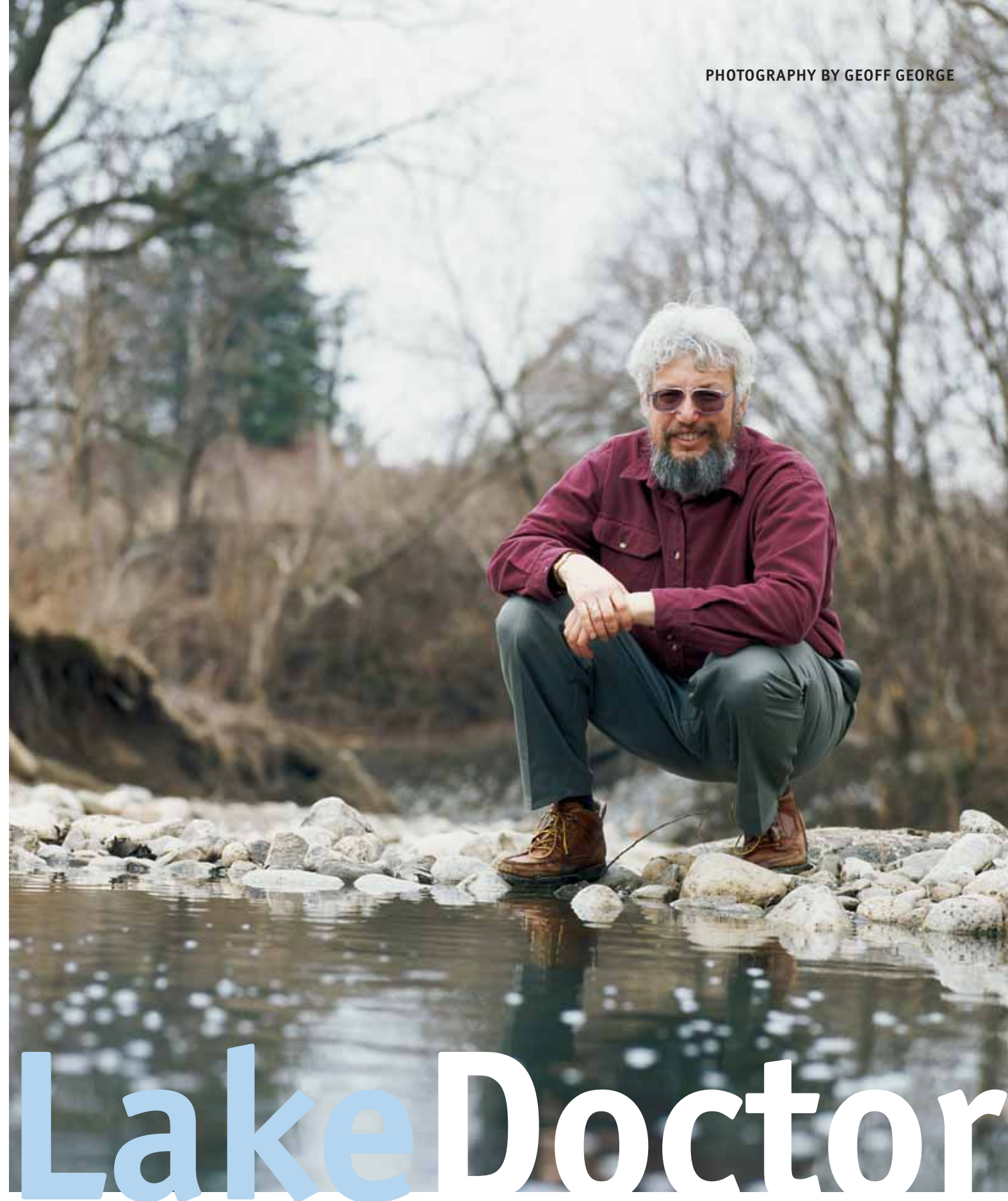
to native biodiversity. They are, he says. The centimetre-long crustaceans, which he describes as "very live, very colourful and very active", have been stealthily creeping into the Muskoka lakes, and seem to be here to stay.

What does this mean to the average cottager? The jury's still out. The worst-case scenario is that the spiny water fleas will ravenously devour zooplankton (tiny aquatic herbivores), depleting lakes of these fish-food delicacies. Fish life would suffer and, ultimately, so would sport fishing and cottage life. There's more bad news: With fewer zooplankton, there are fewer herbivores, so algae may proliferate, reducing the clarity of the lake waters. Not a pleasant scenario.

"So far," says Yan, "we haven't noticed a measurable effect on the amount of algae in these waters. Instead, what we have in some cases is a tapioca-like sludge floating in the lakes – colonies of rotifers [minute aquatic animals]. We believe these colonies are increasing as the spiny water fleas eat the zooplankton. What this will mean in the long term, we don't know."

However, Yan is well aware of the impact spiny water fleas have had on recreational salmon fishing in the Great Lakes, and he knows they're maddeningly difficult to get rid of. "Lots of people have cancelled their annual fishing trips there because the creatures snag the gear. Anglers are unhappy, and this means a loss of revenue for some people relying on the tourist industry," he says. He also worries about the changing diet of fish in the Great Lakes and Muskoka waters. "We have a huge existing problem with mercury contamination of sport fish," he says. "The fact that they now eat spiny water fleas, which could also be contaminated, just might magnify the problem."

Yan wants to see more research effort put into finding out, for instance, if the fish that eat the spiny water fleas are safe and edible. "And what can we do about spiny water fleas if it turns out they are bad? First we would have to ascertain just how bad they are, then find the vulnerable parts of their life cycle. All this costs money." A challenge, yes. But if Yan is as successful at getting to the bottom of the spiny water flea problems as he was with acid rain, the inland waters of Ontario are in good hands. ■



Lake Doctor

VISIONARIES

York's 'immersive environments' may seem out-of-this-world, but their perception research is always down-to-earth.

BY MICHAEL TODD

Reprinted from Summer 2005

EVER HAD A FEW DRINKS TOO MANY, staggered home, climbed into bed and awoken to find the room spinning? Then you've just experienced your own vestibular illusion (vestibular referring to the inner ear's gravity-sensing mechanism). Your brain goes crazy trying to sort out whether it's you who are spinning, or the room – or both.

A common reaction to that sensation is to feel nauseous. To avoid getting sick, most people sit up (gravity helps the inner ear feel reoriented in space). Turning on the light helps, as well as perhaps touching a wall. Any of these techniques – all gravity cues – gives us a sign that our world is how we think it should be (upright, not spinning). But sight is our primary tool, and our most highly evolved sense. "We tend to pay attention to the sensory system that screams the loudest – like kids seeking attention," explains Jim Zacher, a research associate with York's Centre for Vision Research (CVR). Zacher helped build several "immersive environments" at York.

Immersive environments, or IEs, are used for a variety of experiments in vision, motion perception, and the relationship between vision and the organs of balance (inner ear).

PHOTOGRAPHY BY LINDSAY LOZON



OVER, UNDER, SIDEWAYS, DOWN: The Tumbling Room

For instance, an ongoing puzzle is how humans determine what's "up" or "down". "Vision is our primary sense for telling us where we are," says Zacher. "But when you have strongly competing sensory information which disagrees, there will be problems with orientation. For instance, your eyes might tell you you're up, but your vestibular system will be saying your head's pointing down. So which do you trust? When sensory systems are at war it causes humans to make mistakes." For space shuttle astronauts the contradictions in up and down can lead to disorientation and space sickness. With fighter pilots it can lead to fatal crashes.

A VISION FOR VISION

THE PUZZLE OF HOW HUMANS SEE is what led Distinguished Research Professor Emeritus Ian Howard to establish the "Vision Group" – now the Centre for Vision Research – at York in the mid-1980s. York's lab was then one of 12 in the world. For Howard, a professor of psychology and biology, the question of "what's up?" has meant years of research into vision and how the brain interprets data and converts it from a stereo image (our two eyes) into a coherent 3-D picture of the world. To investigate the puzzles of perception, Howard built the first of the IEs on campus – called the Sphere – in 1986, well before the days of virtual reality.

"IEs are a popular technology now for scientific visualization, psychological research and task training for pilots and astronauts," says Michael Jenkin, York computer science & engineering professor and CVR member.

Howard's Sphere is like a giant golf ball painted on the inside with black dots on a white background; subjects sit on a tilting chair inside the ball which then rotates around them. In 1996, the Tumbling Room was built for perceptual experiments. NASA astronauts used the room for training prior to the 1998 Neurolab shuttle mission to help combat space sickness. Howard's down-to-earth suggestion to NASA designers for minimizing Visual Reorientation Illusions (causing space sickness) was to design the shuttle so there's a clear sense of up and down, and avoid making every wall a work surface. In other words, make it look like a place you'd live in. While NASA has funded his research, it has yet to take his advice, he says.

The latest jewel in CVR's crown is IVY, or "Immersive Visual environment at York". It's a cube with computer-generated visual displays on all sides. Jenkin and his team members built it in 2002 for a fraction of what companies that actually make such virtual "caves" charge. York now has a solid 20-plus years of research in visual perception. And with the continual evolution of IE technology, that reputation shows no sign of diminishing.

IN THE BEGINNING WAS THE SPHERE

IAN HOWARD'S GIANT ROTATING SPHERE was a York's pioneering "immersive environment", built nearly 20 years ago. The interior is entirely white except for large black dots randomly placed on the surface. Subjects sit in the middle, strapped into a seat. The Sphere, the seat or both can be rotated around either a horizontal or vertical axis.

Before the days of virtual displays, the Sphere was an early foray into determining how much our sense of spatial orientation – up or down – was due to visual cues and how much came from vestibular (inner ear) or proprioceptor cues (pressure on areas like the back, buttocks or feet).

Unlike the newer Tumbling Room, which has a rich visual environment to suggest up and down (a chair, table, curtains, cups and saucers, a window, etc.), the Sphere has only polka dots. "Turning the Sphere rarely makes people feel as if they've turned completely upside down, but turning the furnished room makes people feel they have turned head over heels," notes Howard. In the Sphere, it's more a sensation of tilting.



WHAT GOES AROUND : The Sphere



TUMBLING AROUND THE KITCHEN

AFTER THE SPHERE CAME THE TUMBLING ROOM, another immersive environment designed by Ian Howard. It's an actual hand-built furnished room – a kitchen – that's still in use. It looks like the real thing except in this room up, down and sideways can be deceiving. Which isn't a problem really, because that's just the way Centre for Vision Research experts wanted it. The room is the perfect place for York scientists from diverse disciplines such as biology, computer science, psychology and kinesiology to investigate the mysteries of human perception.

In the Tumbling Room, pictures, a clock and a bookcase are fixed to the wall. A table, chairs and two lifelike mannequins are screwed to the floor. Cups, bowls and cutlery are glued to the table. You are strapped into a padded chair and the room is rotated completely around your line of sight. Instead of seeing the room rotating, you feel that you have turned head over heels and the room has remained stationary.

An even more amazing illusion occurs when you are turned upside down in this upside-down room. You feel upright in an upright room even though your gravity sense organs are telling you that you are upside down. For most people, what they see overrides the conflicting information from the gravity sense organs.

Astronauts in space have only what they see to give them a sense of what is up and what is down. But their visual environment does not contain many familiar objects, so they often become disorientated and experience sudden reversals of their sense of up and down. The work on the Tumbling Room suggests that astronauts would have a stable sense of orientation if the visual environment were enriched.

The Tumbling Room proved so valuable in investigating human spatial orientation that NASA used it to train space shuttle astronauts. The Canadian Space Agency and NASA also funded Howard to conduct experiments in which astronauts aboard the space shuttle used a virtual-reality version of the Tumbling Room. It has attracted attention in Europe as well: the BBC featured the room last year in the science segment of its Radio 4 program, "Leading Edge".

IVY'S LEAGUE

MICHAEL JENKIN is a can-do kind of guy. When the computer science and engineering professor first investigated the price for a virtual-reality room made by firms like CAVE and Fakespace, the price tag was just too high. "It was around half a million bucks," he says. Jenkin decided the Centre for Vision Research could build its own room. Final price tag for IVY, Jenkin's acronym for "Immersive Visual environment at York", was about \$100,000. There are only five others like it in the world, and none in Canada.

The six-sided, 8-ft-by-8-ft room has a three-inch-thick glass floor – made of the same specialized glass used in the CN Tower's observation deck – that supports your weight. The walls are special high-tech mylar screens onto which images are rear-projected. Imaging is controlled by computer. The room can be used for space simulations, robotics and vision research.

Stereoscopic virtual-reality images can be created on all six sides of the room, floor and ceiling included, so up can be down and vice versa. Wearing special stereoscopic glasses, a person inside the room can experience effects like watching solid-looking balls whiz by, moving through the walls, or spiralling down a tunnel. The room also has the ability to recreate virtual scenes and objects so accurately that participants experience them as physically real.

The ability to study human perception in virtual environments can help prepare astronauts for the disorientation associated with zero-gravity environments. But IVY also has applications for such things as tele-operation (remote operation of robots). Other spin-offs could include applications for interior design, architecture, urban planning and even recreating crime scenes, where investigators can walk through the actual scene months later looking for things they might have missed. Jenkin, Howard and other York scientists might not crack the code of how humans see tomorrow, but you can bet they'll keep on looking. ■■

ALISON MACPHERSON LAUGHS at the mention of a ubiquitous flyer around campus – one that says “Stats doesn’t suck!” She knows how lively statistics can be. In fact they’re downright useful in helping her negotiate the minefields of controversy in her area of child injury prevention research. Sitting in her office, you wouldn’t think the unassuming Macpherson would be one to pick a fight. Yet for the past four years, stats have drawn this new member of York’s School of Kinesiology & Health Science into some of the hottest child-safety debates in the world.

Take bicycle helmet laws, for example. In Ontario, they’re a fact of life, so much so that the provincial government is considering extending the law to skateboarders, inline skaters and adult cyclists. But in Quebec, which has no helmet law, and England, where the British Medical Association took a stand against one, legislation is viewed as an assault on personal freedom as well as a threat to cycling and, believe it or not, the environment. Both places have active organizations dedicated to fighting legislation that Macpherson argues helps prevent up to 85 per cent of children’s head injuries from cycling accidents. Statistics are her main weapon in a war of numbers that has landed her in an ongoing debate with an Australian critic on the effectiveness of helmet legislation. And just how does this former hospital administrator and mother of three handle such battles? “I do the best research that I possibly can, come up with the best evidence I can, and let the data speak for themselves,” she says.

Another brush with controversy came in a study brought about by the Toronto school board’s unpopular decision to suddenly demolish playground equipment in 2000 (her research will show that replacement equipment did reduce injuries). Although she claims conflict is her least favourite part of the job, Macpherson’s latest project won’t convince anyone she isn’t flat-out looking for trouble: it’s a study of injuries from bodychecking in minor hockey guaranteed to make Don Cherry grimace. Although the article has yet to be published, Macpherson says the number of injuries among young hockey players aged 10-14 is rising. “The issue of bodychecking in youth hockey requires a good hard look,” Macpherson said after the release last year of hockey injuries data by the Canadian Institute for Health Information. It’s that kind of data that Macpherson, who sometimes represents the institute as an expert spokesperson, is using for her study, which looks at

injuries in Ontario and Quebec. “Playing hockey should be fun. It shouldn’t be sending so many kids to hospital,” she said.

Critics of population-based injury prevention studies say their authors would have parents “wrap children in cotton wool”, if they could, to keep them safe. It’s a charge Macpherson, who was recently appointed adjunct scientist for the Institute of Clinical Evaluative Studies, rejects. “The whole goal of injury prevention is to reduce the number of serious injuries while maintaining the promotion of physical activity,” she says. “You will never find an injury prevention researcher who says kids should stop playing hockey or kids should stop biking.”

Macpherson’s own children, 12, 9 and 4, enjoy skiing and biking – with helmets, of course – and the oldest competes in diving. They are a big part of the reason she chose to research child safety. In her former job as manager of admitting and patient registration at Montreal’s Children’s Hospital, she helped compile some of the data she now uses in her studies. When she was laid off in 1996, Macpherson received a training allowance that enabled her to enter graduate studies under renowned pediatric epidemiologist Barry Pless at the McGill University Health Centre. As a researcher, she worked with both the Montreal regional health board and the Pediatrics Outcome Research Team at Toronto’s Hospital for Sick Children. Her 2003 doctoral thesis on bike helmets was the paper that started the debate with her Australian counterpart. She joined York’s faculty in 2004.

It’s after looking at her work history and choice of research subjects that the picture of Macpherson, the passionate child-safety advocate, starts to emerge from her scholarly statistical world. She appears as every bit the crusader, ready to spread the alarm raised by the numbers of injuries caused by such simple things as kids crossing the road to school or babies toddling around in wheeled walkers, which Canada only banned in April last year. It is the first country to do so despite numerous studies by epidemiologists like her proving how dangerous the devices can be.

“Stuff like that does drive me crazy,” Macpherson says, explaining why she tries to promote awareness of her and others’ research through organizations like SafeKids Canada. “The time of the scientist working in isolation, if it ever existed, is gone. I see it as part of my job,” she says, before adding unconvincingly, “I’m not an advocate. My job is to generate the research.” Either way, she’s making the world a little safer for a lot of children. ■

PHOTOGRAPHY BY GEOFF GEORGE

Feeling Their Pain

Preventing childhood injuries is a quiet crusade for epidemiologist Alison Macpherson. BY DAVID FULLER

Reprinted from April 2005

NORBERT BARTEL GRABS the still-packaged toy from a cluttered desk and waves it in the air, his words quickening with enthusiasm as he speaks. “When people think about scientists, they think about Einstein: he is the epitome of the scientist,” Bartel says, as the khaki drab doll with a shock of white hair stares out from its plastic bubble. “What other scientist has an action figure?”

His passion for the famed physicist is more than scholarly reverence. Bartel’s current project in York’s Department of Physics & Astronomy will help determine whether Einstein’s general theory of relativity (no, not $E=mc^2$, his other theory) was right or, unthinkably, wrong. The question is no small matter when you’re talking about space-time and gravity, the stuff that keeps our universe together. In fact, some folk outside the Faculty of Science & Engineering, where Bartel and his team are plotting the vindication (or downfall) of Einstein’s universally accepted legacy, were less than thrilled at the prospect he might tarnish a cultural icon. “We got some negative comments,” Bartel says, his ardour momentarily cooling at the memory of obtaining permissions for copyright material for his film about the project, *Testing Einstein’s Universe*.

Bartel’s enthusiasm for the work is shared by his York colleagues: Michael Bietenholz, senior research associate, Ryan Ransom, post-doctoral fellow, and graduate student Jerusha Lederman. Together, they have enjoyed a season of notoriety that began with the launch of the USS700-million Gravity Probe B (known as GP-B) in April and continued with the separate discovery in June of what they believe is a new black hole or neutron star. Both stories made headlines and were a reminder of how teams like Bartel’s have made York a key player in Canadian space research.

Drawn to astrophysics more than 20 years ago by a desire to study fundamental aspects of science, Bartel “knew discoveries of exotic stars would lead us to something new in nature. I knew I could be part of a larger story,” he says. “You need enthusiasm, the big picture. If you lose the broader aspects you can get bogged down in the details.”

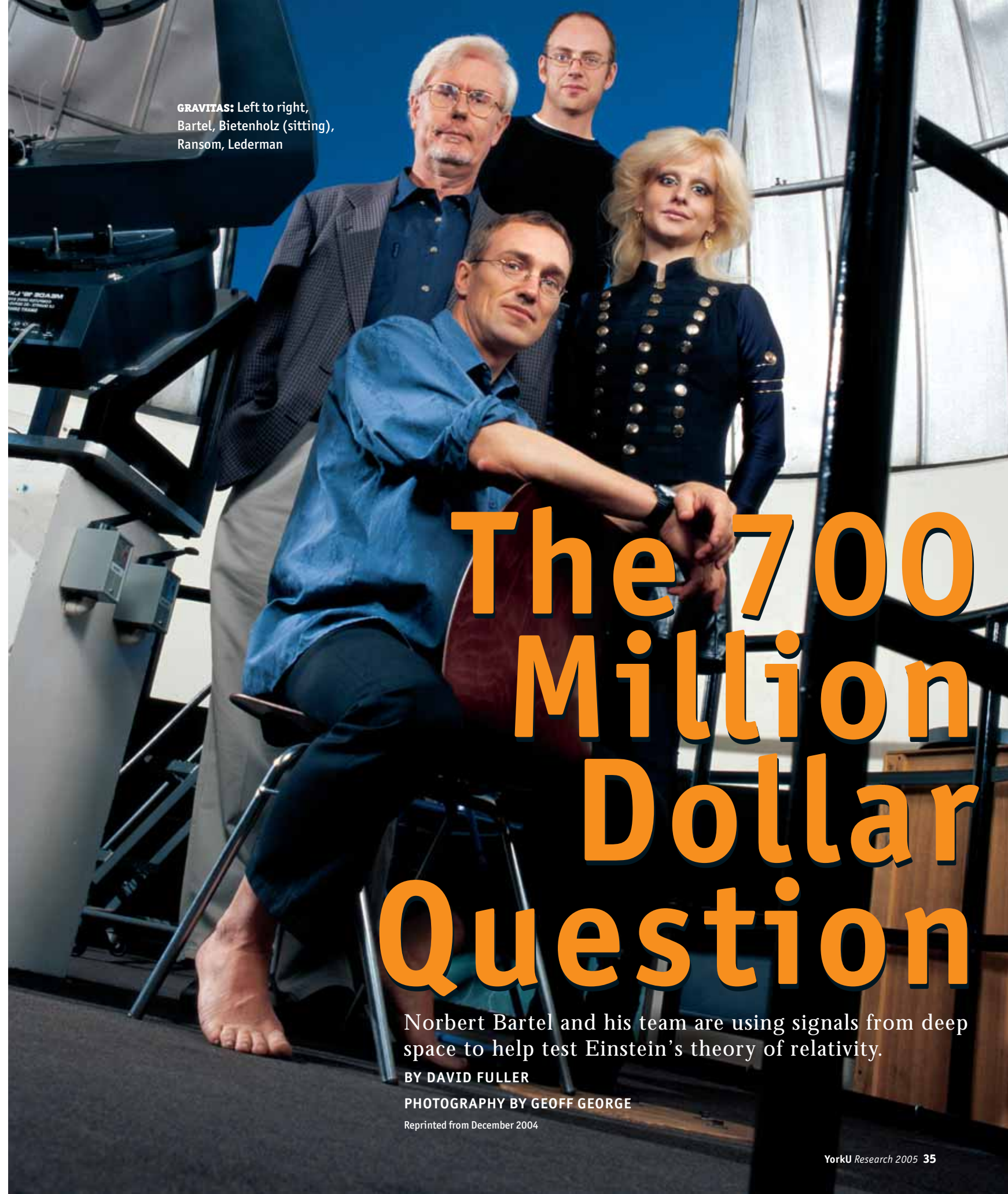
And the devil is, indeed, in the details: the team members spend their days painstakingly interpreting radio signals received by giant earth stations located around the world, aimed, for the gravity probe project, at a specific guide star, IM Pegasi, that they helped choose. Using a technique known as very-long-baseline interferometry (VLBI), their calculations will be cross-checked by scientists at Harvard University and used to interpret what the probe records. Led, since 1962, by principal investigator Francis Everitt of Stanford University, GP-B was developed by NASA and Stanford specifically to test Einstein’s theory. The researchers are looking for one number in particular: 42 milli-arcseconds, an indication of space-time warping known as “frame-dragging”, a consequence of Einstein’s theory, General Relativity, published in 1916.

“It will be quite dramatic. It’s a \$700-million question,” Bartel explains. “It will all come down to a group of people in a room with a calculator and one is going to push the button and...there will be the number, no fudging – with Einstein there is no fudging.”

Bietenholz, co-writer with Bartel and others of a paper on supernova 1986J, in which they discovered a new black hole or neutron star, appreciates the advice about the “big picture.” Bietenholz pores over results from terabytes of data gathered by more than a dozen earth stations looking for signs of change in supernovae, a specialty he shares with Bartel, one of the world’s foremost authorities on the subject. “When you make an image from the data set, it’s a small part of the process but the anticipation – you work blind for a time and, then, when you see....” His sentence is completed by pointing to a large, colourful image on his wall representing a supernova as it explodes, scattering life-matter into space.

The newest members of the team are both graduates of York’s Space & Communication Sciences Program. Ransom also received his PhD in astrophysics at York in 2003 and has been tracking GP-B’s guide star, IM Pegasi, since he wrote a master’s thesis on it in 1997. His meticulous reports on the star’s movements are the basis of York’s contribution to the project. “I’m the number cruncher,” he says. For Ransom, the “best scenario” will be if the result of the experiment is a number slightly different than what everyone expects – enough to prove Einstein was on the right track but with a deviation that leaves room for more work in the future.

Master’s student Lederman is studying the stability of quasars used as references by the guide star, an important component of the project. She is also responsible for much of the creative work that goes into the team’s Web site for the GB-P film (www.astronomyfilms.com) and related promotional and media efforts. “Norbert,” says Lederman, echoing her colleagues’ thoughts about their mentor, “is truly a special, rare, genuine and inspiring individual.” There may not be a Bartel action figure in the works just yet, but this York team is certainly part of the big space picture. ■



GRAVITAS: Left to right, Bartel, Bietenholz (sitting), Ransom, Lederman

The 700 Million Dollar Question

Norbert Bartel and his team are using signals from deep space to help test Einstein’s theory of relativity.

BY DAVID FULLER

PHOTOGRAPHY BY GEOFF GEORGE

Reprinted from December 2004

WHEN YORK'S SERGEY KRYLOV TALKS about his research, you find yourself swept along with his enthusiasm for his groundbreaking cell work. The ebullient Canada Research Chair in Bioanalytical Chemistry is like an archeologist who's been successful on a dig and is getting close to finding the metaphorical Rosetta stone to decode his findings.

Krylov is particularly excited about his research on stem cells, those entities which give rise to the differentiated cells in the rest of our bodies. He already knows how important they are for research into cancer treatment, and now wants to delve deeper into the secrets of how and why they divide and reproduce the way they do – asymmetrically, in which a single cell divides into two cells with different characteristics. If he had that answer, he could couple it with information from chemical analysis of the cells, and take a giant step nearer to the key for treating such diseases as cancer.

Unlike stem cells, cancer cells reproduce symmetrically – creating replicas of themselves – and are capable of dividing indefinitely. “With cancer cells, there's an avalanche, an exponential growth of cells, which we see in tumours,” explains Krylov. “Some even migrate to other parts of the body and eventually kill the host. If we could intervene and make the cancer cells divide asymmetrically, the way stem cells do, we would have a new way of treating cancer.”

Moreover, cancer cells first form through mutation, then replicate themselves, says Krylov. “These cells are what we call ‘non-working’, because they don't help the body; instead, they use up the body's resources for themselves. If we stop cancerous tumours through therapies, they can become benign in some cases. But we need to design specific therapies for each type of tumour in each person. That is where we need to understand the mechanism for cell reproduction.”

Krylov sees stem cells as the superheroes of cell regeneration in adults. While all cells in embryos are constantly dividing as the body grows, this does not happen routinely in adults, even though certain cells do need to be replaced when people have finished growing – for example, skin cells and other cells that have died through injury or disease. And this is where stem cells shine as they regenerate to form specific cells for those areas.

“It is the complex and interesting stem cells that are responsible for the diversity in our bodies,” Krylov says. “Our bodies developed from a single fertilized egg cell, but if you look at a brain cell and a liver cell under a microscope, you'd think they were from different creatures. What we are trying to understand is why stem cells divide asymmetrically and why some of the resulting cells remain stem cells and some become differentiated.”

Russian-born Krylov, who was educated at Moscow State University before coming to Canada in 1994 and to York's Faculty of Science & Engineering in 2000, is in the forefront of research in this field. His recent breakthrough technique for analyzing cell chemistry, particularly the proteins, has given him fresh hope that one day scientists will find the cell-division answers. Such knowledge is essential for designing new ways of dealing with cancer, treating Alzheimer's disease and even regenerating damaged organs, he says. “Cell proteins regulate everything that goes on in cells, and if we can find out how they control cell division, we will have a key to treating many deadly diseases.”

Through his new cell analysis technology, Krylov and his team have been able to show, for the first time, that even cancer cells don't always reproduce entirely symmetrically. Now, with his team of researchers at York, he is on to his next “archeological dig” – investigating how the protein regulators in cancer cells work. “Then, we'll observe sister stem cells of the same age and compare their chemical content, specifically their proteins.” He says it with the gleam of someone eager to solve an ancient mystery. ■



LOOKING FOR THE KEY: Krylov

WE'VE ALL MET PEOPLE we call perfectionists. We might even admire them because they seem highly successful. But there can be a serious downside – particularly for students. Psychology Professor Gordon Flett, Canada Research Chair in Personality and Health in York's Faculty of Arts, knows the debilitating hallmarks well.

For more than a decade, Flett has been delving into the problems of perfectionistic procrastinators, focusing on students. The condition can so overwhelm students that they are unable to complete assignments or even finish a doctoral thesis. And sometimes they are so fearful of not measuring up that they even experience a “wish to die”.

With Professor Paul Hewitt of the University of British Columbia, with whom he published a book in 2002 entitled *Perfectionism: Theory, Research, and Treatment*, Flett has developed The Multidimensional Perfectionism Scale. It describes three types of perfectionists: those who are hard on themselves (self-oriented), those who have exacting standards for others (other-oriented) and those who see others as demanding perfection from them (socially-prescribed).

Flett says it's clear that many perfectionistic students have an enormous fear of failure. They believe their professors, parents or peers expect them to be perfect, and feel they can't live up to their perceptions of how others want them to be. “These students then become concerned about making mistakes if they answer in class, make a presentation, or write an assignment.”

It's natural to want to do well on a test or essay, but when the wish to be perfect in those areas seeps into all areas of one's life, then it's extreme, Flett explains. “Students with self-critical tendencies start feeling that everyone is better than they are. Then they cannot accomplish anything, because they don't think what they're working on is good enough – even when they are getting excellent marks.”

Flett and Hewitt have also developed a scale that taps 25 thoughts, such as “I must be perfect.” The subjects indicate the frequency of these thoughts in the past week. “Once I saw a student circling the top rating for each question, and

laughing almost hysterically, saying, ‘This is my life! This is how I feel every day!’” says Flett. “Unfortunately, such thoughts are often accompanied by feelings of anxiety and depression.”

Counselling seems the obvious answer, and it is available through York's Counselling & Development Centre. The trouble is, “only a few brave perfectionists” concede that they need it, because they think they're failures to even admit to having a problem. Results of studies on perfectionistic students show that many didn't recognize that they needed help, and those who did had trouble opening up about themselves. For those who do seek assistance, Flett says, therapy can help by

teaching them to set more appropriate goals and training them in problem-solving skills, study skills and ways of shielding themselves from stress.

“A professor should encourage such students to seek help and emphasize that getting help is not a stigma,” advises Flett. “The message must get out to perfectionist students that they need to talk to others and share their feelings. They'll see they're not alone in this.” His advice to his own students is, “Break each assignment into components. Get the process going, instead of holding back an assignment until it's perfect, so you get feedback along the way.” Rather than perfection,

says Flett, students should strive for excellence.

As for why the problem strikes some people and not others, Flett says there is evidence that perfectionism runs in families, whether through biological or cultural causes, sometimes showing up in children as young as four or five. And there can be social expectations put upon people by parents, advertisers, the media, peers or work.

Is there anything good about being a perfectionist? Not a lot, even for those who seem very successful, because often they experience little self-satisfaction, says Flett, who is currently studying high-achievers who suffer burnout due to perfectionism. “People might point out that many perfectionists are physically fit,” he says, “but the downside is that they can become compulsive about it.”

As for Flett himself? He's definitely not a perfectionist. “In fact, I wish I were more methodical,” he says with a sigh. ■

‘They cannot accomplish anything, because they don't think what they're working on is good enough – even when they are getting excellent marks’

Psychologist Gordon Flett has charted how something that sounds good – perfectionism – can be very bad, especially for students.

BY CATHY CARLYLE
PHOTOGRAPHY BY RSQUARED

Reprinted from December 2004



EDUCATION

JENNIFER JENSON LOVES VIDEO GAMES: she talks about them all the time. She plays them and keeps track of the latest titles and shares them with the kids at school. If this sounds a bit odd, you're right, although not because a thirtysomething professor of pedagogy and technology in York's Faculty of Education might have better things to do with her time. No, it's because she's not a boy.

Educators have known for years that girls and women are under-represented in geek demographics. With technical expertise playing such an increasingly critical role in employment, Jenson, a researcher in York's Institute for Research on Learning Technologies, wanted to know why this was happening and how to correct it. She discovered through her work with colleague Suzanne de Castell of Simon Fraser University that it's all about the games people play – boy people mostly. With a self-conscious chuckle, she relates how, in field observations of 9-to-13-year-olds, girls were always on the outside when it came to video games. "They played, but not really," she says. "They wouldn't talk about it. The boys were always talking about it." But, she hastens to add, that doesn't mean boys are inherently more skilled at the games than girls – they just think they are. And that, she says, gives them an advantage in a world where technology rules.

Jenson's starting point was the powerful hold games have on students, and how it could be turned to improving the learning environment for both sexes. "Students' attention in school has always been a problem," says Jenson, "but it was never the kind of problem that it is now, because students understand, like never before, that their attention to something has real economic value." Using video games as teaching tools held the double promise of helping girls stay on the technological wave and making the classroom more appealing to boys. "Boys have a whole other kind of support networking culture and a kind of learning style that's so far outside of what we're giving them in terms of classroom experience that they quite rightly say 'no thank you'," she says. Jenson and others argue that technology is part of student culture, and that integrating it into the classroom makes sense. In one recent project where students compared books and video games as narrative, both sexes showed improvement in interest level and work output.

Turning the games' appeal to educational uses, however, presents a challenge on many fronts, not least of which is adult concern about gaming as an appropriate learning activity. Jenson counters by pointing to what she calls the "old-new" idea that people learn while they play. "Most learning occurs outside of school, and pop culture is educating our kids whether we like it or not," she says. To prove the point, Jenson and de Castell are designing Contagion, a Web-based game with a health theme in which pre-teens learn about the transmission and prevention of diseases such as AIDS, SARS and West Nile virus while doing battle with agents of the sinister Pyramidea Innoculata Agency. The prototype will be available for classroom trials in April.

The power of video games to capture and hold students' attention is backed by figures that show games and their hardware now outsell Hollywood movies. And although mature-rated games, such as the latest version of the notorious Grand Theft Auto series, help fuel parent-teacher concerns about gaming in the classroom, they account for a small fraction of total sales. Games rated 'E' for everyone, such as Pokémon and Super Mario, still dominate the market, according to the Entertainment Software Association.

So what is it that students like about games, that makes them want to learn? Jenson says girls respond particularly well when they can customize the characters, a feature boys also enjoy. More important, pedagogically, is that children persevere with games that "scaffold success", an element common to most popular titles, where players happily fail many times as they build the skill level needed to beat the game.

The final challenge, says Jenson, will be to get more and better-designed games into classrooms, many of which still offer "edutainment" artifacts designed in the 1980s that she describes as "barely entertaining or educative." Convincing teachers to embrace technology as central to the learning experience has never been easy, says Jenson, but it's getting there with the advent of more user-friendly software. "I think that's where the shift is now really coming. You can feel like you're integrating technology without having to be an expert and that's always been the tension between integration and implementation."

Although Jenson spends a good deal of her time thinking about games, it's not child's play: she sees high stakes. "If we don't take this seriously," she says, "we're actually going to alienate this generation of students much more than they've ever been alienated before." ■

GAME GIRL

Jennifer Jenson wants teachers to use video games to help girls learn tech – and get both sexes learning better.

BY DAVID FULLER

PHOTOGRAPHY BY JEFF KIRK

Reprinted from February 2005



SPACE

York's Diane Michelangeli and Peter Taylor are part of a grand Mars adventure – the quest to detect early signs of life on the red planet. BY DAVID FULLER

PHOTOGRAPHY BY GEOFF GEORGE

Reprinted from February 2004

FIND ADVENTURE, TRAVEL THE WORLD. It may sound like a recruiting poster, but for York researchers Diane Michelangeli and Peter Taylor, it's the answer to the question, "So, why did you become a weather scientist?"

"I wanted to become an astronaut," Michelangeli explains over the clatter of dinner dishes and children's voices. "But I realized one day when I was car sick, that was not good for an astronaut. So I decided to specialize in science and get a job at NASA." After receiving her PhD in planetary science and geochemistry from the California Institute of Technology in 1988, Michelangeli spent two years doing post-doctoral research on Mars at the US National Aeronautics and Space Administration's Ames Research Center. Then she headed home to Canada to start a family and a job with an environmental consulting firm researching earth's atmosphere.

With an interest in aviation and intellectual adventure in mind, Peter Taylor took his doctorate in applied mathematics at Bristol University in his native England, graduating in 1967. Travel came later: a perfect hill in Scotland's Outer Hebrides, windswept Sable Island on Canada's east coast and a cottage research station at Grand Bend, Ontario, home of some of the best – that is to say worst – weather in Canada. Next up is a trip to the Arctic to study blowing snow.

But for both Michelangeli and Taylor, the greatest travel adventure will begin late in 2007. That's when NASA launches the Mars Scout mission and its package of Canadian technology designed to study the Martian environment for signs of water, an essential ingredient for life forms past and present. The Canadian component was developed under the leadership of York Professor Emeritus Allan Carswell, chairman of Optech Inc., the Toronto firm that won the contract, along with Brampton, Ont.-based MD Robotics, to provide instruments for the meteorological package on the Phoenix lander. Michelangeli and Taylor's work as mission scientists will give others an idea of what to expect when the landing module sets down on the red planet's north polar plains in the spring of 2008.

Given Mars' dust storms and 80-degree temperature variance between night and day, there will be no shortage of challenges for the "met" team as it works up detailed specifications for the meteorological instrumentation. After Phoenix arrives on the planet, the team will offer advice on how best to survey the Martian atmosphere using Optech's laser-based

light-detecting and ranging (lidar) technology. Once collected, data on temperature, pressure, atmospheric dust particles and water vapour will be fed into computer models developed in York's Department of Earth & Space Science and Engineering in the Faculty of Science & Engineering. The planetary modelling that will be used to analyze the data was developed within York's Centre for Research in Earth & Space Science (CRESS).

Their part of the Mars Scout project, like most of the mission's other components, has one purpose: to find signs of the conditions for life on the solar system's most earth-like planet. The mission slogan, says Taylor, is simple and to the point. "They told us, 'follow the water'." To do that, he will employ knowledge of wind flow patterns in earth's boundary layer gained from years of research at the Canadian Meteorological Service and at York, where he has taught for the past 15 years.

Michelangeli's research into the formation of particulate matter in earth's atmosphere will help reveal how water vapour molecules combine with Mars' fine dust particles to form ice crystals that collect on the planet surface. The York team's interdisciplinary research efforts – which combine math, chemistry, physics and earth science – will give NASA valuable information on the existence and extent of this crucial element.

Searching the Martian atmosphere for signs of life may occupy a good deal of their working lives, but for both researchers attending to signs of life at home keeps them thoroughly grounded. Michelangeli, who has a 10-year-old daughter and seven-year-old son, admits to once squeezing in some rink-side work on her laptop computer only to hear the words, "Mom, watch me!" The lame reply, "I am, I saw everything you did," quickly put thoughts of Martian dust clouds on hold.

Taylor, who has a 10-year-old son at home as well as five grandchildren, met his wife at the meteorological service, where she still works, so weather is never far from his thoughts. During this sabbatical year, Taylor has some time for reading and his duties as co-editor of the international journal *Boundary-Layer Meteorology*.

The colleagues will have some time to spare when the Scout begins its six-month space journey to Mars. Only when the data begin flowing back to earth for analysis will their amazing Martian weather quest resume. Then, if they find what they are looking for, who knows what adventures lie ahead? Perhaps a forecast of partly dusty skies and possible ice precipitation – mixed with early signs of life. ■

READY FOR MARS: Michelangeli, left, and Taylor



Ape Escapes

After 16 years studying orangutans up close, York's Anne Russon has become an international advocate for their survival. BY MARTHA TANCOCK

PHOTOGRAPHY BY GEOFF GEORGE

Reprinted from April 2004



'THEY'RE LIKE FAMILY': Anne Russon



YOU COULD CALL ANNE RUSSON an accidental primatologist. A university math whiz who excelled as a computer programmer in the 1970s, she decided she didn't like either subject and started studying psychology. A chance encounter with four baby chimps at research labs in Montreal turned into her doctoral thesis. "I didn't intend to study primates," says the psychology professor. Now, they're practically her whole life.

Since she began tracking orangutans in the rainforest of Borneo 16 years ago, Russon's social life has suffered. "About all I do is work," she confesses. "But that's what I like best." Every year, she teaches at Glendon for eight months, then packs her binoculars and flies to Borneo for four. This sabbatical year – *quel luxe* – she is spending eight months with her simian "relatives" at Wanariset, an orangutan rescue and rehabilitation centre that has become her home away from home.

Wanariset is one of five orangutan rehabilitation centres in Indonesia where fragmented populations of about 25,000 of these tree-living red great apes still survive in the wild. From this base, Russon follows young orphans, rescued from captivity, as they struggle to re-adapt to the forest they scarcely knew. Most were abducted from the wild as babies and sold overseas, sometimes for thousands of dollars, to unprincipled institutions and to individuals who disowned them once they grew out of the cute toddler stage. Interested in their cognitive skills, Russon is observing how they learn to feed themselves. She'd rather track ex-captives than wild orangutans because they are conveniently close by and bicultural – "they understand something of the human world."

Tracking is hardly arduous. From early morning to late afternoon, Russon watches her subjects swing lazily from tree to tree looking for, then fastidiously eating, fruit, bark and termites. Red apes rarely venture far from sunrise to sunset and usually travel alone. "Once in a while, an orangutan will meet another orangutan – then there's sex, a chase, a fight or play." By about 4:30pm, they begin building their nests for the night. Boredom can be an occupational hazard, admits Russon, who often waits for hours on the ground to catch a glimpse of orangutans 30 metres above in the canopy. She daren't make a peep, even when she breaks for lunch, unless she wants company. "Orangutans are food addicts," she says, "and ex-captives know what the sound of rustling plastic means."

When she first started following juvenile returnees, Russon was shocked "to see how little many of these orangutans know about the forest when they first head out." Sometimes she's had to rescue them from near tragedy. Last summer, the primatologist and her Indonesian assistants carried one weak little five-year-old female back to camp. The young one had spent the day lying on the ground, too dehydrated and discouraged to look for food she hadn't the skills to find. On another occasion, Russon's crew rescued Victor and Rudy, two "know-nothings" who'd ventured too close to loggers and their chainsaws. "They're kids, just kids, and they normally would have a mother around to make decisions and steer them clear of danger."

Being around orangutans has changed Russon's life. "I am probably less impatient and confrontational," she says. "Where we humans sometimes fan the fire, they often calm it down." Red apes shrug off problems they can't solve. Good-tempered and laid back, they love to clown. In the wild, young orangutans spend eight to 10 years with their mothers before setting out on their own. They learn, like human infants, by mimicking and can even communicate by miming. Though they learn slowly compared to humans, they are very clever. In her book *Orangutans: Wizards of the Rain Forest*, Russon fondly calls them "arboreal wizards in drunken slow motion."

Orangutans have captured Russon's heart as well as her mind. Twenty years ago, she was interested mainly in the pure science of ape intelligence. Now, she's travelling the world as an advocate for this endangered species, giving talks, lectures and interviews. Red apes could be extinct in 10 to 20 years if humans continue to destroy their habitat, she says. "Studying them gives me ammunition to try to convince other people that orangutans are worth protecting." Russon has published that ammunition in her book and on her Web site in her biggest rescue attempt yet of the great apes who have touched her heart and her soul. "They're like family," she says. "Unless we can convince humans to leave them alone or help them, then they are surely doomed." ■

BEHAVIOUR

Idealized media images have a lot to do with why people diet endlessly, says psychology Professor Jennifer Mills. She's even coined a word for it. BY CATHY CARLYLE

Reprinted from April 2004

Thinspiration

ARE YOU A CHRONIC DIETER? Do you endlessly try to shed kilos, only to see them return again and again? If you're confused about why, you're part of an erudite club. Chronic dieting has always been a puzzle to researchers. Why do people persist in losing weight, when they usually gain it back? There is no simple answer, says clinical psychologist Jennifer Mills, a psychology professor in York's Faculty of Arts. "Each person's pathway to dieting is unique," she says. "To understand it you have to look at metabolism, genetic disposition to weight-gain and psychological and social influences."

For one thing, some people suffer from "false-hope syndrome", which leads them into chronic dieting, says Mills, who has carried out several major studies about eating disorders. A lot of it has to do with the media. Mills has published three recent studies looking specifically at women ages 18 to 25 who are inspired to diet when viewing idealized body images in the media.

Often, dieters have bought into persuasive magazine and TV ads and features that tell them they'll be happier when they lose weight. For them, being thin holds the promise of becoming more attractive, popular, happier. In fact, just the act of going on a diet sometimes makes these women feel good about themselves, says Mills, whose current research subjects are undergraduates at York.

Sadly, the euphoria is short-lived, and this is how the cycle of dieting and weight-gain starts. When the hoped-for happiness melts away, dieters tend to take solace in food, and regain the kilos. But they believe the next attempt will work, because they buy into new ads that tell them their lives will be better once they lose weight again. Result? Chronic dieters are born. "They forget that the last time they did that, they were no happier," explains Mills.

There is an even more insidious side. Not only do many dieters regain the weight, they blame themselves for doing so. "They say, 'I wasn't disciplined enough. I didn't



PHOTOGRAPHY BY RICK REID

BEHAVIOUR

exercise enough',” says Mills. “They always bring their failure back to their own behaviour, because that is what is controllable. Their genetic make-up isn't.”

Oddest of all may be a phenomenon Mills calls “thinspiration”. Some women are inspired by images of slim models, despite their past failures at keeping the weight off. As unlikely as it would seem, these women have a temporarily enhanced self-image when they see their ideals, instead of realizing they can't attain that look. “But, when the cold light of day hits them, they tend to diet harder,” says Mills. “Learning about ‘thinspiration’ was an important part of the chronic-dieting puzzle for me. It's similar to someone watching Serena Williams play tennis and believing they can be a better tennis player.”

Mills says a psychologist can help educate people about what “normal” body sizes and shapes are and the supposed benefits of weight-loss. “Unfortunately, dieters don't usually seek

Behind Chronic Dieting

RISK FACTORS

- Early puberty
- Heavier than average weight
- Conflict in the family or a very emotionally constricted family
- Low self-esteem

TREATMENT

- Education on what really determines weight (metabolism, genetics)
- Cognitive behaviour therapy, helping dieters think more realistically about themselves

psychological help about their beliefs until they get into medical trouble or they are experiencing binge-eating, precipitated by dieting.” Even worse, the average dieter doesn't see the need for psychological help. “They really believe ‘It's not the diet that is the problem, it's me’.”

Some suffer from cognitive dissonance – the belief that “If dieting is that important to me, then it must work – because I am working so hard at it. They are often very resistant to the idea that, in reality, they do not have a lot of control over their weight,” says Mills. The factors determining a person's general weight and shape, she says, are approximately 80 per cent genetic.

Now, in collaboration with researchers at McMaster University's Department of Psychiatry, Mills is developing a questionnaire measuring the degree to which people think they have control over their weight and shape. “Our goal is to use it in a clinical context to predict which eating-disorder patients are more likely to relapse.”

For dieters, Mills has this bottom-line advice: be realistic about your body size and shape and accept that some things just cannot be radically changed. ■

The Brenda File

Feeling good and bad about yourself

THERE ARE STILL HUGE PIECES MISSING FROM THE CHRONIC dieting puzzle. Catalina Woldarsky (BA Hons. '03) discovered that when she conducted a study for her honours thesis on 170 York undergraduate psychology students, who thought they were being tested for memory. As part of the study, they were shown screen images of attractive, thin models.

First, though, the subjects were primed by reading and writing about a fictitious biography of “Brenda”. Some subjects read about a “Brenda” who was fit, had lost weight and was happy, and then they had to write about a time when they felt fit, attractive and happy; others read about an overweight “Brenda” who was out of shape and unhappy, and they wrote about a period when they felt the same way; and the control group read something neutral about what “Brenda” had done in the summer and wrote of their summer experiences.

“What surprised us was the group primed to feel good about themselves – after all, they'd just written about when they'd been fit and attractive – responded more negatively after they'd viewed media images of models,” says Woldarsky, who was one of psychology Professor Jennifer Mills' students at the time. “And the ones who read the negative ‘Brenda’ account actually felt better about themselves, in comparison to the ‘positive’ group. It's a paradox.”

A theory she is tossing around for the findings is that the “positive Brenda” subjects hit reality when they viewed idealized pictures of women. “They might have compared what they'd said in their account of when they felt attractive and slim, to the screen pictures of beautiful women,” offers Woldarsky. She and Mills are planning to expand the study and publish it.

Getting Along Swimmingly

A cutting-edge bot features state-of-the-art eyes

Reprinted from October 2004

AQUA – a self-propelled \$450,000 robot the size of a suitcase – walks down to the ocean on its legs, wades in and starts swimming with its six bright-yellow flippers. It looks rather like a high-tech, titanium sea turtle. Except for the cable out back connecting it to a land operator, you'd swear it had a mind of its own. And in a way it does, thanks to a super-sophisticated 3-D vision system designed by York scientists.

Its “eyes” (more sophisticated than ones on recent Mars exploration vehicles) were the work of a York research team led by computer science Professor Michael Jenkin. “AQUA's ability to walk and swim makes it unique as a research vehicle,” Jenkin says.

The underwater bot was developed by a consortium of researchers from York, McGill and Dalhousie. Reps from all three universities were on hand this past winter to watch its ocean-going debut in Barbados – which went swimmingly, according to Jenkin.

“AQUA is a great non-invasive way to study marine environments – especially coral reefs,” he says. AQUA uses cameras to map the sea floor, not high-powered sonar which can disturb fish and kill sea mammals. For now, AQUA's vision and navigation systems are controlled by an operator from shore through a fibre-optic tether, but the bot should be out on its own within a year. ■

PHOTOGRAPHY COURTESY OF MICHAEL JENKIN



Critical Math

Jianhong Wu and his team are uncovering the secrets of how SARS spreads. BY DAVID FULLER

Reprinted from December 2003

GETTING RESULTS: Jianhong Wu (foreground, opposite) with his math department colleagues, (first row, left to right) Prof. Huaiping Zhu; Prof. Huaxiong Huang; PhD students Qingling Zeng and Rongsong Liu; (back row, l to r) Alexander Rezounenko, visiting scientist from Kharkov University, Ukraine; research associate Anatoliy Swishchuk; PhD students Asrat Gashaw and Yuriy Kazmerchuk; postdoctoral fellow Chun-Hua Ou; and Markus Riedle, visiting scientist from Humboldt University, Berlin

PHOTOGRAPHY BY HORST HERGET

Y

ou won't find him wearing a white coat or a facemask, nor will you spot him in a laboratory flanked by microscopes and Petrie dishes. You'd also be forgiven for picturing York Professor Jianhong Wu poring over patients' charts in a hospital. After all, where would you expect to find one of the world's leading SARS experts as he works at uncovering secrets of a disease that infected thousands across the globe over the past year?

Try looking in a Tim Hortons somewhere between his home and office. There, seated quietly with only pencil, paper and a medium coffee – cream, no sugar – you'll see this award-winning mathematician lost in thoughts that will help researchers gain new insights into the SARS virus and how it spreads. "I make it my rule not to do math at home," says Wu, who holds a Canada Research Chair in Applied Mathematics. "I get too lost in my work," he says, in deference to his wife Ming and their one-year-old daughter.

It's little wonder Wu finds caffeine a boon to his labours. He travels widely, and in early September flew to Banff, Alta., where he and his team of 12 researchers, five from York, attended a conference of SARS experts which he helped organize. The weekend session allowed researchers from Canada, the US, Britain, Taiwan and Australia to compare notes on methodology aimed at tracking the disease and predicting what results interventions, such as a quarantine, might produce. "The optimal design of the quarantine period is one of the major issues," Wu said in Banff. "If it's too long, the possibility that some people will not obey the order is high. If it's too short, the potential is that some symptomatic person might come back into the community and spread the disease."

Immediately after that conference, Wu travelled to China to deliver a series of lectures. The trip represented more than an opportunity for scholarly exchange; it was also a return to his native country where, in 1987 at age 23, he received the first doctorate in mathematics granted in the 1,000-year history of Hunan University. Wu began his university career at age 15, having already devoured his older sisters' collection of text books. Wu is proud of his achievement but gives credit to his middle sister, who gave up her chance for a costly university education so that he and his youngest sister could attend. "She made a sacrifice for me," he says in typically gracious style,

adding, "and she's the smartest one of us."

Born in Changsha, Hunan, in 1964, Wu was raised by his grandmother during the Cultural Revolution while his parents worked in the city. The family had little money for education, but those difficulties helped him appreciate school all the more. "I was a successful student not because I worked hard, which I did, but because I enjoyed it," he says. It's a message Wu brings to his math students at York, where he concentrates on building confidence and encouraging them to ask questions. "There are no formulas," he says. "If you understand it, you remember it. Then you can reproduce the results."

Wu knows about results. He has written five books, one of which is a standard reference in his field, and more than 170 scholarly papers, and has a long list of fellowships and research grants. The SARS team, which also includes York Professors

"There are no formulas. If you understand it, you remember it."

Neal Madras, Marcia Rioux, Vincent Tao and Huaiping Zhu, receives funding from MITACS (Mathematics of Information Technology and Complex Systems), a federally funded National Centre of Excellence. Wu's colleagues in York's Department of Mathematics and Statistics, Zhu, Steven Wang and Ziji Yang, received a grant from the Canadian Foundation for Innovation that will help build a parallel computing laboratory needed to run the complex mathematical modelling used in the studies of the SARS and West Nile viruses.

These exciting developments are based on Wu's research into the architecture of the human central nervous system and its ability to recognize patterns in large amounts of information by "parallel processing." "The brain's individual neural pathways are very simple but they are connected in a very complicated way," Wu explains. Mathematics can mimic that process, and powerful computer technology has made it possible to collect and analyze the vast amount of information required to study patterns in global phenomena like SARS. But it's all driven by Wu's work at the theoretical level, much of it puzzled out in the quiet surroundings of a coffee shop. ■

MOVEMENT

How do your eyes tell your hand to pick up a cup of coffee or move a cursor? York's Centre for Vision Research is doing eye-opening studies. BY MICHAEL TODD

Reprinted from October 2003

HOW DO WE PICK UP a cup of coffee? That's what Lauren Sergio wants to know. Or turn a doorknob, point a cursor, play a video game. These simple things rely on our brains analyzing hugely complex vision and motor control signals. To Sergio, a scientist at York's Centre for Vision Research (CVR), "it's all about input and output." Input comes in through your eyes and output goes through your brain putting muscles in motion.

Consider this: *no one* has any idea how that cup of coffee makes it from the table to your mouth. Visual input – seeing that large mocha cappuccino steaming away on your desk – somehow gets translated into the delicate, precise bio-mechanical motion of your elbow, wrist and then fingers, closing around the cup at just the right place in time and space with the perfect amount of force. Misjudge the weight, hold a Styrofoam cup too tightly and you'll crush it. Not enough force and you'll drop it.

How do visual and bio-mechanical systems interact? How do brain, muscles and vision work together to get a task done? These are just some of the puzzles on which the CVR's 132 researchers – in disciplines ranging from biology, physics and computer science to robotics and kinesiology – try to shed some light.

"We know movement and vision are connected, but in between – what happens in the brain – remains a mystery," says Sergio, a psychology professor in York's School of Kinesiology and Health Science. Her work could have important ramifications for areas like robotics (using human data to help program a robotic arm), gerontological studies (eye-hand coordination deteriorates as we grow older) and treatment of trauma patients who have suffered brain or spinal injuries.

It was Sergio's interest in sports, dating to her childhood in Glastonbury, Connecticut, that led her to wonder how people actually played them, and that led from an academic interest in physiology to systems neuroscience. Her areas of focus are reaching movements, eye-hand coordination and the neural basis for motor dysfunction. Now she and other CVR researchers are trying to map the brain's functions in relation to vision and motion.

Looking Good

The Centre for Vision Research is a classic example of York's interdisciplinary approach. Some key facts:

- ♦ The CVR has 132 researchers, including 23 York faculty and 16 outside scientists, who work in 35 labs on and off campus.
- ♦ CVR scientists working jointly on projects can come from many different disciplines, ranging from medicine to psychology and computer science.
- ♦ The CVR does collaborative research with Canadian universities and many international institutions, including the Massachusetts Institute of Technology, Oxford University and Israel's Technion.

They are also looking at the impairment of those functions, through such afflictions as Alzheimer's, Parkinson's or a spinal injury. The resulting lack of coordination of movement in reaching or walking, Sergio notes, is similar to an infant's struggles. The adult may be trying to relearn lost activity. Babies are establishing those neuro-motor connections, learning and relearning them through trial and error until they become automatic functions. Often those are movements that we take for granted – until we lose them.

How we move depends on what we see, so Sergio is examining what happens in the brain when someone reaches for an object – say a computer mouse – to make another object move, such as a cursor. Her research records what errors people make as they learn to coordinate progressively harder tasks in York's sensorimotor neuroscience lab. She maps brain activity specifically through motor behaviour (moving an arm while looking at a visual target on a computer screen) and tracking the associated activity in the brain's visual cortex.

TRY THIS EXPERIMENT: Place your computer mouse *horizontally* on your mouse pad. Now move the mouse, still horizontal, trying to get the cursor to go to a target such as the File button on your upper left screen.

How did you do? Impossible? That's because your brain has just gone insane, says Sergio. Your brain has learned one thing to the point of doing it automatically. It's mapped a vision and movement path. "If you rotate the mouse you have to completely relearn the movement," says Sergio. "This is a very basic level of motor learning: matching the motor commands to our muscles to get a particular outcome. But children, certain brain-damaged patients – including dementia – and non-human primates have more difficulty with these things."

If you're having problems, don't despair. Sergio says most adults can learn to deal with the mouse's new orientation in about 15 minutes. "Voila," she says. "Our humanity exemplified by a rotated computer mouse!" Brief pause. "Well, OK, maybe that's a bit grandiose, but I think it's still a neat demo of our unique sensory-motor adaptability."

As for that mocha cappuccino: "We haven't figured out the mystery behind picking up a cup of coffee. But we're working on it." ■

Visionary Science

PHOTOGRAPHY BY NANCY MERCADO



Canadians don't yet realize how much the US Homeland Security Act is changing their world. BY DANIEL DRACHE

Reprinted from February 2005

Border Blues

PHOTOGRAPHY BY JAMES REID

Daniel Drache, senior research fellow and associate director of the Robarts Centre for Canadian Studies, has been a professor of political science at York since 1971. In this essay, he elaborates on themes he set out in his 2004 book Borders Matter: Homeland Security and the Search for North America (Fernwood Publishing).

THE US BORDER IS AS IMPORTANT TO AMERICANS as the flag, the constitution and the presidency. It is the embodiment of American sovereignty and the line in the sand for citizenship, separating those who have it and those who are aliens. Each year, US border authorities aggressively remove nearly 200,000 migrants – 70,000 for criminal offences and 120,000 for non-criminal reasons. The Congress wants tougher measures with which to remove many more.

For Canadians, the border has never acquired such iconic status. We think of it as open, porous and undefended. Our idea of the border is largely civic. We value it because it protects Canada's programs, identity and cultural diversity. Our business

elites, on the other hand, think of it as a necessary inconvenience, which they would like to dismantle. How misinformed.

Canadians haven't come to terms with the Bush revolution in foreign policy. We haven't absorbed its impact, at the border or inside it, on Canadian sovereignty and public policy. We haven't thought long and hard about whether we need a Canadian revolution in foreign policy and border policies post-9/11. This is a profound mistake.

In an era of globalization, national borders are not easily dismantled, despite the fact that ideas go across them and money pours over them. Our border, like any border, is fixed by law and geography, and changed by circumstance, need and mentality. For day trips and cross-border shopping, it doesn't seem to matter very much. For everything else, it does matter – greatly.

Every border has four aspects: it is a security moat, a regulatory wall, a commercial gate and a citizenship checkpoint. In an age of interdependency, concerns over the movement of people and products across the globe have made borders more important, not less. For example, mad cow disease closed the Canada-US border for beef exports, and US authorities do not allow state authorities to import cheaper Canadian drugs into their country without approval. For transportation, public health and public safety, the regulatory impact of the border is large and significant.

The first truth is that a border is never solely about commerce; it is a complex institution maintained by the state for domestic and foreign policy goals. We are wrong to believe that NAFTA created a seamless and porous frontier. Every ship, every truck, every flight, every passenger vehicle and every mail parcel must be recorded, controlled, possibly inspected and x-rayed. The second key fact is that the US Homeland Security Act has not rendered the border unimportant. Rather, Canadians and Americans have very different ideas of how the border protects each society.

The Homeland Security Act has redefined the US border to include everything and to be everywhere. Many Canadians do not understand the extent to which US law and institutional arrangements have changed post 9/11. Nor are Canadians particularly gifted readers of US presidential intent and the multi-centred, diffuse nature of US politics. We are still operating on old assumptions and a belief in the power of good neighbourliness.

The orbit of the new security act seems to be limitless. Statements such as "for the good of our wider security" put the global community on notice that the power and interests of the US extend everywhere. It is the cornerstone legislation of George W. Bush's presidency. It gives the Executive extraordinary power to take pre-emptive action abroad, and at home it removes the democratic restraints on the Justice Department that prevented it from conducting surveillance without probable cause or court sanction. The role of the police and intelli-

gence has been transformed into a seamless organization for national security, operating in a global, continental, regional or local environment. Homeland security has put the US government at odds with its principal allies and with many Americans.

We haven't thought long and hard about whether we need a revolution in foreign policy post-9/11. This is a profound mistake.

Blinded by its own strength, Washington not only wants to look after its own side of the border but ours as well.

Yet Canadians are more sharply critical of US policies today than at any time in the last 15 years. Canadian public opinion does not support US unilateralism globally or continentally. A poll taken in March 2004, a year after the US invasion of Iraq, found that 65 per cent of Canadians opposed the US model of regime change. Later in the year, only 14 per cent, with very little regional variation, indicated they would vote for Bush if they could. Other recent surveys reveal that security now ranks only eighth place, far down the list after health, education and employment as the principal concerns of Canadians. For Americans, security is the number one concern.

Canadians are not indifferent to terrorism nor to the importance of addressing Canada's and North America's security needs. The Chrétien and Martin governments have been super active on security issues that affect the border, passing a torrent of domestic legislation and making new agreements with the US. The Smart Border Accord facilitates the flow of trucks and people across the border while also subjecting Canadian truckers to US homeland security checks and screening. Ottawa can hold immigrants on a security certificate. The detainees have no right to counsel, no right to habeas corpus and no Charter protection. They could be deported to a country that would use torture. Procedures around immigration, passport issuance, intelligence gathering, public health and emergency preparedness have all been beefed-up, modernized, overhauled.

By the government's own estimate, it has spent a whopping \$9 billion on Canada's contribution to the North American security perimeter, a massive sum in only three years.

DESPITE THESE INITIATIVES, there is a marked anti-Canadian sentiment in the Bush administration and in Congress. It is a

ESSAY

baseless charge that Canada is a safe haven for terrorists, yet the rumour still makes the rounds in Washington. Even though Canada has stepped up to the plate, Canada-US relations remain tense and unclear. Bush is pressuring Ottawa to renew NORAD and to sign on to the highly controversial Pentagon plan for a missile-defence system. Post-homeland security, Canada is struggling to adjust to its new status as a decidedly junior partner.

What, then, are our best options? One is to passively endorse the Bush revolution in foreign policy – by stealth, incrementalism, ad hocery or default. Another is to build distance between ourselves and the Bush revolution. The third option is to strike a balance between homeland security and human security.

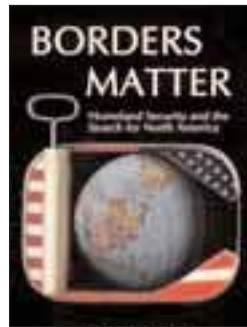
Today there is no single template for North American security in the way NAFTA was for commerce. Canadians remain adamant that our authorities must define our security interests as we understand them. Security policies have to conform to Canadian laws, and support and enhance Canadian sovereignty. They have to be consistent with Canadian values of social diversity, multiculturalism, full accountability and the protection of civil and social rights. The great danger is that governments will

go too far in fighting terrorism and ignore the rule of law and human rights.

Canadians support complementary policies, not common ones. In this security-obsessed age, Canada does not need a common visa, common identity card, common refugee policy and common interdiction policy with the US. A security regime is not an exercise in supranationality. We will take divergent approaches reflecting our own cultures, values and priorities.

As a society, Canada is not particularly well informed about the impact of US homeland security on our institutions and strategic interests. So far there has been no public accounting of its spreading effects at the border and inside it. This is a grave oversight that needs addressing. We badly require a fine-grained audit like the one Roy Romanow conducted for Canada's health care system. We also need a full-scale debate on the political, legal and strategic impact of the US policies.

Thoreau once wrote that "friends at a distance" make for the "longitudes of life". We ought to take his insight to heart. Friends at a distance is a good starting place to rethink the great border, security and Canada-US relations. Disengagement, scepticism, prudential self-interest and support for international law and the UN offer a constructive alternative in uncertain times. ■



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BOOKS

Fit for a King

Inside the libraries of King Henry VIII

Reprinted from February 2005

You can find out a lot about a person from his personal library – tastes, interests, obsessions – even if that person lived nearly 500 years ago. That's what York Distinguished Research Professor James Carley has done with Henry VIII. Carley's new book, *The Books of King Henry VIII and his Wives*, is published by the British Library and distributed by University of Toronto Press in North America. It contains more than 100 illustrations, many in colour. "Henry had several libraries and he acquired books in different ways," says Carley, an English professor in the Faculty of Arts. "Some were gifts or presentations, others came from abbeys that were dissolved, and he 'inherited' libraries from his wives." Interestingly, of Henry's six wives, half were avid readers. Not all the books listed in Henry's library catalogues still exist, but some have survived. Of those, quite a few contain handwritten comments about what the founder of the Church of England was reading at the time. Records of his libraries show he was deeply involved in theological matters and monastic history. And he was interested in all the liberal arts, especially music and poetry. Says Carley, "This book is really a glimpse into how Henry's mind worked." ■

ILLUSTRATION BY RYAN PRICE



It's what keeps academic researchers going. BY DAVID DEWITT

Making a Difference

Regardless of our chosen fields, in some sense we academics believe that the insights gained from our research will affect the world in which we live. For many, the obvious connections have to do with quality of life through science and technology; for others it is a new interpretation of a classic treatise or critical retrospective on a master painter; and still others see it in the way autistic children are able to learn and be productive. Research takes many forms, but eventually it resonates in some part of our lives.

If one chooses, as I have, to concentrate on contemporary issues in regional and global peace and security, then one's laboratory may not merely be the documents of record, the vast secondary interpretive literature, or computerized databases. Indeed, it may even stretch well beyond the ability to interview key decision-makers. In today's world of relatively open access,

Our efforts brought North

research can include becoming a quasi-participant as well as a close and careful observer. When asking questions, it is possible to find oneself involved directly in trying to fashion the answers.

My work has taken me from North America to Europe to the Middle East and on to Asia, and in each the fundamental issue has been the multiple aspects of peace and security. How can we make peace – and, one hopes, prosperity – possible by addressing the factors that undermine security? And if it is too ambitious to resolve a conflict, how can we better manage it?

To this end, external research funding has supported not only specific projects but important international collaborations. These often involve the participation of researchers in direct policy-relevant work, including “track-two” diplomacy. This brings together academic and other civil society experts from the principals in an international dispute to examine issues that may be too sensitive for official diplomatic undertakings. In essence, researchers like myself act as intermediaries or emissaries when governments are not officially able to do so.

David Dewitt is associate vice-president research (social sciences & humanities), director of the Centre for International and Security Studies, and professor of political science at York.

For the Canadian public, this is often, unfortunately, a hidden benefit of funded research in our universities. Examples include our effort with the North Pacific Cooperative Security Dialogue, begun in 1990 and still continuing in other forms today. This brought North Korea to the table for the first time with both regional allies and adversaries. Similar efforts have focused on the Arab-Israeli conflict, starting long before it was seen as either acceptable or even legal to meet with declared members of the Palestinian Liberation Organization. Today, with others, I continue to examine ways to promote peace and security in the Asia Pacific region.



Such efforts can lead to remarkable experiences – from an unanticipated meeting in Pyongyang which included briefing the leading North Korean diplomat on what it means to abide by the nuclear Non-Proliferation Treaty, to an intensive discussion with a leading mufti in Damascus about a Middle East in which both Palestinians and Israelis would have secure, independent states within a more peaceful region.

This illustrates how many international relations scholars across Canada and beyond are often challenged on two fronts – to continue to undertake their own intellectual journeys of scholarship while also using their research in efforts to make this a more peaceful world. Each of us who works at a Canadian university is in a remarkably privileged position. While our research, in whatever field, is meant to further knowledge and discovery without prejudice, we also have a responsibility to ensure that it is disseminated in ways that, whenever possible, make a difference. For some, that difference might come through technology transfer, through the ethical practice of a profession, or through an insightful piece of performance art. For those of us involved in the study of international relations, it may come through using our expertise to encourage policymakers to pursue options that will avoid violence, reduce poverty, enhance human security and foster peace both within and between countries and peoples.

A tall order, yes. But making an impact on human life is what keeps researchers going and, we hope, the funders funding. ■



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A Social Scientist sees communities.
A Child Educator sees building blocks.

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